Dutch thin-capitalization rules and
Dutch companies' financing and investment decisions

Explanation based on Dutch companies' micro data

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Abstract

This study analyze the effects of the introduction of the Dutch thin-capitalization rules on the Dutch companies' financing and investment decisions. Theory predicts and earlier literature suggests that companies' financing and investment decisions are indeed influenced by the restriction of the deductibility of interest payments to related parties. The empirical analysis is based on a large micro-level panel dataset for the period 2003-2006 of a total of 481 Dutch companies. The empirical evidence shows that the ratio of internal debt against equity has been decreased by an increase in the fiscal equity portion. This increase in the fiscal equity portion cannot be explained by the increase in the profit reserves, but can be explained by the extraordinary profits. Therefore, this study proves that the release of the fiscal hidden reserves as part of the extraordinary profits is the driver behind the increase of the fiscal equity as was suggested by earlier studies. Furthermore, empirical evidence shows that the direct investments in participations have not been decreased, but that the intercompany receivables have increased. This is the expected result due to the technical design of the Dutch thin-capitalization rules. In addition, empirical evidence is found that the Dutch thin-capitalization rules not decreased the investments of Dutch companies, but it could be argued that the investments of Dutch companies even increased. This empirical evidence shows again that fiscal rules, such as thin-capitalization rules definitely influence the companies' financing and investment decisions.

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Chapter 1: Introduction

This thesis studies the influence of the introduction of the Dutch thin-capitalization rules on the Dutch companies' financing and investment decisions. To identify and explain the underlying determinants in more detail the following research hypothesis is formulated:

"How did the introduction of the Dutch thin-capitalization rules influence the financing and investment decisions of Dutch companies?"

To understand whether there should be an influence at all and whether this is relevant, we have to go back to June 1958. At that time the American Economic Review published the very famous article *'The Cost of Capital, Corporation Finance and the Theory of Investment'* of Franco Modigliani and Merton H. Miller[1]. They concluded that the financial structure of the company does not influence the market value of the company and, more important in respect of this thesis, that the deduction of interest on debt for corporate income tax purposes also did not influence the financial structure. However, a few years later they published an amendment to that paper[2] mentioning that the deduction of interest on debt does influence the financial structure as the costs of debt will be lower due to that tax advantages.

Based on the above and later published literature, it is for sure that in principle debt is to be preferred above equity. Therefore, a lot of companies are seeking to increase their debt position to an optimal level in order to make use of this so-called tax shield. This will eventually lead to overall lower effective corporate income tax rates for such companies as the company tries to allocate the interest expense to the country with a relatively higher tax rate and the interest income to the country with a relatively lower tax rate or a country with no taxation on interest income at all. This possibility of profit shifting over countries is of course only relevant for multinational companies. Purely national companies can not shift their profit from or to another country. However, they can shift their profits to another entity within the their purely domestic group. For example, if they have a loss making entity they can (re)structure their group in such a way that the loss making entity will receive interest income from a profit making entity provided that no national anti-abuse regulations are in place. The interest income will then be offset against the losses at the level of the loss making entity and on the other hand the interest expenses will be deductible at the level of the profit making entity. Therefore, it is also possible that certain purely national companies in principle prefer debt above equity.

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[1] Modigliani, F. and Miller, M.H., *'The Cost of Capital, Corporation Finance and the Theory of Investment'*, The American Economic Review, Vol. 48, No. 3, June 1958, pp. 261 – 297.
[2] Modigliani, F. and Miller, M.H., *'Corporate Income Taxes and the Cost of Capital: A Correction'*, The American Economic Review, Vol. 53, No. 3, June 1961, pp. 433 – 443.

From a country perspective the profit shifting over countries is to some extend not preferred in the sense that the whole or part of the corporate income tax base could be eroded. In this respect countries incorporate legislation in order to prevent companies from eroding the corporate income tax base in their country. For example, France introduced interest deductibility limitations as per January 1st, 2007 and China introduced interest deductibility restriction rules in 2009.

Recently, on December 5th, 2009 , The State Secretary of Finance of the Netherlands, J.C. de Jager, sent a letter[3] to the Chairman of the house of Representatives of the Dutch Parliament. This letter was the fulfillment of the promise he made that he will send an outline of the current situation in relation to possible corporate income tax measures. He made this promise when the legislative consultation of 9 November 2009[4] was debated in the House of Representatives during the plenary debate held on 18 November 2009. The legislative consultation document was on its hand a reaction on the discussion whether multinationals can influence their effective corporate income tax rate by means of profit shifting over countries. Those multinationals can indeed shift the profits over countries by using loans and receivables as stated by The State Secretary of Finance in another letter of June 14th, 2009[5]. From a Dutch treasury perspective it is not desired that by using loans and receivables the Dutch corporate income tax income (a total of € 18.8 billion in 2008[6]) will partly vaporize. Therefore restrictions on the deductibility of interest expenses, on top of the already existing restrictions, were proposed. However, the most important part of the December 5th letter states that most part of the proposed legislation will not be incorporated as the considerations that must be addressed are extremely complex[7].

Therefore, it is in this respect first of utmost importance that the influence of the already existing restrictions on the deductibility of interest expenses is examined in detail before thinking about implementing new policy. How do these restrictions influence the financing and investment decisions? And more specific for the Dutch government are the effects in such a way the Dutch government wants to, i.e. that not to much debt will be allocated to companies based in the Netherlands? The existing restriction on the deductibility of interest expense that will be taken into account in this thesis are the Dutch thin-capitalization rules. The Dutch thin-capitalization rules were incorporated in 2003 and were already effective as of January 1st, 2004. In general, the rules provide for a restriction on the deductibility of interest when the ratio of equity and debt exceeds a certain threshold. This restriction applies to all Dutch corporate income tax resident companies. Therefore, multinationals with

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[3] This letter can be found on the website of the Ministry of Finance (http://www.minfin.nl/Actueel/ Kamerstukken/2009/12/Stand_van_zaken_mogelijke_maatregelen_in_de_vennootschapsbelasting).
[4] Parliamentary Papers II 2009/10, 32 128, no. 52, p. 33.
[5] Parliamentary Papers II 2008/09, 31 369, no. 6.
[6] The 2008 financial report of the Netherlands can be found on the website of the National Budget (http://www.rijksbegroting.nl/).
[7] It is outside of the scope of this thesis to address the technical details of the proposed legislation.

companies in the Netherlands as well as purely domestic Dutch companies could be hit by this restriction.

This thesis takes earlier literature a step further in trying to analyze the specific effects caused by the introduction of the Dutch thin-capitalization rules. In an earlier study by Nerée tot Babberich[8] it is found that Dutch companies have reduced their internal debt ratios by increasing their equity levels and not by reducing their internal debt levels due to the introduction of the Dutch thin-capitalization rules. The release of the fiscal hidden reserves has been given as a possible explanation for the findings. This possible explanation is investigated in this thesis. In addition to that, another possible explanation is taken into account. This other possible explanation can be found in the higher increase of the profit reserves due to the addition of the yearly higher profit compared to the companies which were not influenced by the introduction of the Dutch thin-capitalization rules. The increase of the profit reserves could also lead to a significant increase in the equity levels of the Dutch companies.

Another aspect of the Dutch thin-capitalization rules is also taken into account in this thesis. This aspect relates to the technical design of the Dutch thin-capitalization rules. The Dutch thin-capitalization rules will effectively not restrict the deductibility of the intercompany interest expense when on the other hand there is an even big intercompany interest income. Due to this design of the Dutch thin-capitalization rules the investment decisions of Dutch companies is influenced in the sense that a swift from participations to intercompany receivables has taken place to influence the balance of intercompany interest expense and intercompany interest income. As a result of this shift the Dutch thin-capitalization rules effectively not limit the deductibility of interest paid on intercompany debt, but increase the interest received on intercompany receivables. Furthermore, it also increases the taxable income in the Netherlands relatively to the situation before the introduction of the Dutch thin-capitalization rules.

In this respect the structure of this thesis is as follows. Chapter 2 reviews the existing literature on companies' financing and investment decisions from both a theoretical and empirical point of view in relation to thin-capitalization rules. Furthermore, the Dutch thin-capitalization rules are explained in detail. Chapter 3 discusses the theoretical model that lead to the propositions regarding the influence of the introduction of the Dutch thin-capitalization rules on the financing and investment decisions. The methodology used for the empirical analysis and the data selection process are discussed in chapter 4. Chapter 5 provides the description of the data. The empirical results and some robustness checks are presented in chapter 6. Finally, the thesis concludes in chapter 7 by providing a summary and a conclusion.

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[8] Nerée tot Babberich, N.P.M. de, *"The Thin-Capitalization Rules and Multinationals' Financing and Investment decisions – Experience from Dutch Legislation"*, Erasmus University Rotterdam, 2009

Chapter 2: Literature review

Section 2.1: Introduction

This chapter reviews the existing literature in relation to companies' financing and investment decisions. The main theories in relation to the capital structure try to explain the liabilities side of the balance sheet of a company. The liabilities side consists of a mix of debt and equity. Within the categories of debt and equity there are a lot of different sources. One can think of common equity, preferred stocks, bonds, convertible bonds, loans and so on. However, the theories are focusing on the proportions of debt against equity. The theory of Modigliani and Miller is firstly analyzed as it can be seen as the starting point of the capital structure theories. Secondly the tradeoff theory is discussed and subsequently the pecking order theory. The last theory about the capital structure which is analyzed is the free cash flow theory.

Furthermore, this chapter also describes the Dutch thin-capitalization rules in detail. This is of importance in order to understand the possible influence on the companies' investment and financing decisions. Thereupon the literature in relation to empirical evidence of the influence of the thin-capitalization rules on the financing and investment decisions is discussed. This chapter concludes in the last section with a summary of what is discussed in this chapter.

Section 2.2: Modigliani and Millers theory

As already introduced in chapter 1 of this thesis, Modigliani and Miller published a famous article in 1958[9]. This article can nowadays be seen as the starting point of the capital structure theories. Therefore, and in order to understand the theories that follow, the theory of Modigliani and Miller is discussed in detail after a general introduction of the traditional capital structure theory.

First of all the value of a company (*V*) equals the total equity (*E*) and debt (*D*) of the company;

$$V = E + D .\tag{1}$$

The traditional capital structure theory assumes that debt is relatively cheap compared to equity, i.e. r_e > r_d, as equity is seen as the riskier source of financing from the perspective of the investor due to the fact that equity is subordinate to debt. This suggestion results in the traditional capital structure theory to a higher value of the company if the ratio of debt against equity is reduced;

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[9] Modigliani, F. and Miller, M.H., *'The Cost of Capital, Corporation Finance and the Theory of Investment'*, The American Economic Review, Vol. 48, No. 3, June 1958, pp. 261 – 297.

$$V = r_d \frac{D}{D+E} + r_e \frac{E}{D+E} = r_e - (r_e - r_d)\frac{D}{D+E}\ . \tag{2}$$

However, it should be noted that in case there is too much debt, both the shareholders and the holders of the debt require a higher return as the risk of investing is high, e.g. increased risk of bankruptcy. This results in a higher required return on equity and debt, i.e. the cost of the capital of the company increases. Therefore, based on the traditional capital structure the value of the company is maximized at the ratio of debt against equity where the marginal benefits of increasing debt equal its marginal costs.

Modigliani and Miller, on the other hand, argued in their article that the way the capital of a company is structured, i.e. the ratio of equity against debt, does not have any impact on the value of the company itself provided that certain assumptions hold. The main assumption made by Modigliani and Miller is that there are perfect markets. Therefore, there are no market imperfections, such as financial market frictions, i.e. transaction costs, taxes and regulations, asset indivisibility, non-traded assets and agency and information problems[10], and no incomplete market, i.e. a market is complete when a market exists with an equilibrium price for every asset in every possible state of the world[11] in Modigliani and Millers theory. The Modigliani and Miller theory consists of four propositions. The first two propositions can be seen as the basic propositions regarding the valuation of the securities of the companies which have different capital structure.

The first proposition is that *'the market value of any firm is independent of its capital structure'*[12]. As can be derived from the traditional capital structure theory the value of a company (*V*) equals the total equity (*E*) and debt (*D*) of the company. Subsequently, according to Modigliani and Miller the value of a company which is fully levered (*V_l*) equals the total equity (*E*) and debt (*D*), but also the value of a company which is not levered at all (*V_u*) equals also the total equity (*E*) and debt (*D*);

$$V = E + D = V_l = V_u\ . \tag{3}$$

Therefore, the value of a company draws down to the cash flow generating ability, which can be realized with the asset side of the balance sheet of a company. The liability side of the balance sheet of a company does thus not influence the value of a company. The value of those cash flow generating

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[10] Degennaro, R.P. and Robotti, C., *'Financial Market Frictions'*, Economic Review of Federal Reserve Bank of Atlanta, Vol. 92, No. 3, Third Quarter 2007.

[11] IMF, 2003, External Debt Statistics: Guide for Compilers and Users – Appendix III, Glossary, IMF, Washington DC.

[12] Page 268 of Modigliani, F. and Miller, M.H., *'The Cost of Capital, Corporation Finance and the Theory of Investment'*, The American Economic Review, Vol. 48, No. 3, June 1958, pp. 261 – 297.

assets can be calculated by discounting the expected cash flows at a expected rate of return on those specific risk class assets (r_a). Using the assumption of perfect markets results in an equilibrium where the expected rate of return on the specific risk class assets equals the total cost of capital. These cost of capital can be recaptured as a mix between the required return by the investors in the equity of the company and the debt of the company and is also called the 'weighted average cost of capital' (WACC). Thereupon, the value of a company can only be influenced ceteris paribus by altering the cash flows and/or the cash flow generating assets or ceteris paribus by adjusting the WACC. Hence, if there will be eventually higher (lower) cash flows the value of the company will be higher (lower) or if the WACC will be higher (lower) as a result the value of the company will be lower (higher). This has been proven by the following example.

Suppose there are two companies, company A and company B, both with the same identical operational cash flows. Company A has a better leverage, i.e. company A has relatively more debt then company B. Based on the traditional capital structure theory this implies a higher value of the cash flows and thus a higher value of company A. If that is the case the shareholder of company A buys all to outstanding debt of the current debt holders and he owns all the expected cash flows for the future of company A. Subsequently, the shareholder sells the shares in company A as well as the receivables on A and use part of the received funds to buy for a relatively lower price the shares in company B as well as the receivables on B. This gives him the ownership of the same identical operational cash flows as of company A. The pure profit of shareholder A is the difference in the value of company A minus the value of company B. However, since there does not exists a free lunch and in a perfect market no profit through arbitrage exists, the value of company A should be equal to the value of company B. In other words, given the operating income, which is the pie that belongs to the holders of the equity and debt, the value of the company should not be higher (or lower) by dividing the pie differently across the holders of the equity and debt[13]. More in general and in other words, every investor can replicate the financial actions of a company without costs and without additional risk. As this is the case, proven by Modigliani and Miller, a company can adjusts its capital structure but it does not influence the value of the company.

Using proposition 1 as the starting point Modigliani and Miller formulate their proposition 2 as follows: *'...the expected yield of a share of stock is equal to the appropriate capitalization rate for a pure equity stream in the class, plus a premium related to financial risk equal to the debt-to-equity ratio times the spread between the capitalization rate and the rate of return'*[14]. In other words, the cost

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[13] An analogous example based on the example of Myers *'...the value of a pizza does not depend on how it is sliced.'* in Myers, S.C., *'Capital Structure'*, The Journal of Economic Perspectives, Vol. 15, No. 2, Spring 2001, pp. 81-102.

[14] Page 271 of Modigliani, F. and Miller, M.H., *'The Cost of Capital, Corporation Finance and the Theory of Investment'*, The American Economic Review, Vol. 48, No. 3, June 1958, pp. 261 – 297.

of equity, i.e. the required rate of return for the shareholders, increases linear with the ratio of equity against debt. Furthermore, the companies' WACC is a constant, which equals the expected rate of return on the specific risk class assets (r_a), in contrast with the traditional capital structure theory. Hence, using formula (2) to explain this proposition leads to formula (4);

$$r_e = r_a + (r_a - r_d)\frac{D}{E}. \tag{4}$$

Using formula (4) and assuming that the WACC is constant tells us that when the ratio of debt against equity increases, the rate of return on equity (r_e) increases, as well as the rate of return on debt (r_d) increases. The increase of the rate of return on equity and the increase of the rate of return on debt can be explained on the basis of increasing risks for the distributors of the equity and debt. The increased risk on equity can be explained with two arguments. The first argument relates to the operational results of the company. Due to the larger portion of debt, the fixed financial costs of the company increase, resulting in higher fluctuations in the net result. Hence, this leads to a higher risk for the shareholders. The second argument can be found in the possibility of a situation of default. Due to a higher leverage also the possibility of a situation of default increases. Hence, this leads to a higher risk for shareholders. The chances that the shareholders get their funds back in case of a situation of default decreases as in that situation the funds first are distributed to the debt holders.

From proposition 1 it follows that the liabilities side of the balance sheet does not influence the asset side of the balance sheet. The main point from proposition 2 is that the return on the asset side of the balance sheet of a company is constant and as a result also irrelevant of how the liabilities side of the balance sheet of a company looks like.

Proposition 3 deals with the dividend policy a company can pursue. It states that the value of a company is independent of the dividend policy of that company. Following the argument underlying proposition 1 companies that are completely identical except for the dividend policy should have the same market value. Proposition 4 of Modigliani and Miller consist of the statement that from the shareholders point of few the financial decisions of a company also are not relevant. The value of the company will anyhow stay the same and as a result the return that belongs to the shareholders also. Both proposition 3 and proposition 4 follow directly from proposition 1 and 2. Pursuant to the topic of this thesis, namely the capital structure of companies, these propositions 3 and 4 will not be discussed any further.

In conclusion it can be said that the propositions of Modigliani and Miller effectively say that financial decisions, i.e. the way a company is financed, does not influence the value of a company in a perfect

market. However, today's world can not been seen as a perfect market, which could make the theory worthless. Nevertheless, as Miller described it '*...showing what doesn't matter can also show, by implication, what does.*'[15] the theory is still valuable.

The specific role of taxes was already covered in these propositions in the sense that it was assumed that they had no influence. However, a few years later Modigliani and Miller published an amendment in relation to this point[16]. The amendment addresses the role of taxes in relation to the capital structure more specific and showed that taxes do matter. It is by now accepted and empirical shown that taxes do create differences between the value of a company which is fully levered (V_l) and the value of a company which is not levered at all (V_u).

Lets first introduce corporate income taxes into the theory by using the classical tax system. The classical tax system is used in most western countries and the most important part of this system for this theory is that in principle the interest payments on debt are deductible from the corporate income tax base, i.e. effectively deducted at the corporate income tax rate (t_c) and dividends paid out on the equity are not tax deductible[17]. Due to this difference in deductibility debt is in principle to be preferred above equity. Hence, the relative costs of debt financing are lower due to the tax deductibility. Increasing the ratio of debt against equity lowers the tax to be paid by the company. This advantage of the company is commonly know as the tax shield. Using formula (3) and introducing this tax shield leads to the following formula (5) of the value of a company;

$$V = E + D = V_l = V_u + t_c * D. \tag{5}$$

Subtracting the tax shield (*TS*) leads to formula (6);

$$TS = V_l - V_u = t_c * D. \tag{6}$$

Based on the formulas (5) and (6) the value of a company which is fully levered (V_l) equals the value of a company which is not levered at all (V_u) plus the tax shield (t_c*D). This is a linear relationship which depends on the height of the corporate income tax rate. In principle this means that the value of a company is at its maximum when the company is fully financed with debt. However, Modigliani and

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[15] On page 100 of Miller, M.H., *'The Modigliani-Miller Propositions After Thirty Years'*, The Journal of Economic Perspectives, Vol. 2, No. 4, Autumn 1988, pp. 99-120.

[16] Modigliani, F. and Miller, M.H., *'Corporate Income Taxes ad the Cost of Capital: A Correction'*, The American Economic Review, Vol. 53, No. 3, June 1961, pp. 433 – 443.

[17] In principle as a lot of countries also have certain anti abuse regulations in place, which restrict the deductibility of the interest payments on debt.

Miller noted that this is not the case as there are additional considerations which should be taken into account.

One of the additional considerations has been taken into account by Miller himself in an article in 1977[18]. This consideration has to be made at the level of the investor as it involves the role of personal income taxes. The advantage of using debt at the company level is partially offset in case the tax at the level of the investor on interest income, i.e. tax on debt income (t_d), is higher than the tax on the dividends and/or capital gains, i.e. tax on equity income (t_e). The usage of debt at the company level can even turn into a disadvantage in the situation where there is a higher tax at the level of the investor on interest income than the cumulative corporate income tax rate and the tax on the dividends and/or capital gains. Including taxes at the level of the investor in formula (6) leads to the following formula (7);

$$TS = V_l - V_u = \left(1 - \frac{(1-t_c)(1-t_e)}{(1-t_d)}\right)D .$$
(7)

Based on this formula, if $(1-t_c)(1-t_e)$ is not equal to $(1-t_d)$ the shareholders of a company can increase the value of their invested funds by changing the ratio of equity against debt. However, in today's world there are a lot of different types of investors and each type of investor has its own effective and marginal tax rate. The intention of the investor is to maximize the value of its invested funds, i.e. the value of its return net of taxes. Therefore, given the ratio of equity against debt of a company the investors investing in that company are in general the investors that are in the equilibrium when $(1-t_c)(1-t_e)$ equals $(1-t_d)$. As a result there is a market equilibrium and if there is temporarily no market equilibrium it will soon be restored as the shareholders of a company can increase the value of their invested funds by arbitrage. Because of this the ratio of debt against equity does influence the wealth of the investors in the debt and/or equity of the company, but not the value of the company itself. However, in an international context, as described in chapter 1, the investors can and most of the time are located in a country with relatively low taxes compared to the company in which is invested.

Section 2.3: The tradeoff theory

From Modigliani and Millers theory follows that the value of a company is at its maximum when the ratio of debt against equity is as high as possible. Assuming in this respect that in an international context the taxes at the level of the investor are not material, companies should still be fully financed with debt. However, by empirical research is proven that a lot of companies still are moderately

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[18] Miller, M.H., *'Debt and Taxes'*, The Journal of Finance, Vol. 32, No. 2, May 1977, pp. 261 – 275.

financed with debt. For example, Graham[19] finds evidence that about half of the firms in its sample had an effective tax rate that equals the statutory tax rate. Therefore, there are supposed to be some sort of 'costs' related to using debt. This is where the tradeoff theory steps in. The tradeoff theory suggests that ceteris paribus a tradeoff takes place between the benefits of debt and on the other side the costs of debt, which results in the observed ratio of debt against equity[20]. These costs can be divided into two categories, namely the costs of financial distress and the costs that relate to agency problems.

First of all the costs of financial distress. A situation of financial distress occurs when the ratio of debt against equity is relatively to high or has increased compared to the operational results of a company. Adversely the operational results of a company could be to low or have become lower given a certain ratio of debt against equity. Subsequently, in that situation the company can not handle its financial obligations, i.e. interest payments. This leads to the costs of financial distress, which can be divided into direct and indirect costs[21]. Direct financial distress costs are related to bankruptcy or the prevention of bankruptcy, for example the costs relating to a financial restructuring[22]. Indirect financial distress costs capture all other costs not directly related to the financial situation, for example lower sales, higher costs of capital and bad publicity[23]. In summary, financial distress costs lead to a lower tax shield as the advantage of debt decreases[24];

$$TS = V_l - V_u = t_c * D - PV(C_{fd}).$$ (8)

As a result the tax shield of debt equals the advantage of debt (t_c*D) minus the present value of the costs relating to the situation of a financial distress ($PV(C_{fd})$). In equilibrium, the ratio of debt against equity equals the marginal benefits of debt in terms of the tax shield to the marginal costs in terms of financial distress. Depending on, amongst others, the company's current ratio of debt against equity a company needs to increase or decrease its debt position in order to increase its value. Empirical

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[19] Graham, J.R., *'How Big Are the Tax Benefits of Debt?'*, The Journal of Finance, Vol. 55, No. 5., October 2000, pp. 1901-1941.

[20] Robichek, A.A. and Myers, S.C., *'Optimal financing decisions'*, Prentice-Hall foundations of finance series (Englewood Cliffs, N.J.), 1965, 166 p. and Hirshleifer, J., *'Investment Decision under Uncertainty: Applications of the State-Preference Approach'*, The Quarterly Journal of Economics, Vol. 80, No. 2, May 1966, pp. 252-277.

[21] Kim, E.H., *'A Mean-Variance Theory of Optimal Capital Structure and Corporate Debt Capacity'*, The Journal of Finance, Vol. 33, No. 1, March 1978, pp. 45-63.

[22] Warner, J.B., *'Bankruptcy Costs: Some Evidence'*, The Journal of Finance, Vol. 32, No. 2, Papers and Proceedings of the Thirty-Fifth Annual Meeting of the American Finance Association, Atlantic City, New Jersey, September 16-18, 1976, May 1977, pp. 337-347.

[23] Altman, E.I., *'A Further Empirical Investigation of the Bankruptcy Cost Question'*, Journal of Finance, American Finance Association, Vol. 39, No. 4, September 1984, pp. 1067-1089.

[24] Kraus, A. and Litzenberger, R.H., *'A State-Preference Model of Optimal Financial Leverage'*, Journal of Finance, American Finance Association, Vol. 28, No. 4, September 1973, pp. 911-922.

evidence[25] suggests that indeed the costs of financial distress explain part of the ratio of debt against equity. However, the explained part is relatively small. Therefore, other sorts of costs should explain the ratio in more detail.

Agency costs relate to the problem of incomplete, asymmetric information, which were introduced by Jensen and Meckling[26]. In general, a situation of incomplete, asymmetric information occurs if parties do not dispose of the same information, the availability of the relevant information is limited, and if the information can only be obtained against high costs. The agency theory deals with the relations between parties that do not have the same interests. This relationship is always concluded in some sort of contract, implying that the interests of both parties are not aligned. Before Jensen and Meckling published their article it was the common understanding that management and shareholders of the company have the same interests, namely maximizing the total value of the company. However, the agency theory states that management, i.e. the agent, and the shareholders, i.e. the principal, do not have the same interest. In order to prevent self interest seeking behavior of the management and trying to align the interests of both parties agency costs are made. Jensen and Meckling define agency costs as the sum of: '*(1) the monitoring expenditures by the principal, (2) the bonding expenditures by the agent, (3) the residual loss*'[27]. Agency costs can be divided into agency costs of outside equity and agency costs of debt. Agency costs of outside equity are the costs as a result of the relation between shareholder and management. Agency costs of debt are the costs as a result of the relation between shareholders and parties distributing the debt to the company.

The costs of outside equity emerge when the interest of the management and the interest of the shareholders diverge. Assuming that the management does not own any shares, the costs of any non financial benefit taken out by the management, when they are maximizing their own value, will be fully born by the shareholders. Furthermore, if management owns half of the shares, just half of the costs of the non financial benefit will be born by the shareholders. This will lead to an incentive for managers to increasing their non financial benefit instead of increasing the value of the company. This is called the self interest seeking behavior of management and can be limited by implementing monitoring activities by the shareholders. The costs of the monitoring activities are part of the costs of outside equity. In order to align the interest of management with the shareholders the remuneration of the management is aligned with the remuneration of the shareholders by providing management with

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[25] Warner, J.B., *'Bankruptcy Costs: Some Evidence'*, The Journal of Finance, Vol. 32, No. 2, Papers and Proceedings of the Thirty-Fifth Annual Meeting of the American Finance Association, Atlantic City, New Jersey, September 16-18, 1976, May 1977, pp. 337-347 and Altman, E.I., *'A Further Empirical Investigation of the Bankruptcy Cost Question'*, Journal of Finance, American Finance Association, Vol. 39, No. 4, September 1984, pp. 1067-1089.

[26] Jensen, M.C. and Meckling, W.H., *'Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure'*, Journal of Financial Economics, Vol. 3, No. 4, October 1976, pp. 305-360.

[27] On page 308 of Jensen, M.C. and Meckling, W.H., *'Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure'*, Journal of Financial Economics, Vol. 3, No. 4, October 1976, pp. 305-360.

shares and/or share options. This involves additional costs, which are part of the costs of outside equity.

The agency costs of debt are born by parties that distribute the debt to the company, i.e. holders of debt, and relates to the conflicting interest of the shareholders with the interests of the holders of the debt. This conflict becomes clear in the following situations. In the first situation shareholders transfer wealth from the company to themselves. The incentive for the shareholders to maximize that transfer of wealth, is due to the fact that they have a residual claim on the assets of the company in contrast with the holders of debt, who have a non-residual claim on the assets of the company. This transfer can be achieved by increasing the dividend distributions to the shareholders. The holders of debt want to minimize that transfer as it can result in bankruptcy in which they do not (partly) receive their money. Attempts or even incentives to maximize this transfer create the agency costs of debt. Another situation in which agency costs of debt occurs is the situation of asset substitution. Asset substitution emerges when the owners of the company invest in riskier projects than was agreed under the terms of the distribution of the debt. The stakeholders are encouraged to invest in the riskier projects due to their residual claim. If the value of the company increases due to that investment, the additional increased value comes to the stakeholders. Furthermore, investing in riskier projects results also in higher risk for the holders of the debt as the downside of the investment will be born by the holders of the debt. The reputation of the shareholders and the management decreases the situation of asset substitution as they do not want to fail, as it could result in a bad reputation for the future[28]. However, the possibility of asset substitution does increase the agency costs of debt. The last situation relates to the opposite situation of asset substitution and is called the problem of underinvestment. A situation of underinvestment is present when the shareholders do not want to invest in valuable investment opportunities as their incentive is absent. The absence of their incentive is present when it is likely that the potential gains from the investments will flow to the holders of debt while the shareholders have done the investment. This is for example the case in a situation of financial distress. In order to prevent this from happening also additional costs have to be made, for example the costs of restructuring or selling activities. However, in a perfect capital market these costs are incorporated in the premium asked for by the holders of the debt, e.g. additional risk premium on top of the interest.

In conclusion it can be noted that the tradeoff theory provides a sound framework for understanding the observed ratio of debt against equity and the tradeoff which takes place when a company issues debt. Empirical evidence[29] also proves that the tradeoff theory holds in practice.

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[28] Diamond, D.W., *'Reputation Acquisition in Debt Markets'*, Journal of Political Economy, University of Chicago Press, Vol. 97, No. 4, August 1989, pp. 828-862.

[29] Such as for example Auerbach, A.J., *'Real Determinants of Corporate Leverage'*, NBER Working Papers, No. 1161, National Bureau of Economic Research, Inc., 1985, MacKie-Mason, J.K., *'Do Taxes Affect Corporate Financing Decisions?'*, Journal of Finance, American Finance Association, Vol. 45, No. 5, December 1990, pp.

Section 2.4: The pecking order theory

The pecking order theory has in 1961 already been described by Donaldson[30]. However, Myers and Majluf[31] provided the theoretical explanation why the pecking order theory exists. They made the assumption that a company pursues the interests of its current shareholders. This theory is based on an adverse-selection model, which is based on the distribution of information between management, the holders of the debt and shareholders. For management it is optimal to issue shares if currently the company is overvalued based on their own information. Therefore, the potential investors in new shares will interpret the issuance of shares as a signal that the shares are currently valued to high. Subsequently, this leads to a decrease in the price of the shares. This is, however, not in line with the interests of the current shareholders of the company. Based on the fact that the issues relating to the valuation of debt are less difficult than the valuation of the shares, a decrease in the value of the shares, after taking out additional debt on the market, is less pronounced.

As a result of the information problem the pecking order theory of capital structure uses the following steps in order to come to the observed ratio of debt against equity; (1) companies prefer internal financing above external financing, (2) dividends are not changed to meet the cash requirements, i.e. cash requirements show up as changes in the external financing, (3) in case external financing is required, companies issue the safest form of financing first followed in the end by equity as last resort, i.e. sorts of debt from safest to riskier before the sorts of equity from safest to riskier and (4) in the end reflects the company's ratio of debt against equity the overall requirement for external finance[32].

In conclusion can be noted that the pecking order theory provides a sound framework for understanding the observed ratio of debt against equity and the order in which companies extract financing from the capital market. Empirical evidences[33] also proves that the pecking order theory holds in practice.

1471-1493 and Fama, E.F. and French, K.R., *'Testing Trade-Off and Pecking Order Predictions about Dividends and Debt'*, The Review of Financial Studies, Vol. 15, No. 1, Spring 2002, pp. 1-33.

[30] Donaldson, G., *'Corporate Debt Capacity: A Study of Corporate Debt Policy and the Determination of Corporate Debt Capacity'*, Harvard University, Graduate School of Business Administration, Boston, 1961, pp. 294.

[31] Majluf, N.S. and Myers, S.C., *'Corporate Financing and Investment Decisions When Firms Have Information That Investors Do Not Have'*, Journal of Financial Economics, Vol. 13, No. 2, July 1984, pp. 187-221.

[32] Myers, S.C., *'Capital Structure'*, The Journal of Economic Perspectives, Vol. 15, No. 2, Spring 2001, pp. 81-102.

[33] Such as for example Dierkens, N., *'Information Asymmetry and Equity Issues'*, The Journal of Financial and Quantitative Analysis, Vol. 26, No. 2, June 1991, pp.181-199, Shyam-Sunder, L. and Myers, S.C., *'Testing static tradeoff against pecking order models of capital structure'*, Journal of Financial Economics, Vol. 51, No. 2, February 1999, pp. 219-244 and D'Mello, R. and Ferris, S.P., *'The Information Effects of Analyst Activity at the Announcement of New Equity Issues'*, Financial Management, Vol. 29, No. 1, Spring 2000, pp. 78-95.

Section 2.5: The free cash flow theory

The free cash flow theory is the last theory that is discussed. The theory also tries to explain the ratio of debt against equity of a company. Free cash flow can, according to Jensen, be defined as *'cash flow in excess of that required to fund all projects that have positive net present values when discounted at the relevant cost of capital.'*[34]. If a company has indeed substantial free cash flow the problem rises how to motivate management of the company to distribute the funds to its shareholders instead of that the management is investing the funds in projects with a relatively to low return on investment compared to the cost of capital or even not investing at all and dissipate the funds. The free cash flow theory states that leveraging up the company with more debt reduces the free cash flow. Hence, management can not invest the excess funds or dissipate it at all as interest have to be paid. This reduces also the agency costs of outside equity. Furthermore, it can increase the return for the shareholders as the interest paid on the debt substitutes the dividend distributions on the shares. Therefore, besides the tax advantage of debt there is also another advantage, namely the disciplining device for management. Farre-Mensa[35] published preliminary results that are consistent with the free cash flow theory.

Section 2.6: The Dutch thin-capitalization rules

The Dutch thin-capitalization rules have been incorporated in the Netherlands in article 10d[36] of the Corporate Income Tax Act as of January 1, 2004 and no transitional provisions have been incorporated in the law, i.e. already existing situations were not in some sort of way protect. This was a response to the Bosal-case[37] of the European Court of Justice. The Court ruled that previous interest deductibility restriction rules were incompatible with European Law. As the decision would have had considerable financial consequences for the Dutch Treasury the Dutch thin-capitalization rules were introduced. In general, the Dutch thin-capitalization rules restricts the deductibility of the interest payments in the case that the ratio of debt against equity is, according to the Dutch government, too excessive. Therefore, these rules certainly influence the ratio of debt against equity as it eliminates part of the advantage of debt financing, i.e. the interest deductibility, and it is in this respect of utmost importance to understand the technical details of the rules.

A company, which is subject to the Dutch corporate income tax[38], is subject to the Dutch thin-capitalization rules if it is part of a 'group' according to the Dutch legal provisions regarding annual

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[34] On page 323 of Jensen, M.C., *'Agency Cost Of Free Cash Flow, Corporate Finance, and Takeovers'*, American Economic Review, Vol. 76, No. 2, May 1986, pp. 323-329.

[35] Farre-Mensa, J., *'Capital Structure and the Free Cash Flow Problem'*, New York University, Economics, March 24, 2008, pp. 28 (http://www.nyu.edu/econ/user/galed/fewpapers/FEW%20S08/Farre-Mensa.pdf).

[36] Appendix A provides an unofficial English translation of the article.

[37] European Court of Justice, September 18, 2003, case C-168/01 (Bosal-case), European Court reports 2003 Page I-09409 (http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:62001J0168:EN:NOT).

[38] This is the case if the company is a Dutch tax resident, i.e. decisive management decisions are effectively made in the Netherlands.

accounting. A group is defined in these provisions as *'an economic unity in which legal persons and companies are organizationally connected'*. In practice this means whether one company is effectively in control of the other. Therefore, the Dutch thin-capitalization rules are not applicable to the company that is not part of such a group. Furthermore, the Dutch thin-capitalization rules are also not applicable to the company that is part of a tax consolidated group for Dutch corporate income tax purposes.

The Dutch thin-capitalization rules effectively are applicable on interest payments on debt that are distributed by so-called related entities[39]. According to the literally wording of the article the rules are also applicable on interest payments to non-related entities. Interest paid to related entities is balanced with the interest received from related entities. Only the interest paid in excess of the interest received could, however, be restricted on the bases of the Dutch thin-capitalization rules.

The deductibility of the interest paid is restricted in case the ratio of debt against equity is too excessive. According to the Dutch thin-capitalization rules, a company is considered to have an excessive ratio of debt against equity if the average debt position of that company exceeds three times the average equity position and this amount exceeds € 500.000. The debt position means the balance of all the loans and all the receivables. Loans only include loans of which the interest would be taken into account when determining the taxable profit and as of January 1, 2007 also debts from agreements, entered into force after January 1, 2007, which are comparable to a loan agreement, such as hire-purchase agreements and financial lease agreements. Loans do not include other liabilities, such as short-term supplier credit or provisions. The equity position on the other hand means fiscal equity, excluding fiscal reserves. The determination of the average debt position and the average equity position takes places on the basis of the average of the debt position and equity positions at the beginning and at the end of the book year. It is in this respect assumed that the average equity position is at least € 1.

Based on the above it is determined whether the ratio of debt against equity of a company is too excessive. However, even if this is the case there is still a possibility for that company to prove that its ratio of debt against equity is not too excessive. This is the so-called 'group test'. The ratio of the company is not too excessive if it corresponds to the ratio group that is belongs to. The ratio of debt against equity of the group should, in contrast to the ratio of the company, be determined on the basis of the commercial annual accounts of the group. For commercial purposes does debt not only include loans, but also all the items that are considered to be liabilities according to accounting standards, e.g. also short-term supplier credit and provisions and the debt position does not mean the balance of all

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[39] A related entity is present in the following three situations; (1) an entity in which the taxpayer holds an interest of at least one third, (2) an entity that holds at least one third interest in the company and (3) an entity in which an other company holds an interest of at least one third whilst this other company holds at least on third interest in the company.

loans and receivables. Furthermore, equity for commercial purposes does also include, amongst others, the tax deductible provisions and no threshold of € 500.000 exists. According to this group test the debt of a company is too excessive when its ratio of equity against debt is higher than the ratio of the group. This implies that a company should pursue a lower ratio of debt against equity compared to the group in order to prevent being restricted in the deduction of its interest expenses.

Section 2.7: Empirical research on the influence of thin-capitalization rules
This section reviews the empirical literature related to the influence of the thin-capitalization rules on the financing and investment decisions. There is already some theoretical evidence[40] proving the influence of general thin-capitalization rules on the financing and investment decisions by using a theoretical model. However, there are a few studies providing empirical evidence of the influence of the thin-capitalization rules. Only one of those is focusing specifically on the Dutch thin-capitalization rules. These studies are now discussed.

The first study that provides evidence on the influence of thin-capitalization rules is the study published by Buettner, Overesch, Schreiber and Wamser[41], which was then still a working paper and later published as a discussion paper[42]. The latest version is discussed as it includes more data then the earlier version. The study uses a large company-level panel dataset of multinationals in 36 countries in the time period between 1996 and 2004 in order to analyze, amongst others[43], the influence of the thin-capitalization rules on the capital structure of the companies. The empirical evidence proves that the introduction of thin-capitalization rules results in a significant lower ratio of debt against equity. Hence, this supports the view part of the advantage of using debt disappears when the deductibility of the interest is restricted by thin-capitalization rules. The dataset is taken from the micro-level dataset (hereafter: MiDi) of the Duetsche Bundesbank[44]. The figures used are based on the commercial annual

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[40] Such as for example Fuest, C. and Hemmelgarn T., *'Corporate Tax Policy, Foreign Firm Ownership and Thin-capitalization'*, CESifo Working Paper Series, No. 1096, December 2003 (http://www.cesifo-group.de/DocCIDL/cesifo1_wp1096.pdf), Haufler, A. and Runkel, M., *'Firms' Financial Choices and Thin-capitalization Rules under Corporate Tax Competition'*, CESifo Working Paper Series, No. 2429, October 2008 (http://www.cesifo.de/DocCIDL/cesifo1_wp2429.pdf) and the most recent Maßbaum, A. and Sureth, C., *'Thin-capitalization Rules and Entrepreneurial Capital Structure Decisions'*, BuR – Business Research, Official Open Acces Journal of Verband der Hochshullehrer für Betriebswirtschaft e.V., Vol. 2, No. 2, December 2009, pp. 147-169 (http://www.business-research.org/2009/2/02accounting/2163/stoll1260783187.89.pdf).
[41] Buettner, T., Overesch, M., Schreiber, U. and Wamser, G., *'The Impact of Thin-Capitalization Rules on Multinationals' Financing and Investment Decisions'*, CESifo Working Paper Series, No. 1817, October 2006 (http://www.cesifo-group.de/DocCIDL/cesifo1_wp1817.pdf).
[42] Buettner, T., Overesch, M., Schreiber, U. and Wamser, G., *'The impact of thin-capitalization rules on multinationals' financing and investment decisions'*, Deutsche Bundesbank Discussion Paper Series 1: Economic Studies, No. 3, 2008 (http://econstor.eu/bitstream/10419/19715/1/200803dkp.pdf).
[43] They also investigate for example the allocation of debt over those countries and find that more debt is allocated to countries with relatively higher tax rates and where the costs of external financing are relatively high.
[44] Page 36 of Buettner, T., Overesch, M., Schreiber, U. and Wamser, G., *'The impact of thin-capitalization rules on multinationals' financing and investment decisions'*, Deutsche Bundesbank Discussion Paper Series 1: Economic Studies, No. 3, 2008 (http://econstor.eu/bitstream/10419/19715/1/200803dkp.pdf).

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accounts of the companies. However, as not all the thin-capitalization rules are based on the commercial annual accounts the overall evidence found could be biased. For example, the Netherlands uses the fiscal accounts as described in section 2.6. Because the Dutch thin-capitalization rules use the fiscal accounts and for the fact that a small part of their sample, only 4.85%, relates to Dutch companies it can not be argued that the results found predict the effects of the introduction of the Dutch thin-capitalization rules.

After the first study a second study was published, which partly resumed the discussion whether or not the thin-capitalization rules are effective by, Overesch and Wamser[45]. They used the same sort of dataset, i.e. taken from Midi. This brings the same possible bias in their evidence as the first study. By using a difference-in-differences approach they found significant evidence that the reforms in 2001 and 2004 were effective, i.e. the German thin-capitalization rules are effectively imposed. The ratio of debt against equity has significantly decreased and the decrease was driven by the significantly lower position of debt owed to related entities. Furthermore, the results of their study indicated that some of the restricted companies even had adjusted their capital structure, i.e. lowering the ratio of debt against equity. Again, the results do not compare to the introduction of the Dutch thin-capitalization rules. First, this is due to the different technical design of the Dutch thin-capitalization rules compared to the German thin-capitalization rules. Second, as also mentioned in relation to the first study, the Dutch thin-capitalization rules use the fiscal accounts.

Another study is performed by Weichenrieder and Windischbauer[46]. They used the same sort of dataset as used by Overesch and Wamser in the previous study only for another time period, namely for the time period of 1997-2003. The results of this study are also less pronounced then the previous studies. They express their results as *'not or only weakly significant'*[47]. Although the introduction of the German thin-capitalization rules in 1994 and the reforms in 2004 were followed by a visible reduction of the ratio of debt against equity, the weakly significant evidence found suggests that the German thin-capitalization rules were indeed effective, but the effect itself was very limited. The results also suggest that the weakly significant reduction of the ratio of debt against equity was driven by using relatively more equity and more external financing instead of debt from related entities. Again, the results of this study can not be translated to the introduction of the Dutch thin-capitalization rules.

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[45] Overesch, M. and Wamser, G., *'German Inbound Investment, Corporate Tax Planning, and Thin-Capitalization Rules – A Diffrence-in-Differences Approach'*, CESifo Working Paper Series, No. 37, December 2006 (www.cesifo-group.de/DocDL/IfoWorkingPaper-37.pdf).

[46] Weichenrieder, A.J. and Windischbauer, H., *'Thin-Capitalization Rules and Company Responses – Experience from German Legislation'*, CESifo Working Paper Series, No. 2456, November 2008 (http://www.cesifo-group.de/DocCIDL/cesifo1_wp2456.pdf).

[47] On page 29 of Weichenrieder, A.J. and Windischbauer, H., *'Thin-Capitalization Rules and Company Responses – Experience from German Legislation'*, CESifo Working Paper Series, No. 2456, November 2008 (http://www.cesifo-group.de/DocCIDL/cesifo1_wp2456.pdf).

Nerée tot Babberich has published the most recent study in relation to thin-capitalization rules and capital structure. He was the first to focus on the effect of the Dutch thin-capitalization rules[48]. He used a large company-level dataset of Dutch multinationals, including the fiscal annual accounts, for the time period 2003-2006. The empirical evidence states that a significant decrease of the ratio of debt against equity has taken place as a result of the introduction of the Dutch thin-capitalization rules. Furthermore, no evidence is found on a possible adverse effect on the investments of Dutch multinationals. The reduction in the ratio of debt against equity was driven by a relatively increase of the equity position, but not by a decrease of the debt position. Therefore, Nerée tot Babberich concludes that the Dutch thin-capitalization rules did influenced the ratio of debt against equity but that the goal of the Dutch government, i.e. reducing the amount of interest deducted against the Dutch corporate income tax base, was not reached. In this respect it is interesting to investigate how the companies increased their equity position in order to analyze whether the introduction of the Dutch thin-capitalization rules were maybe some how nevertheless effective.

Section 2.8: Conclusion

This chapter has presented the main theories in relation to the capital structure of a company. The starting point was Modigliani and Millers theory, stating that due to the tax advantage the ratio of debt against equity should be as high as possible taken additional considerations into account, such as the taxes at the level of the investors. The tradeoff theory states that the costs of debt, such as costs of financial distress and agency costs, should be balanced against the advantages of debt and that balance should result in an optimal ratio of debt against equity. Subsequently, the pecking order theory suggest that the companies pursue a specific order from internal financing to external financing in order of less riskiest financing to the riskiest, i.e. debt, to get to the optimal ratio of debt against equity. The free cash flow theory determines the ratio of debt against equity on the basis of minimizing the free cash flow by paying interest instead of dividends in order to discipline management.

Furthermore, the Dutch thin-capitalization rules have been discussed in detail and can be summarized as a restriction of the deductibility of the interest payments in the case that the ratio of debt against equity is too excessive. Thereupon have the studies providing empirical evidence of the influence of the thin-capitalization rules on the financing and investment decisions been discussed. Empirical evidence has been provided that indeed prove that due to thin-capitalization rules the ratio of debt against equity has decreased. Only one study has been found that preliminary had the focus on the Dutch thin-capitalization rules. It was proven that also the ratio was decreased by increasing the equity position. However, it is interesting in this respect to investigate how the companies have increased their equity position in order to analyze the real effects.

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[48] Nerée tot Babberich, N.P.M. de, *"The Thin-Capitalization Rules and Multinationals' Financing and Investment decisions – Experience from Dutch Legislation"*, Erasmus University Rotterdam, 2009.

Chapter 3: Theoretical model and propositions

Section 3.1: Introduction

Based on a theoretical model[49] that is used in the literature, this chapter formulates the propositions regarding the influence of the introduction of the thin-capitalization rules on companies' financing and investment decisions. The model incorporates all relevant factors that determine the capital structure of companies, with a focus on internal financing. This focus is due to the technical design of the Dutch thin-capitalization rules as the rules effectively only may restrict the interest payments paid on internal financing. First, the theoretical model is discussed and second, the propositions are formulated.

Section 3.2: The theoretical model

Assume that there are two companies that form a corporate group and that one of these companies, i.e. the parent, holds all the shares in the other company, i.e. the subsidiary. The parent is located in country 1 and the subsidiary is located in country 2. Including more companies to the group does not change the propositions derived from the model as, in principle, the implications for each company in the group should be the same. In an international context, the effects of the model should even become more clear as the profit shifting is more effective, i.e. interest payments received can be allocated to a country were they are not taxed at all. However, including the international angle into the model makes it unnecessary more complicated. Furthermore, it is assumed that, given the theories in the previous chapter, the group strives for an optimal ratio of debt against equity in order to maximize the total value. The corporate income taxes of both countries used in the model are the statutory tax rates. Each company does in the real world effectively not face the statutory tax rates, but effective tax rates and when making an investment it faces its own marginal tax rate. However, from a theoretical model perspective it does not matter if the statutory corporate income tax rates are used as the directions of the implications and propositions will not differ, only the significance of the implications could be different. Furthermore, it is assumed that the profit distributions to the shareholder are free of taxation at the level of the shareholder as it is in most countries. The total value, as generally accepted in economic models, is determined by using the economic profit. The economic profit of a company is defined as the above normal return.

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[49] By Overesch, M. and Wamser, G., *'German Inbound Investment, Corporate Tax Planning, and Thin-Capitalization Rules – A Diffrence-in-Differences Approach'*, CESifo Working Paper Series, No. 37, December 2006 (www.cesifo-group.de/DocDL/IfoWorkingPaper-37.pdf), Buettner, T., Overesch, M., Schreiber, U. and Wamser, G., *'The impact of thin-capitalization rules on multinationals' financing and investment decisions'*, Deutsche Bundesbank Discussion Paper Series 1: Economic Studies, No. 3, 2008 (http://econstor.eu/bitstream/10419/19715/1/200803dkp.pdf) and Nerée tot Babberich, N.P.M. de, *"The Thin-Capitalization Rules and Multinationals' Financing and Investment decisions – Experience from Dutch Legislation"*, Erasmus University Rotterdam, 2009.

Subsection 3.2.1: Corporate income tax

This sections defines the implication of corporate income tax on the ratio of external debt against equity of the subsidiary. The total economic profit of a subsidiary (π^2) takes the normal return (term 1), costs of external debt in place (term 2) and costs of equity in place (term 3) into account and can be formulated as follows;

$$\pi^2 = \underbrace{f(k_2)*(1-t_2)}_{1} - \underbrace{(i_2\lambda_2 k_2)*(1-t_2)}_{2} - \underbrace{rk_2(1-\lambda_2)}_{3}. \tag{1}$$

The normal return after taxes of the subsidiary (1) is defined by the total output at the level of the subsidiary which is a function of the invested capital at the level of the subsidiary ($f(k_2)$) times 1 minus the corporate income tax rate in the country of the subsidiary (t_2). The costs of debt (2) is defined as the interest rate of the debt in the country of the subsidiary (i_2) times the portion of external debt (λ_2) of the total invested capital at the level of the subsidiary (k_2). However, this should be multiplied by 1 minus the corporate income tax rate in the country of the subsidiary (t_2) as interest is tax deductible from the corporate income tax base. The costs of equity (3) is defined as the required return on equity in the country of the subsidiary (r) times the total invested capital at the level of the subsidiary (k_2) times the portion of equity (1- λ_2) and no term is included to incorporate the tax effect as the return on equity in general not can be deducted from the corporate income tax base.

If the total economic profit of a subsidiary (π^2) is below zero it does not mean that the subsidiary is in a loss making position. It only means that strictly economical speaking the investor could better have invested its money into another company as the subsidiary did not make enough profit to at least provide the investor with the required return on equity. Subsequently, if the normal return after taxes of the subsidiary (1) is lower than the costs of debt (2) the subsidiary is in a loss making position and as a result it can not pay out the required return on equity (3) or even an economic profit. Based on this formula (1) in principle, if the company is economically profit making, the total economic profit of a subsidiary (π^s) and the costs of equity (3) are available as a profit distributions to the parent.

Subsection 3.2.2: Possibility of internal financing

Only external financing was taken into account in the previous subsection. However, if the parent of the group has for example enough funds available the subsidiary can also be financed with internal financing. Therefore, a portion (μ_2) of the total invested capital at the level of the subsidiary (k_2) can be financed by way of internal financing. The subsidiary should also pay interest (i_1) on this internal financing ($\mu_2 k_2$) to the parent as if they are non-related business partners. The whole interest payments on the internal financing ($i_1\mu_2 k_2$) is temporarily assumed to be deductible from the subsidiary's corporate income tax base at the corporate income tax rate in the country of the subsidiary (t_2).

Subsequently, the interest income at the level of the parent is taxed at the corporate income tax rate of the country of the parent (t_1). Therefore, using internal financing results for the group as a whole in the following formula;

$$i_1 \mu_2 k_2 (t_2) - i_1 \mu_2 k_2 (t_1). \tag{2}$$

Using internal financing, i.e. profit shifting, can lead to a higher economic profit if the corporate income tax rate in the country of the subsidiary (t_2) is higher than the corporate income tax rate of the country of the parent (t_1). Strictly theoretical speaking, including internal financing could also lead to a overall lower economic profit if the corporate income tax rate in the country of the subsidiary (t_2) is lower than the corporate income tax rate of the country of the parent (t_1). However, in the real world companies can prevent this as the parent also can substitute the internal financing for equity. Subsequently, if the rearranged internal financing tax consequence (term 4) is included in the total economic profit in relation to the subsidiary (π^2) it gives the following formula (3);

$$\pi^2 = \underbrace{f(k_2)*(1-t_2)}_{1} - \underbrace{(i_2 \lambda_2 k_2)*(1-t_2)}_{2} - \underbrace{rk_2(1-\lambda_2)}_{3} + \underbrace{i_1 \mu_2 k_2(t_2 - t_1)}_{4}. \tag{3}$$

Subsection 3.2.3: Costs and benefits of financing
The implementation of financing brings, besides the advantage of the tax shield, other costs and benefits along as described in chapter 2. Therefore, these costs and benefits of financing also are taken into account when deriving the theoretical model and trying to understand the influence of the introduction of thin-capitalization rules on companies' financing and investment decisions. The costs are related to the total financing, i.e. the external financing (λ_2) and the internal financing (μ_2), at the level of the subsidiary. Therefore, the function of the costs can be assumed as $c_2 (\lambda_2 , \mu_2)$ and has the following properties (4);

$$c_{2\mu} = \frac{dc_2}{d(\lambda_2,\mu_2)} \rangle 0 \ , \ c_{2\mu\mu} = \frac{d^2 c_2}{d^2(\lambda_2,\mu_2)} \rangle 0. \tag{4}$$

In words, the cost function $c_2 (\lambda_2 , \mu_2)$ is increasing at an increasing rate with the internal financing. The benefits of financing are also related to the total financing at the level of the subsidiary and the function of these benefits can be assumed as $b_2 (\lambda_2 , \mu_2)$ and has the following properties (5);

$$b_{2\mu} = \frac{db_2}{d(\lambda_2,\mu_2)} \rangle 0 \ , \ b_{2\mu\mu} = \frac{d^2 b_2}{d^2(\lambda_2,\mu_2)} \langle 0. \tag{5}$$

In words, the benefit function $b_2(\lambda_2, \mu_2)$ is increasing at an decreasing rate with the internal financing. Subsequently, when the cost function (term 5) and benefit function (term 6) of the total financing are included in the total economic profit function, the total economic profit in relation to the subsidiary (π^s) becomes the following formula (6);

$$\pi^2 = \underbrace{f(k_2)*(1-t_2)}_{1} - \underbrace{(i_2\lambda_2 k_2)*(1-t_2)}_{2} - \underbrace{rk_2(1-\lambda_2)}_{3} + \underbrace{i_1\mu_2 k_2(t_2-t_1)}_{4}$$
$$- \underbrace{c_2 k_2(\lambda_2,\mu_2)}_{5} + \underbrace{b_2 k_2(\lambda_2,\mu_2)}_{6} \quad . \tag{6}$$

As the cost function decreases the total economic profit it is deducted from the existing formula (3) and as the benefit function increases the total economic profit it is added to the existing formula (3).

Subsection 3.2.4: Explanation ratio of debt against equity of a subsidiary

As the implication of using internal debt for the total economic profit using the theoretical model is determined, there is an optimal situation of the ratio of debt against equity of a subsidiary where the total economic profit is at its maximum. This is the situation where the marginal costs of using financing equals the marginal benefits. This can be defined by deriving the first order condition;

$$\frac{\partial \pi^2}{\partial \mu_2} = r + i_1(t_2-t_1) - c_{2,\mu}(\lambda_2,\mu_2) + b_{2,\mu}(\lambda_2,\mu_2) = 0 . \tag{7}$$

Based on this first order derivation (7) it can be shown that the portion of internal financing is the consequence of the required return on equity, the interest, the difference in the corporate income tax rates between the country of the subsidiary and the country of the parent, the additional costs and benefits of using debt. When the country of the subsidiary changes its corporate income tax rate the marginal effect on the internal financing equals the derivative at the corporate income tax rate in the country of the subsidiary (t_2) of the first order condition (7);

$$\frac{d\mu_2}{dt_2} = \frac{i_1}{c_{2,\mu\mu}(\lambda_2,\mu_2) - b_{2,\mu\mu}(\lambda_2,\mu_2)} \rangle 0 . \tag{8}$$

As the portion of internal financing moves in line with the movements in the corporate income tax rate in the country of the subsidiary this derivative (8) is always positive. This is due to the fact that the incentive of using internal financing is higher when the corporate income tax rate in the country where it can be deducted is also higher and therefore the tax advantage of using financing, i.e. the tax shield, is also higher. On the other hand, when the country of the parent changes its corporate income tax rate

the marginal effect on the internal financing equals the derivative at the corporate income tax rate of the country of the parent (t_1) of the first order condition (7);

$$\frac{d\mu_2}{dt_1} = \frac{-i_1}{c_{2,\mu\mu}(\lambda_2,\mu_2) - b_{2,\mu\mu}(\lambda_2,\mu_2)} \langle 0.$$

(9)

As the portion of internal financing moves inversely with the movements in the corporate income tax rate in the country of the parent this derivative (9) is always negative. This is due tot the fact that the incentive of using internal financing decreases when the higher corporate income tax rate in the country where the interest payments is received results in a higher corporate income tax to be paid.

This situation is present when the corporate income tax rate in the country of the subsidiary (t_2) is higher then the corporate income tax rate of the country of the parent (t_1). Subsequently, when the group is maximizing the total economic profit function it should substitute equity for a portion of internal financing. This profit shifting leads to an overall decrease of the taxes paid by the group, i.e. the effective corporate income tax rate of the group is lower, as the interest payments can be deducted against a high corporate income tax rate and is only taxed at a lower corporate income tax rate. It can be theoretical shown by taking the derivative at the corporate income tax rate of the country of the parent (t_1) and at the corporate income tax rate of the country of the subsidiary (t_2) of the first order condition (7);

$$\frac{d\mu_2}{d(t_2 - t_1)} = \frac{i_1}{c_{2,\mu\mu}(\lambda_2,\mu_2) - b_{2,\mu\mu}(\lambda_2,\mu_2)} \rangle 0.$$

(10)

Subsection 3.2.5: The thin-capitalization rules
By incorporating the thin-capitalization rules into the theoretical model eventually the propositions can be formulated.

In general, thin-capitalization rules restrict the deductibility of the interest payments when the ratio of equity and debt exceeds a certain threshold. This actual threshold is set by the governments according to their opinion regarding an excessive ratio of debt against equity. When the threshold is reached a certain amount of interest payments is not tax deductible such that the tax shield is reduced. The formula for this amount can be defined as follows;

$$\varphi_2 i_1 t_2 (\mu_2 - \bar{\mu}_2) k_2 .$$

(11)

Where (φ_2) can be seen as the switching variable that defines whether the thin-capitalization rules effectively restrict the deductibility of the interest payments or not. The variable (φ_2) turns 1 when the thin-capitalization rules indeed are effective, i.e. the ratio of debt against equity is to high, and turns 0 when they are not effective, i.e. the ratio of debt against equity is not too excessive. Hence, the total formula (11) turns zero when the rules are not effective. However, when the rules are effective the restricted interest equals the interest (i_1) times the corporate income tax rate (t_2) times the excessive internal financing. The excessive internal financing is determined as the portion of the total invested capital (k_2) that exceeds the threshold (μ_2). When the formula of the possible costs due to the restriction of the interest deduction is incorporated (term 7) into the total economic profit formula (6), it becomes;

$$\pi^2 = \underbrace{f(k_2)*(1-t_2)}_{1} - \underbrace{(i_2\lambda_2 k_2)*(1-t_2)}_{2} - \underbrace{rk_2(1-\lambda_2)}_{3} + \underbrace{i_1\mu_2 k_2(t_2-t_1)}_{4}$$
$$- \underbrace{c_2 k_2(\lambda_2,\mu_2)}_{5} + \underbrace{b_2 k_2(\lambda_2,\mu_2)}_{6} - \underbrace{\varphi_2 i_1 t_2(\mu_2 - \bar{\mu}_2)k_2}_{7} \qquad (12)$$

Subsequently, as the thin-capitalization rules are incorporated in the theoretical model the optimal portion of internal financing can be formulated using formula (11) as follows;

$$\frac{\partial \pi^2}{\partial \mu_2} = r + i_1(t_2 - t_1 - t_2\varphi_2) - c_{2,\mu}(\lambda_2,\mu_2) + b_{2,\mu}(\lambda_2,\mu_2) = 0. \qquad (13)$$

Hence, the group faces an additional cost after the introduction of the thin-capitalization rules into the theoretical model compared to formula (7). These interest payments are not deductible anymore due to the thin-capitalization rules.

Section 3.3: The propositions

As a result of the incorporation of the thin-capitalization rules the propositions of this thesis relating to the influence on companies' financing and investment decisions due to the introduction of the Dutch thin-capitalization rules are formulated. Assume that before the introduction some Dutch companies had an optimal ratio of internal financing against equity that exceeded the introduced threshold of the Dutch government. After the introduction of the Dutch thin-capitalization rules these companies are confronted with additional costs; part of the interest payments can not be deducted anymore. Furthermore, it could be that companies already anticipated in 2003 and that they where in an optimal situation when the Dutch thin-capitalization rules were introduced. If all other factors, for example the corporate income tax rates, have not changed, these Dutch 'restricted' companies find it optimal to reduce the ratio of internal financing against equity until the point where the marginal benefits of internal financing equal the marginal costs. This results in proposition 1;

Proposition 1: Due to the introduction of the Dutch thin-capitalization rules the ratio of internal debt against equity of Dutch 'restricted' companies is decreased.

Therefore, these company are expected to increase their equity positions or decrease their internal financing. Nerée tot Babberich finds that the significant decrease of the ratio of internal debt against equity due to the introduction of the Dutch thin-capitalization rules was driven by a relatively increase of the equity portion, not by a decrease of the internal financing portion. Theoretically this can also be explained as a change in the equity portion has a three times larger effect than a change in the internal financing portion due to the technical design of the Dutch thin-capitalization rules. Therefore, the incentive to change the equity portion is much larger compared to changing the internal financing portion. Furthermore, the costs of increasing the equity portion are smaller compared to the costs of decreasing debt, e.g. redemption fines. This results in proposition 2;

Proposition 2: If the ratio of internal debt against equity of Dutch 'restricted' companies is reduced, this is done by increasing the equity portion.

If proposition 2 holds, the equity portion has to be increased by some specific factors. Nerée tot Babberich argues that one of those factors is the release of fiscal reserves. Fiscal reserves can be described as the non realized gain between the fair market value and the fiscal book value of certain assets, e.g. gains on participations or goodwill. By restructuring or selling those assets the gains can be realized and hence, lead to a higher portion of equity. This can be described as an extraordinary profit of the company. A second factor that potentially results in a higher equity portion is a reduction in profits distributed to the shareholders. This results in higher profit reserves and increases the equity portion of the company. Third, the issuance of new shares is the last factor that potentially explains a higher portion of equity. However, this is not expected as will be explained when the propositions regarding the companies' investment decisions are described. Therefore, proposition 3 is described as follows;

Proposition 3: If the equity portion is increased is should have been driven by: (a) extraordinary profits and (b) not distributing the realized profits.

However, related to the specific technical design of the Dutch thin-capitalization rules and to the investment decisions of Dutch 'restricted' companies, a fourth solution exists. Recapturing from the explanation on the Dutch thin-capitalization rules, only the interest payments to related entities in excess of the interest payments received from related entities are restricted. Due to this balance the Dutch companies have the incentive to increase the interest payments received from related entities. By increasing the interest received they can effectively escape from the restriction of the Dutch thin-

capitalization rules. In order to create interest income at the level of the Dutch companies the investments could be restructured. This restructuring will take place by a swift from participations to intercompany receivables as this easily can be done. The Dutch company could incorporate a new entity and sell its participations to that new entity against an intercompany receivable. In principal, the interest could than be deducted at the level of the new entity. This leads to proposition 4;

Proposition 4: The Dutch 'restricted' companies decrease their direct investments in participations and increase their intercompany receivables.

Furthermore, as mentioned, when thin-capitalization rules are introduced the group faces an additional cost, namely the interest payments that are not deductible against the corporate income tax rate anymore. Subsequently, the cost of capital, i.e. the WACC, increases. When this is the case possible investments opportunities will be valued lower, as the expected cash flows of the investments will be discounted at a higher WACC. Therefore, the Dutch 'restricted' companies effectively are expected to reduce their overall investments. This results in proposition 5;

Proposition 5: The Dutch 'restricted' companies reduce their overall investments

However, if proposition 4 holds, then effectively proposition 5 should not hold. As due to the swift of the Dutch 'restricted' company from direct investments in participations to intercompany receivables the Dutch thin-capitalization rules will not be effective anymore. Hence, the group does not face an additional cost as all the interest payments are deductible. Therefore, the WACC should not have been increased due to the introduction of the thin-capitalization rules and as a result the overall investments should not have been reduced.

Section 3.4: Conclusion

Based on a theoretical model, this chapter formulates the propositions underlying the empirical analysis of the influence of the introduction of the Dutch thin-capitalization rules on Dutch companies' financing and investment decisions. The theoretical model controls for the corporate income tax, the possibility of internal financing, the additional costs and benefits of financing, the international angle and of course the thin-capitalization rules. Three propositions relate to Dutch companies' financing decisions and two propositions relate to Dutch companies' investment decisions.

The propositions in relation to the financing decision state that due to the introduction of the Dutch thin-capitalization rules the ratio of internal debt against equity of Dutch 'restricted' companies is decreased and that this is done by increasing the equity portion. The increase in the equity portion is realized by extraordinary profits and by not distributing the realized profits. Furthermore, the first

proposition in relation to the investment decision states that due to the technical design of the Dutch thin-capitalization rules, i.e. only the interest payments from related entities in excess of the interest received from related entities is restricted, Dutch 'restricted' companies decrease their direct investments in participations and increase their intercompany receivables. Subsequently, a more general proposition regarding the investment decision is formulated due to the increase of the WACC, namely that Dutch 'restricted' companies reduce their overall investments. The next chapter will elaborate on the methodology used in order to test these propositions.

Chapter 4: Methodology and data-selection process

Section 4.1: Introduction

This chapter discusses the methodology used for testing each proposition and the data-selection process. First, the estimation methodology for testing the propositions is introduced. Secondly, the data-selection process is presented. Finally, a short summary concludes the chapter.

Section 4.2: Estimation methodology

The formulated propositions claim that the introduction of the Dutch thin-capitalization rules have urged those companies that expect to be restricted by these rules to change their financing and investment policies. The instrument used to test the propositions between two sets of variables is the method of setting up a regression analyses. A regression analyses states that the dependent variable is a function of the independent variables and a residual. In order to estimate the effects of the independent variable on the dependent variable the coefficients have to be determined. To determine the coefficients a differences-in-differences estimator is applied to a panel of Dutch companies over the period 2003-2006.

An differences-in-differences estimator can be used if observations for two groups over two time periods are available. Both of the groups are not exposed to the restriction in the first period, but one of the two groups is exposed to the restriction in the second period. The estimator effectively estimates the influence of the restriction on one of the two groups compared to the other group. In relation to this thesis there are the group of selected Dutch 'restricted' companies (hereinafter referred to as: *'treatment group'*), i.e. the companies that effectively are restricted on the deductibility of the interest payments to related entities due to the introduction of the Dutch thin-capitalization rules in 2004, and the group of selected Dutch 'non-restricted' companies (hereinafter referred to as: *'control group'*), which are companies that are not restricted on the deductibility of the interest payments to related entities but have the same key aspects as the treatment group. Hence, the only difference between the two groups is the restriction due to the introduction. The above leads to the following general model;

$$Y_{it} = \beta * TCD + t_t + f_i + \varepsilon_{it},$$ (14)

where Y_{it} denotes in general the dependent variable and changes when testing each proposition, *TCD* denotes the thin-capitalization dummy independent variable, t_t denotes the year specific fixed effects, f_i denotes the company specific fixed effects and ε_{it} denotes the residual. In general this model captures the effects of the different independent variables, i.e. *TCD*, t_t and f_i. The differences-indifferences estimator of the coefficients is equal to the OLS estimator applied to formula 14. The results of the

model provides insight in the explanatory power of the independent variables on the dependent variable.

The *'TCD'* variable, i.e. thincap dummy, identifies the influence of the introduction of the Dutch thin-capitalization rules on companies' financing and investment decisions of the treatment group relatively compared to the control group. The variable is effectively a dummy variable. In year 2003 the dummy variable equals '0' for all selected companies, i.e. the treatment group and the control group, as the Dutch thin-capitalization rules where not in place yet and it is assumed that the companies have not already anticipated in 2003. In the years 2004-2006 the dummy variable equals '0' for all companies that are not restricted, i.e. the control group. On the other hand the dummy variable turns '1' for all companies that are restricted, i.e. the treatment group. The intuition regarding the treatment group is that they are not influenced by the dummy in the year 2003, but in the years 2004-2006 due to the fact that as of 2004 they are restricted. Hence, the thin-capitalization dummy (*'TCD'*) is formulated as follows;

$$TCD = 1 \text{ in years 2004-2006 for treatment group} \tag{15}$$
$$TCD = 0 \text{ otherwise.}$$

When testing each proposition the *'Y_{it}'* variable is substituted for the relevant variables. These relevant variables are now discussed in relation to each proposition.

In order to test proposition 1 the *'Y_{it}'* variable is substituted for the dependent variable ratio that equals the ratio of internal debt, i.e. financing received from related entities, against the fiscal equity of Dutch companies (internal debt divided by fiscal equity). This ratio does not exactly equal the ratio for the applicability of the Dutch thin-capitalization rules as that ratio is not the relevant test for this regression. What matters is that the reaction of companies needs to be found on the introduction of the Dutch thin-capitalization rules. Due to the fact that companies can alter and adjust their financing received from related entities and their equity more easily than their external debt it is expected that if there is a reaction present at all it for sure is present in a change in the ratio of internal debt against the fiscal equity of Dutch companies. Besides, the Dutch thin-capitalization rules effectively only restrict the deductibility of the interest payments on internal debt received from related entities and hence, a reaction is expected on the internal debt instead of the external debt.

Furthermore, an adjustments has to be made to the ratio in order to use the ratio as a dependent variable in the regression. Depending on the values of the financing received from related entities and the fiscal equity of Dutch companies the ratio can have any value. In this respect the value of the ratio is set at a minimum of 0 and a maximum of 100. Setting the ratio at a minimum of 0 implies that the

fiscal equity of Dutch companies is at least € 1 as this is determined by the Dutch thin-capitalization rules and also negative values of the internal financing do not exist. The results of the regression with the dependent variable ratio explains the change in the ratio of internal debt against the fiscal equity of the treatment group compared to the control group due to the introduction of the Dutch thin-capitalization rules.

For testing proposition 2 the dependent variables log of the internal financing value and the log of the fiscal equity value are separately used. The logs of the values are used in order to determine the relative changes and as a result to be able to control for the different groups. The fiscal equity value is set at a minimum of € 1 as they otherwise will be bst when taken the log and this is also determined by the Dutch thin-capitalization rules.

Proposition 3 (a) is tested in two separate ways in order to ensure the robustness of the effects. Both ways to test this proposition includes another dependent variable. The first way takes the log of the extraordinary profits as the dependent variable into account. These extraordinary profits are determined on the basis of the fiscal data by taking the sum of the fiscal gains on assets, i.e. the release of the non realized profits on assets, the total of the exceptional benefits, e.g. the realization of foreign exchange results, and the positive results realized on participations, e.g. profits on the sale of participations.

The second way to test proposition 2 takes the log of the difference between the commercial value of the total assets and the fiscal value of the total assets in each year as a dependent variable into account. The economic intuition is that the difference between the commercial value of the total assets and the fiscal value of the total assets should have decreased due to the release of the fiscal reserves on the assets. This decrease should have been higher for the treatment group compared to the control group and hence, should have let to an relatively higher increase in the fiscal equity for the treatment group.

Subsequently, proposition 3 (b) can be tested by including the change of the non distributed profits, i.e. the profit reserves, as the dependent variable into the regression model, i.e. the log of the profit reserves. As some of the observations have negative values a fixed amount is added to each observation to be able to estimate the effects[50]. Adding an amount to the value of each observation is a good solution for estimating the effects with regression when observations contain negative values and the log is taken into account. Subsequently, the log of these observations is taken. The intuition is that the treatment group have distributed less of their dividends to their shareholders but added them to their profit reserves compared to the control group in order to decrease their ratio.

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[50] Hu, T., *'The Fitting of LOG-Regression Equation When Some Observations in the Regressand are Zero or Negative'*, Metroeconomica, Vol. 24, No. 1, pp. 86-90.

For testing proposition 4 two regressions are run. The first regression tests whether the introduction of the Dutch thin-capitalization rules have decreased the direct investment in participations of Dutch companies. This is done by taking the log of the direct investments in participations as the dependent variable. The value of the thincap dummy will stay the same as it is expected that the swift from the direct investments in participations to intercompany receivables will have taken place in 2004 or in later years. It is assumed that companies did not have the possibility to anticipate on the introduction of the Dutch thin-capitalization rules in 2003, as the legislation was published in the last months of 2003 and the time to anticipate was too short. In this respect a robustness check is performed in chapter 6 in order to test whether companies have already anticipated on the introduction of the Dutch thin-capitalization rules in 2003.

The second regression tests whether the introduction of the Dutch thin-capitalization rules have increased the intercompany receivables of Dutch companies. The log of the sum of all intercompany receivables will be taken as the dependent variable. The value of the thincap dummy will also stays the same in this regression and in this respect also a robustness check is performed in chapter 6.

In order to test the last proposition the dependent variable for this proposition is the log of the total fiscal assets. The intuition is that the overall total fiscal assets should have been decreased due to the introduction of the Dutch thin-capitalization rules as the costs of capital have increased. Furthermore, this proposition also is tested by taking the log of the total commercial assets as the dependent variable as the total fiscal assets do not represent the fair market value of the assets. This is due to the fact that the valuation of certain assets do not have to be the fair market valuation for tax purposes, e.g. participations have to be valued at cost price. The commercial assets value on the other hand highlights the fair market value changes of the total assets, i.e. the value of all investments.

The 't_t' and 'f_i' are necessary in the regression method in order to make sure that the thincap dummy effectively estimates the influence of the restriction on the treatment group compared to the control group. The 't_t' variable captures the differences that over time are common to both groups. For example, the Dutch corporate income tax rates can for example have caused the expected decrease in the ratio as they have decreased from 34,5% in 2004 to 31,5% in 2006 for the profits above € 22.689. The 't_t' variable captures such effects. The 'f_i' variable captures the differences that are related to the specific firms. For example, it captures the specific effects of companies that are in specific business sectors.

Section 4.3: Data-selection process

This section describes the data selection that leads to the treatment group and the control group. The selection of both groups is based on the available companies in the Corporate Income Tax Information

System ('CITIS')[51], which is discussed in the next chapter. The following five selection criteria are used to identify the treatment group.

First, the CITIS allows for selecting those companies that have been restricted by the thin-capitalization rules in the years 2004-2006. The companies that for the first time became restricted in 2005 or in 2006 are excluded from the treatment group as it is assumed that those companies have taken into account the additional costs of the non-deductibility of the excess interest payments.

Second, although the selected companies selected by the first criteria are restricted by the thin-capitalization rules they can, however, effectively not have been restricted. They were effectively not restricted if the sum of the non-deductible interest was zero or negative. The sum of non-deductible interest is, besides the thin-capitalization rules, also determined by other interest restriction rules[52]. Hence, the companies that have a negative or zero value for this sum of non-deductible interest are excluded from the treatment group.

Third, the fiscal book year of the companies in both the treatment group and the control group should equal the calendar year in the years 2003-2006 in order to achieve consistency of the selected dataset. A robustness check has been performed to check whether it is possible to select a certain fiscal book year period that does not equal the calendar year for testing the propositions. However, the groups of both companies become too small for reliable analysis. Subsequently, companies with different fiscal book years in the years 2003-2006 are excluded from the treatment group.

Fourth, a selection is made in relation to the taxable profits of the companies. The companies of which their average taxable profit of the years 2003-2006 were zero or negative are excluded. The intuition behind this selection is that the incentive to do anything about the restriction of the deductibility of the interest payments, i.e. changing their ratio of internal debt against equity, of companies with a zero or even negative average profit is much lower than the incentive of companies with a positive average taxable profit[53].

Fifth, the amount of the restricted interest due to the Dutch thin-capitalization rules should be high enough in the years 2003-2006 to create an incentive for the companies to react. When the incentive is too low it implies that the costs of for example restructuring could be to high in relation to the benefit

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[51] In Dutch the 'Vennootschapsbelasting Informatie Systeem (VIS)'.

[52] The anti abuse rules regarding the deductibility of the interest of article 10a and article 15 of the Dutch Corporate Income Tax Act 1969.

[53] This intuition is also supported by empirical studies such as Ramb, F. and Weichenrieder, A.J., *'Taxes and the Financial Structure of German Inward FDI'*, Review of World Economics (Weltwirtschaftliches Archiv), Springer, Vol. 141, No. 4, pp. 670-692, December 2005.

of the additional deductible interest payments. Therefore, the companies that have an amount of less than € 1.000 of restricted interest due to the thin-capitalization rules when this amount is below 5% of their taxable profits in the years 2003-2006 are excluded from the treatment group.

After these five selection criteria, the treatment group consists of 173 companies. The fiscal data, including the fiscal value of the total assets, of these companies is available for the years 2003-2006. The overall group of companies that are effectively restricted on the basis of the Dutch thin-capitalization rules in 2004 consists of 1720 companies. Hence, the research sample consists of more than 10% of all the companies that have effectively been restricted in 2004.

Subsequently, the control group is selected on the bases of the following selection criteria. First, companies that are too close to the threshold of the Dutch thin-capitalization rules in the period 2003-2006 are not selected in order to achieve that the selected companies are not influenced by the Dutch thin-capitalization rules. Therefore, companies with a ratio of debt against equity higher than 2 : 1 in the period 2003-2006 are excluded from the control group. A robustness check is performed with respect to the ratio 2:1, which indicates that increasing or decreasing the ratio does not have a significant effect on the amount of excluded companies.

Second, also the fiscal book year of these companies should equal the calendar year in the period 2003-2006 in order to achieve that the selected dataset is consistent. This selection criteria has also been applied to select the treatment group in order to mitigate the differences between the two groups. In this respect the same robustness check has been performed whether it is possible to select a certain fiscal book year period that does not equal the calendar year. However, as mentioned with the treatment group the group became too small and too different for testing the propositions of this thesis. Hence, the companies of which their fiscal book year do not equal the calendar year in the period 2003-2006 are excluded from the control group.

Third, a selection is made in relation to the taxable profits of the companies. The companies of which their average taxable profit for the period 2003-2006 is zero or negative are excluded from the control group. This selection is made in order to make this control group comparable to the treatment group.

Fourth, from the characteristics of the treatment group it is obvious that those companies have a large portion of internal financing at their disposal. In order to make the control group comparable the companies in the control group should also have at least a large enough portion of internal financing. Therefore, companies that have less than € 100.000 as internal financing are excluded. A robustness check is performed with respect to the amount of internal financing, which indicates that increasing or decreasing the amount does not have significant effect on the amount of excluded companies.

After these four selection criteria, the control group consists of 308 companies. The fiscal data, including the fiscal value of the total assets, of these companies is available for the period 2003-2006. Compared to the treatment group the control group is almost two times as large.

Section 4.4: Conclusion

This chapter has described the methodology for each proposition formulated in the previous chapter. In order to test the propositions a general regression has been formulated, which uses a differences-in-differences estimator. That differences-in-differences estimator can effectively specify the influence of the introduction of the Dutch thin-capitalization rules on specific factors for the treatment group compared to the control group. Furthermore, has the data selection process been described. After the data selection process the research sample consists of a total of 481 Dutch companies of which 173 Dutch 'restricted' companies, i.e. the treatment group, and 308 Dutch 'non-restricted' companies, i.e. the control group. The fiscal data is available for these companies over the years 2003 up to and including 2006. The results of the regressions on the research sample are presented in chapter 6, but first some descriptive statistics of the data are provided in the next chapter.

Chapter 5: Data

Section 5.1: Introduction

After having described the methodology and the data selection process in the previous chapter, this chapter deals with the data. First, the available panel data is discussed. Second, some descriptive statistic of the treatment group and the control group are analyzed. Third, some descriptive statistics in relation to the restricted interest are presented. Fourth, the descriptive statistics of the dependent variables used for testing the propositions are presented. The last section concludes with a summary of what is discussed in this chapter.

Section 5.2: Data

This section deals with the data used for this thesis. The data can be divided into two parts. First, the fiscal data and second the commercial data. The fiscal data has been used for testing all of the propositions. However, as discussed in the previous chapter in order to test proposition 2 and proposition 5 in the second way the commercial data is used.

The Dutch Ministry of Finance has the CITIS at their disposal. This system consists of the micro data of all companies in the Netherlands who are subject to Dutch corporate income tax and is based on all the information available to the Dutch Tax Authorities. Most of the information comes directly from the companies, amongst others, when they register themselves with the Dutch Tax Authorities and when they file their tax return each year. Therefore, this dataset consist of all the fiscal accounts and other relevant fiscal information. Currently the dataset consists of more than three hundred thousand companies in the Netherlands from the year 1991 up to and including 2006. However, the dataset before the year 2004 is not complete as some companies did not file their tax returns digitally before 2004. As most companies already filed their tax returns digitally in the period 2003-2006, these years are used for the present study, no relevant data is missing.

The commercial data is taken from the Review and analysis of companies in Holland-database, i.e. the REACH-database[54]. This database contains general information on over two million Dutch companies and contains more detailed information on over four hundred thousand Dutch companies. This detailed information consists of detailed financial data, financial statements, financial ratio's, activities of the companies, the share ownership and detailed information about the management. It should be noted that the commercial data is not available for all companies for more recent years. As some companies are not up-to-date regarding the filing of their commercial data with the Dutch Chamber of Commerce, which is one of the sources of the REACH-database.

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[54] A product of Bureau van Dijk Electronic Publishing, Amsterdam.

Section 5.3: Descriptive statistics of treatment group and control group

The total group of companies that were restricted in 2004 consists of 1720 companies. Focusing on these 'restricted' companies in 2004 for the period 2003-2006 gives a total of 5160 observations. The treatment group consists of 173 companies and gives a total of 519 observations for the period 2003-2006. The control group consists of 308 companies and gives a total of 924 observations for the period 2003-2006. The following table provides an overview of the descriptive statistics mean, median, maximum, minimum, standard deviation, number of observations and number of companies of the different groups;

Table 1 - Some descriptive statistics of the companies for period 2003-2006

Variable	Mean	Median	Maximum	Minimum	Std. Dev.	Observations	Companies
2004 'restricted' companies							
Turnover *	15,08	0,00	4.346,00	0,00	127,36	6880	1720
Taxable profits *	1,23	-0,02	2.625,67	-94,48	44,53	6880	1720
Total assets *	37,01	3,42	6.135,94	0,00	180,67	6880	1720
treatment group							
Turnover *	49,84	3,62	4.346,00	0,00	233,91	692	173
Taxable profits *	16,85	0,31	2.625,67	-47,64	138,63	692	173
Total assets *	77,71	8,72	6.135,94	0,00	371,58	692	173
control group							
Turnover *	99,92	18,69	4.034,25	0,00	280,73	1232	308
Taxable profits *	12,11	2,16	892,55	-40,78	50,30	1232	308
Total assets *	477,01	69,77	18.635,79	1,64	1.458,87	1232	308

* amount x € 1.000.000

This table provides some insights in the group of 2004 'restricted' companies, treatment group and control group for the period 2003-2006. Firstly, it is remarkable that the median turnover for the 2004 'restricted' companies and the treatment group is relatively low for the period 2003-2006. This is an indication that the observations are observations of purely holding companies. A purely holding company does not have many fiscal turnover as it only holds shares in other entities and sometimes some receivables. Secondly, this table indicates that some large companies are included in the 2004 'restricted' companies group and the treatment group, but that many really large companies are not included according to the means, medians and standard deviations. Relatively larger companies are included in the control group compared to the other groups. Hence, most really large companies were not restricted by the thin-capitalization rules, which indicates that they have already anticipated in the year 2003, which is assumed they did not, that based on the technical design of the thin-capitalization rules, they avoided the thin-capitalization rules on the group ratio or that their ratio of debt against equity did not exceeded the threshold set by the Dutch government. Some of these really large companies are part of the control group as is indicated by the relatively larger amount of turnover and total assets of the control group. Furthermore, the treatment group contains the larger companies of all

the 2004 'restricted' companies as the amount of turnover and total assets of this group is relatively larger than the 2004 'restricted' companies. This makes the treatment group more comparable to the control group as the control group contains even larger companies compared to the treatment group.

Subsequently, the 2004 'restricted' companies, the treatment group and the control group are divided into the different industry categories of the International Standard Industrial Classification of all Economic Activities (hereafter: "ISIC"). Table 2 provides an overview of this division into the different industry categories;

Table 2 - Division of companies into industry classes

Industries	2004 'restricted' companies	treatment group	control group
Agriculture, forestry and fishing	0,0%	0,0%	0,0%
Mining and quarrying	0,0%	0,0%	0,0%
Manufacturing	5,0%	11,0%	12,7%
Electricity, gas, steam and air conditioning supply	0,7%	0,6%	0,6%
Water supply; sewerage, waste management and remediation activities	1,9%	3,5%	2,9%
Construction	0,0%	0,0%	0,0%
Wholesale and retail trade; repair of motor vehicles and motorcycles	0,0%	0,0%	0,0%
Transportation and storage	1,2%	1,2%	2,6%
Accommodation and food service activities	0,0%	0,0%	0,0%
Information and communication	8,4%	13,9%	16,2%
Financial and insurance activities	2,7%	4,0%	2,3%
Real estate activities	0,1%	0,0%	0,3%
Professional, scientific and technical activities	1,9%	4,0%	1,0%
Administrative and support service activities	33,8%	32,4%	26,0%
Public administration and defence; compulsory social security	7,7%	4,0%	4,5%
Education	0,1%	0,6%	0,0%
Human health and social work activities	28,1%	20,2%	28,2%
Arts, entertainment and recreation	0,4%	1,7%	1,0%
Other service activities	1,2%	1,2%	0,6%
Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use	0,5%	0,0%	0,6%
Activities of extraterritorial organizations and bodies	0,2%	0,0%	0,3%
Unclassified	5,9%	1,7%	0,0%
Total	100,0%	100,0%	100,0%

Table 2 shows that a large part of the 2004 'restricted' companies, the treatment group and the control group fall within the services providing companies categories, i.e. the administrative and support service activities. Within this category amongst others the holding companies are present. As a further distinguish within these categories is not possible, due to the non availability of that information, it is plausible to assume that indeed a large part of the companies restricted by the thin-capitalization rules are holding companies. Furthermore, it can be derived that the treatment group is a good sample of the 2004 'restricted' companies and that the treatment group and the control group are comparable in relation to their division in the different industry classes. Looking at the percentages of each group for each industry class shows that the percentages of the groups are close to each other.

Section 5.4: Descriptive statistics of restricted interest

This section describes the amount of restricted interest by the thin-capitalization rules and the Dutch companies that were restricted by the thin-capitalization rules in the period 2003-2006 in order to provide a general overview of the relevance and maybe even the effectiveness of the thin-capitalization rules. First, the following figure provides an overview of the amount of fiscal interest payments that is restricted due to the Dutch thin-capitalization rules in the period 2003-2006.

Figure 1 - Amount of restricted interest by the Dutch thin-capitalization rules
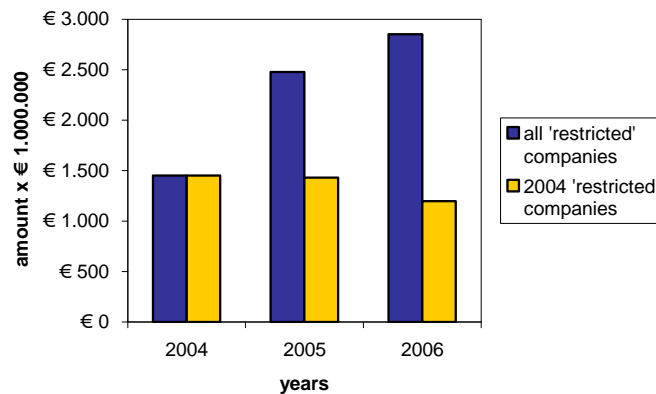
From figure 1 can be derived that the total amount of restricted interest of all 'restricted' companies has significantly increased after the introduction of the Dutch thin-capitalization rules in 2004. The amount almost doubled from more than € 1,5 billion in 2004 to almost € 3 billion in 2006. This is caused by companies that became restricted in the year 2005 or the year 2006. As the amount of restricted interest of the companies who were restricted in 2004, i.e. the 2004 'restricted' companies, has slightly decreased. This implies that the thin-capitalization rules effectively decreased the amount of internal financing of the 2004 'restricted' companies, but the rules did not restrained companies in 2005 or 2006 from using internal debt as a financing source for their activities. A total of 1728 additional companies had an amount of restricted interest in the year 2005 compared to the year 2004. In the year 2006 a total of 1792 additional companies had an amount of restricted interest in the year 2006 compared to the year 2005.

Subsequently, based on this figure one thing is for sure, namely that the rules are effective as corporate income tax anti-base erosion rules for the Dutch government. A simple calculation shows that the Dutch government, when using an average statutory corporate income tax rate of say 30%, received more than € 2 billion additional corporate income tax in the period 2004-2006 if the possibility of a loss situation is not taken into account. Taken the tax losses into account the Dutch government received less additional corporate income tax in the period 2004-2006. Even when the marginal corporate income tax rates of these companies were much lower the amount of additional corporate income tax was still substantial.

It can be concluded that the amount of restricted interest of all the companies who were restricted in 2004 is slightly decreasing. As the treatment group is a sample of all those companies it is interesting to see whether this group shows the same trend. The following figure provides an overview of the amount of restricted interest of the 2004 'restricted' companies and the treatment group of the period 2003-2006.

Figure 2 - Amount of restricted interest of 2004 'restricted companies' and treatment group
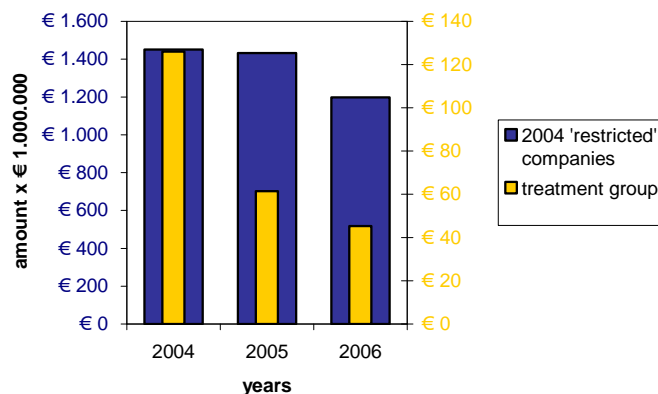
Based on the above figure the treatment group shows a similar trend as all the 2004 'restricted' companies. Their reaction was even stronger. The amount of restricted interest of the treatment group dropped down from more than € 120 million in 2004 to almost a third in 2006, i.e. more than € 40 million. The difference in the strength of the trend is mainly caused by the selection criteria used in order to get to the selected companies. For example, the treatment group consist of companies with positive taxable results over the period 2003-2006 and hence, their incentive is bigger compared to all the 2004 'restricted' companies. Furthermore, it is interesting to see whether companies actually got rid of the total restricted interest. The following table provides an overview of the number of companies representing the amount of interest in the period 2004-2006 and the average restricted interest payments per year per group of companies;

Table 3 - Overview of number of companies in relation to amount of restricted interest per year

	2004		
	amount of restricted interest *	number of companies	average per company **
2004 'restricted' companies	1.451	1.720	844
treatment group	126	173	728
	2005		
	amount of restricted interest *	number of companies	average per company **
2004 'restricted' companies	1.432	1.162	1.232
treatment group	61	108	569
	2006		
	amount of restricted interest *	number of companies	average per company **
2004 'restricted' companies	1.197	751	1.594
treatment group	45	56	809

* amount x € 1.000.000
** amount x € 1.000

From this table it can be concluded that more than 56 % of the 2004 'restricted' companies did not have any restricted interest payments in the year 2006 and more than 67% of the treatment group. It is remarkable that the average restricted interest of the 2004 'restricted' companies has increased over the years. This implies that the companies with real large amounts of internal financing accepted the non-deductibility of the interest payments in line with the companies that became restricted in the years 2005 or 2006. The average of the selected companies dropped significantly in 2005, but increased in 2006. In relation to the trend in the number of selected companies in those years it implies that the few companies that got rid of the restricted amount of interest from 2005 to 2006 had a relatively low amount of restricted interest.

In conclusion it can be noted that on the basis of the above figure 2 and table 3 the selected companies have reacted more strongly to the introduction of the thin-capitalization rules. This was also expected as a result of the selection criteria of these companies. For example, the treatment group consists of companies with positive taxable results over the period 2003-2006 and hence, their incentive is bigger to reduce the amount of restricted interest compared to all the 2004 'restricted' companies. However, these companies did something to decrease the amount of interest payments that were restricted. The answer to this question will be provided in the next chapter.

Section 5.5: Descriptive statistics of dependent variables

This section deals with the descriptive statistics of the fiscal variables of the research sample. Recapturing from the previous section the research sample consists of a total of 481 companies for the period 2003-2006. Hence, the research sample consists of a total of 1924 observations. Table 4 provides an overview of the descriptive statistics mean, median, maximum, minimum, standard deviation, number of observations and number of companies of these companies;

Table 4 - Some descriptive statistics of the research sample

Variable	Mean	Median	Maximum	Minimum	Std. Dev.	Observations	Companies
Ratio	2,58	0,27	100,00	0,00	10,90	1924	481
Internal financing *	60,26	5,92	5.557,50	0,00	308,65	1924	481
External financing *	43,73	4,28	5.161,81	0,00	241,38	1924	481
Fiscal equity *	227,18	12,31	13.562,55	-264,52	895,14	1924	481
Extraordinary profits *	17,51	0,00	4.927,26	-264,62	178,64	1924	481
Profit reserves *	70,73	3,74	7.597,61	-5.032,04	482,79	1924	481
Direct investments in participations *	188,81	0,34	14.980,27	0,00	930,14	1924	481
Intercompany receivables *	49,31	2,16	3.993,46	0,00	239,23	1924	481
Fiscal value of total assets *	333,39	35,07	18.635,79	0,00	1.203,65	1924	481

* amount x € 1.000.000

From this table can be derived that overall the variables are not normally distributed. The distribution of most variables has a high skweness and high kurtosis, i.e. the values of the skweness and kurtosis tests are all positive. For testing the propositions of this thesis this is not of significant importance, as long as these characteristics of both the treatment group and the control group are almost equal.

Furthermore, the variables fiscal equity, extraordinary profits and profit reserves have negative values and all other variables do not have negative values. Based on the characteristics of each variable these values are all logical.

Subsequently, the most interesting comparison between the treatment group and the control group will be discussed. The following table provides an overview of the descriptive statistics of both groups of companies for the year 2004;

Table 5 - Some descriptive statistics of both the treatment group and control group

Variable	treatment group						
	Mean	Median	Maximum	Minimum	Std. Dev.	Observations	Companies
Ratio	8,18	0,00	100,00	0,00	19,76	173	173
Internal financing *	45,11	4,00	2.028,24	0,00	197,93	173	173
External financing *	23,20	3,35	702,86	0,00	81,77	173	173
Fiscal equity *	4,74	0,03	596,13	-183,10	60,32	173	173
Extraordinary profits *	1,38	0,00	85,13	-0,03	8,15	173	173
Profit reserves *	-5,60	-0,23	479,97	-286,28	51,10	173	173
Direct investments in participations *	9,35	0,00	477,30	0,00	51,20	173	173
Intercompany receivables *	8,49	0,01	525,10	0,00	45,08	173	173
Fiscal value of total assets *	75,09	9,52	3.481,35	0,02	308,11	173	173
Variable	contol group						
	Mean	Median	Maximum	Minimum	Std. Dev.	Observations	Companies
Ratio	0,39	0,20	1,95	0,00	0,43	308	308
Internal financing *	53,94	7,40	5.526,30	0,00	327,00	308	308
External financing *	55,62	6,94	3.127,04	0,00	15,72	308	308
Fiscal equity *	335,64	39,30	9.767,44	0,95	59,93	308	308
Extraordinary profits *	30,87	0,07	4.283,31	-59,84	270,88	308	308
Profit reserves *	108,90	11,87	4.639,30	-2.442,82	493,60	308	308
Direct investments in participations *	271,29	8,36	11.941,99	0,00	1.071,12	308	308
Intercompany receivables *	124,88	12,08	6.339,63	0,00	509,23	308	308
Fiscal value of total assets *	447,75	66,90	12.210,53	1,64	1.340,98	308	308

 * amount x € 1.000.000

From table 5 can be concluded that the variable ratio has a significant higher value and the variables internal financing, external financing and fiscal equity have a significant lower value for the treatment group than the values of the control group. Hence, the two groups are not comparable regarding their capital structure. However, due to the selection criteria and the characteristics of both groups this is logical and not a threat to the research sample or the results of the regressions. Furthermore, the descriptive statistics of the variable extraordinary profits are for both groups almost equal and are thus comparable. Subsequently, the variables profit reserves, direct investments in participations, intercompany receivables and the fiscal value of total assets have a significant higher value for the treatment group compared to the control group. Hence, the control group are relatively larger companies.

Furthermore, some figures of both the treatment group and the control group are provided that are highlighting the mean values of different variables over time for both groups in order to provide a general feeling about the correctness or incorrectness of the formulated propositions. The first figure

relates to the variable ratio, i.e. the ratio of internal debt against the fiscal equity of the company, and provides an overview of the mean values of this variable for the period 2003-2006.

Figure 3 - Mean value of variable 'Ratio' over time for both groups
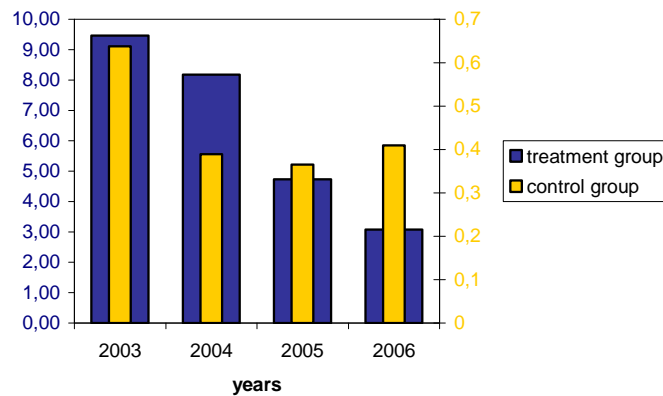
Figure 3 indicates that the ratio of internal debt against equity of the treatment group has decreased over the years. At the year end of 2003 the ratio was much higher than at the year end of 2006, i.e. the ratio decreased more than half. The ratio of the control group on the other hand also firstly decreased and then slightly increased. The following figures provide an overview of the mean values of the variable internal financing and the variable fiscal equity for the period 2003-2006 to compose the change in the ratio.

Figure 4 - Mean value of variable 'Internal financing' over time for both groups
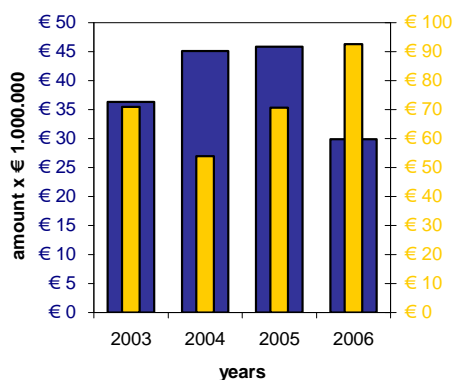
Figure 5 - Mean value of variable 'Fiscal equity' over time for both groups
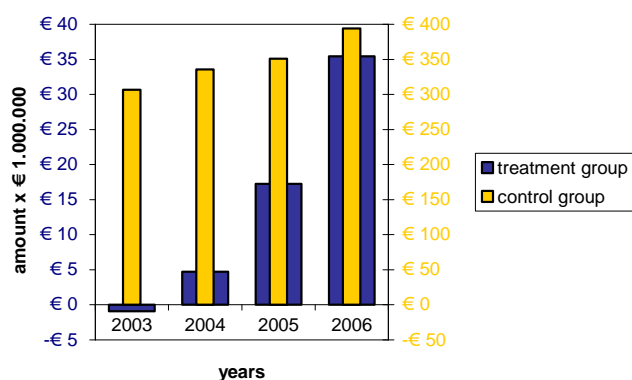
Figure 4 indicates that for the treatment group the internal financing increased until 2005, but then dropped significantly in 2006. On the other hand the internal financing of the control group decreased in 2004, but increased in 2005 and 2006. Subsequently, figure 5 indicates that for treatment group the fiscal equity has increased significant over time. The fiscal equity of the control group has relatively slightly increased. Hence, based on these figures the changes of the ratio over time can mainly be explained by the increase in the fiscal equity.

As described in chapter 3 an increase in the equity can be caused by extraordinary profits, e.g. the release of fiscal reserves in assets, an increase in the profit reserves due to not distributing the profits or the contribution of additional capital. Firstly, the following figure provides an overview of the mean value of the variable extraordinary profits for the period 2003-2006.

Figure 6 - Mean value of variable 'Extraordinary profits' over time for both groups
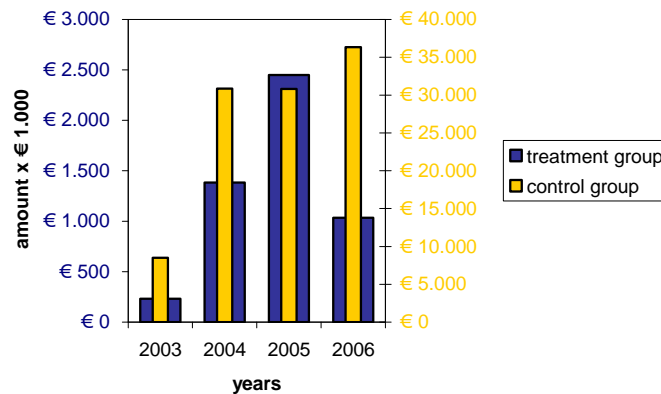
The above figure indicates that in the year 2005 the treatment group had relatively higher extraordinary profits, compared to the control group over time. However, the absolute values of the extraordinary profits can not explain the increase in the absolute values of the fiscal equity of these companies as the amounts are much lower. Furthermore, the high mean value of the control group for the year 2006 can not directly be explained by an even high increase in the mean value of the fiscal equity of those companies in 2006. These companies have probably distributed the profits directly to their shareholders, which has decreased the fiscal equity. This figure suggests that the extraordinary profits probably did not fully explain the movements in the fiscal equity due to the relatively smaller amounts of the extraordinary profits.

Subsequently, as mentioned this proposition is also tested by using commercial data. The change in the differences of the commercial value of the total assets and the fiscal value of the total assets over time indicates the release of fiscal hidden reserves, i.e. a part of the extraordinary profits. However, using the REACH database to find the commercial values of both groups of companies resulted in a lot of missing values for the both groups of companies. As a result the information was only available for 68 companies of the treatment group and for 188 companies of the control group. Based on comparing the variables and the division between the different industry classes reveals that these companies are not comparable anymore. Therefore, the possible outcomes of the regression analysis of these companies are not completely reliable. However, in order to show that they also are not comparable to the rest of the companies the following figures are provided.

Figure 7 - Mean value of variable 'Extraordinary profits' over time for both groups with commercial data available
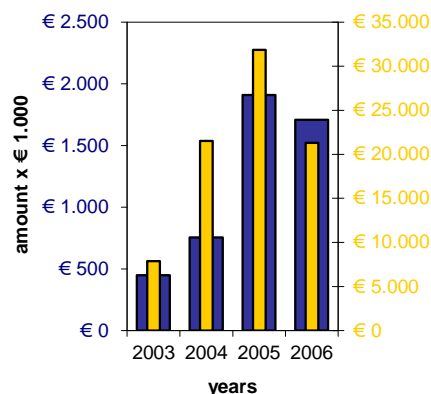
Figure 8 - Mean value of variable 'Differences commercial versus fiscal value of assets' over time for both groups with commercial data available
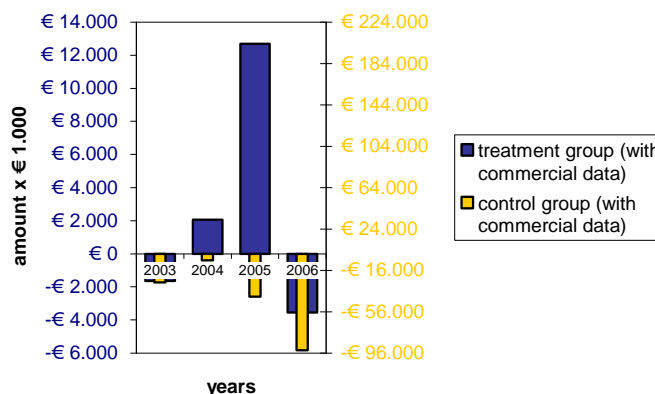
Figure 7 shows the same information as figure 6 but then only for the companies of which the commercial data was available. The movements of the mean value of the treatment group are relatively similar to figure 6, but the movements of the control group are different. Comparing the movements of the mean value of the variable extraordinary profits with figure 8, i.e. the variable of the differences between the commercial value and the fiscal value of the assets over time, indicates that they are completely different. The intuition is that the difference between the commercial value of the total assets and the fiscal value of the total assets should have decreased due to the release of the fiscal reserves on the assets. This decrease should have been higher for the treatment group compared to the control group and should have let to an relatively higher increase in the fiscal equity for the treatment group. However, figure 8 indicates that the commercial value of the assets in 2004 and 2005 have increased in relation to the fiscal value for the treatment group. This implies that no release of fiscal hidden reserves has taken place in those years. On the other hand, has the difference decreased in 2003 and 2006, which could indicate that a release of fiscal hidden reserves has taken place.

However, as the shocks and movements are to large figure 8 is not reliable to conclude something about the fiscal reserves as it is expected that with the release of the fiscal hidden reserves there is a one time negative shock. It is remarkable to see that the value for the control group for each year is negative. This implies that the valuation of the assets for fiscal purposes is higher compared to the valuation of the assets for commercial purposes. This could have been caused by certain depreciation and amortization for commercial purposes, which for fiscal purposes is not allowed. Furthermore, the movements in the differences of the commercial value versus the fiscal value of the assets does not always have to be caused by the fiscal hidden reserves. The difference can possibly for a large part be explained by the fact that for commercial purposes the assets have to be valued at fair market value and as a result every year there will be an impairment and for fiscal purposes are the valuation methods differ, e.g. participations are valued at cost price. Therefore, the changes of the fair market

value of all the assets is also part of the differences of the commercial value versus the fiscal value of the assets. Hence, based on these figures the variable of the differences of the commercial value versus the fiscal value can at first hand not explain the changes in the ratio of internal financing against the fiscal equity.

Secondly, the movements in the fiscal equity can also possibly be explained by the movements of the profit reserves of the companies. In this respects provides the following figure an overview of the mean value of the variable profit reserves for the period 2003-2006 for both groups of companies.

Figure 9 - Mean value of variable 'Profit reserves' over time for both groups
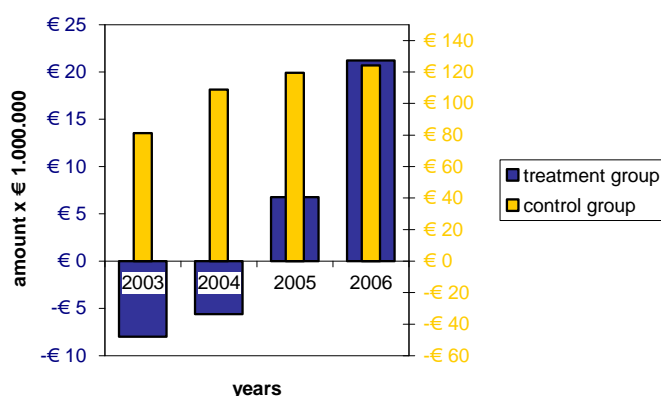
Based on figure 9 it is remarkable to see that the profit reserves of the treatment group increased significant from a large negative value in 2003 to a triple higher value in 2006 even compared to the control group. Compared with figure 5 and the movements of the control group in figure 5 and 7, the movements in the fiscal equity of the treatment group can absolutely and relatively be explained by the movements in the profits reserves. Combining this with figure 6 leads to the conclusion that the increase in the profit reserves can not completely have been caused by the extraordinary profits and hence, should be explained by the fact that the companies have not distributed their normal profits to their shareholders.

The latest figures relate to the last two propositions regarding the investment decisions of the Dutch companies. The following two figures provide an overview of the mean value of the variables direct investments in participations and intercompany receivables for the period 2003-2006 for both groups of companies.

Figure 10 - Mean value of variable 'Direct investments in participations' over time for both groups
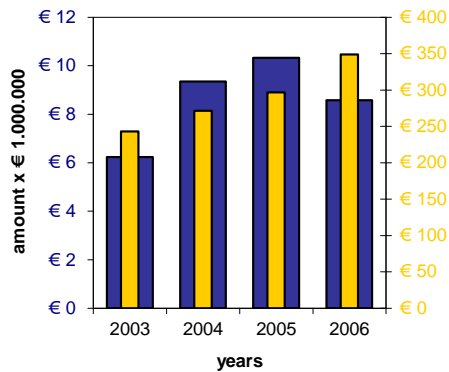
Figure 11 - Mean value of variable 'Intercompany receivables' over time for both groups
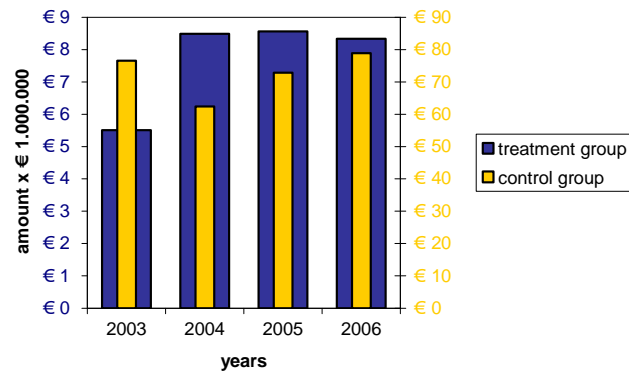
From figure 10 can be derived that the direct investments in participations of treatment group has only been decreased in 2006 and of the control group has been increased every year. A relatively larger increase in 2004 for the treatment group can be distinguished, which is not in line with the proposition, that stated that a decrease was expected. Figure 11 provides insight into the movements of the intercompany receivables. It is remarkable to see that the movements for the treatment group and the control group are the opposite, e.g. an increase in 2004 for the treatment group and a decrease in 2004 for the control group. Hence, in the year of the introduction of the thin-capitalization rules, i.e. 2004, the intercompany receivables increased significantly of the treatment group compared to the control group.

The following figure deals with the last proposition about the value of the fiscal assets. It provides an overview of the mean value of the variable fiscal value of total assets.

Figure 12 - Mean value of variable 'Fiscal value of total assets' over time for both groups
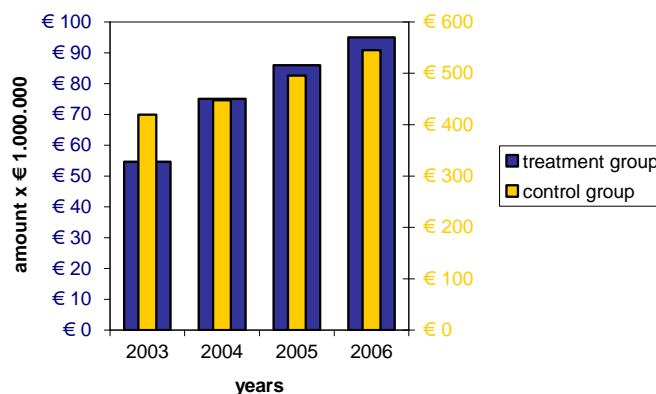
Figure 12 shows that the fiscal assets for both groups have not been decreased in the period 2003-2006. Compared to the assets of the control group have the assets of the treatment group relatively even more increased, especially in 2004, which can be explained by the previous figures.

The last figures are dealing also with the last proposition and take the commercial value of the assets into account for the companies with the commercial value available.

Figure 13 - Mean value of variable 'Fiscal value of total assets' over time for both groups with commercial data available
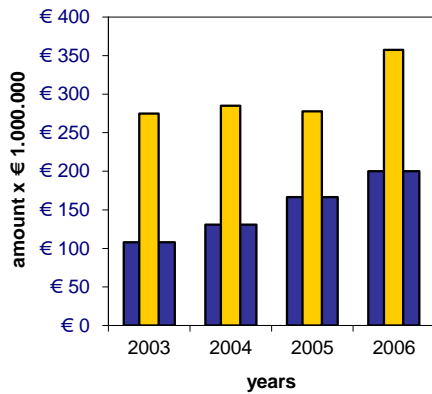
Figure 14 - Mean value of variable 'Commercial value of total assets' over time for both groups with commercial data available
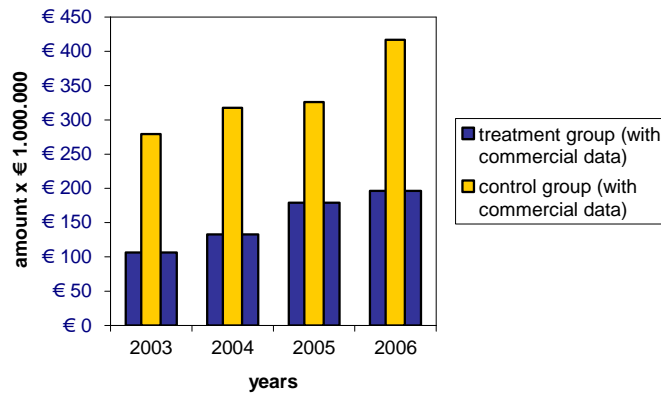
From these figures can be concluded that the fiscal value of the total assets have decreased in 2005 for the control group and for other years and the treatment group has the value increased. The commercial value of total assets on the other hand has increased for each group in each year.

The figures 12, 13 and 14 overall imply that due to the introduction of the thin-capitalization the overall investments, i.e. the assets, of the companies have not been decreased. Furthermore, the control group has a much larger asset base than treatment group. For this difference should be corrected when performing the regressions as the groups are not comparable regarding their asset base.

Section 5.6: Conclusion

This chapter has described the available panel data and some descriptive statistics have been provided and analyzed. It can be concluded that the treatment group is a good sample of all the 2004 'restricted' companies. Also it can be concluded that both groups are for example almost equally divided over the different industry classes. However, regarding their size of the fiscal value of the total assets the groups differ. The control group has a much higher asset base. When performing the regressions in the next chapter this will be taken into account. Furthermore, it is remarkable that the amount of restricted interest due to the thin-capitalization rules have increased over the years.

Subsequently, the figures provided in this chapter indicate that some of the formulated propositions of chapter 3 are indeed correct. If these indications can also be substantiated by real evidence, namely the empirical evidence from the regressions, is discussed in the next chapter.

Chapter 6: Empirical results

Section 6.1: Introduction

The propositions defined in chapter 3 are tested using the methodology discussed in chapter 4. This chapter presents the results from this analysis. As mentioned in the previous chapter, the companies in the treatment group are smaller compared to the companies in the control group. Therefore, for the size of companies is controlled for by including the log of the turnover of the companies. Finally, some robustness checks are reported. This chapter concludes with a summary of what has been presented in this chapter. The tables in this chapter presenting the results for the regressions include the coefficient, standard error, t-statistics and probability of the independent variables, the R^2, the adjusted R^2, the F-statistics and the probability of the f-statistic of each regression. The F-statistics and the probability of the f-statistic of each regression are included as it is a test for the joint significance of the independent variables in the regression.

Section 6.2: Empirical results for testing proposition 1 and 2

The results for testing proposition 1 and 2 are presented in table 6.

Table 6 – Empirical evidence in relation to proposition 1 and 2

Variable	Dependent Variable: Ratio			
	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy	-3,72	1,02	-3,63	0,00
LOG_Turnover	-0,16	0,08	-1,97	0,04
Effects Specification:	year and company			
R-squared	0,46	F-statistic		2,50
Adjusted R-squared	0,27	Prob(F-statistic)		0,00
Variable	Dependent Variable: LOG_Internal Financing			
	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy	0,73	0,41	1,79	0,07
LOG_Turnover	0,32	0,03	9,89	0,00
Effects Specification:	year and company			
R-squared	0,56	F-statistic		3,74
Adjusted R-squared	0,41	Prob(F-statistic)		0,00
Variable	Dependent Variable: LOG_Fiscal Equity			
	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy	2,94	0,32	9,07	0,00
LOG_Turnover	0,16	0,03	6,38	0,00
Effects Specification:	year and company			
R-squared	0,84	F-statistic		16,01
Adjusted R-squared	0,79	Prob(F-statistic)		0,00

From table 6 can be concluded that after the introduction of the Dutch thin-capitalization rules in 2004, the ratio of the internal debt against the fiscal equity of the treatment group compared to the control group has decreased with 3,72 points over the period 2004-2006. Proposition 1 can therefore not be rejected. Subsequently, the question which part of the ratio, the numerator or the denominator,

has changed becomes interesting. The lower panel of table 6 presents the results in this respect. From the outcomes in the middle part of table 6 can be derived that no significant empirical evidence can be found that the decrease of the ratio can be explained by a decrease of the internal debt. Moreover, the coefficient indicates that a significant increase of the internal debt position has taken place of the treatment group compared to the control group over the period 2004-2006 with 0,73 points over the period 2004-2006. Furthermore, from the outcomes in the lowest part of table 6 can be derived that significant empirical evidence is present that the fiscal equity portion of the treatment group compared to the control group has increased with 2,94 points over the period 2004-2006. Hence, proposition 2 can not be rejected.

Section 6.3: Empirical results for testing proposition 3

Table 7 presents the empirical results in relation to proposition 3 (a) based on the first way of empirically testing proposition 3 (a).

Table 7– Empirical evidence in relation to proposition 3 (a) (first way)

	Dependent Variable: LOG_Extraordinary Profits			
Variable	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy	0,37	0,45	-0,82	0,41
LOG_Turnover	0,00	0,03	-0,08	0,94
Effects Specification:	year and company			
R-squared	0,77	F-statistic		5,57
Adjusted R-squared	0,63	Prob(F-statistic)		0,00

This table shows that the changes in the fiscal equity can not be explained by the extraordinary profits of the treatment group compared to the control group over the period 2004-2006. The coefficient is negative, but insignificant and therefore it has no explanatory power.

The second way of testing proposition 3 (a) takes the available commercial figures of the companies into account. Subsequently, the results of these regression can not be compared to the other empirical evidence found in this chapter. In order to compare the results all the propositions are also tested for this specific group of companies. These results can be found in Appendix B and are discussed in more detail in section 6.6 that deals with the robustness checks. Hence, table 8 presents the empirical results in relation to proposition 3 (a) based on the second way of empirically testing proposition 3 (a) for a smaller group of companies.

Table 8 – Empirical evidence in relation to proposition 3 (a) (second way) of different companies

	Dependent Variable: LOG_Differences commercial versus fiscal value of assets			
Variable	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy	-0,69	0,37	-1,87	0,06
LOG_Turnover	-0,11	0,04	-2,93	0,00
Effects Specification:	year and company			
R-squared	0,91	F-statistic		17,98
Adjusted R-squared	0,86	Prob(F-statistic)		0,00

Table 8 shows that by testing proposition 3 (a) the second way the differences between the commercial and fiscal value of total assets have significantly decreased in the smaller selection of the treatment group compared to the smaller selection of the control group over the period 2004-2006 with 0,69 points. Hence, evidence is found in relation to the presence of the release of fiscal hidden reserves. In conclusion it can be stated that the relatively increase in the fiscal equity portion of the treatment group compared to the control group has been driven by relatively larger extraordinary profits of the treatment group. Hence, proposition 3 (a) is not rejected.

Furthermore, proposition 3 (b) claims that the increase in the fiscal equity portion is potentially driven by not distributing the realized profits. Table 9 provides empirical evidence in this respect.

Table 9 – Empirical evidence in relation to proposition 3 (b)

	Dependent Variable: LOG_Profit Reserves			
Variable	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy	0,16	0,13	1,23	0,22
LOG_Turnover	0,00	0,01	0,44	0,66
Effects Specification:	year and company			
R-squared		0,95	F-statistic	44,87
Adjusted R-squared		0,93	Prob(F-statistic)	0,00

Table 9 shows that the changes in dependent variable of the fiscal equity portion can not be explained by the profit reserves of the treatment group compared to the control group over the period 2004-2006. The coefficient is positive, but insignificant and therefore it has no explanatory power. Hence, proposition 3 (b) is also rejected.

Section 6.4: Empirical results for testing proposition 4

The empirical evidence found in relation to proposition 4 is presented in table 10.

Table 10 – Empirical evidence in relation to proposition 4

	Dependent Variable: LOG_Direct investments in participations			
Variable	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy	-0,18	0,30	-0,61	0,54
LOG_Turnover	0,05	0,02	1,99	0,05
Effects Specification:	year and company			
R-squared		0,92	F-statistic	34,08
Adjusted R-squared		0,89	Prob(F-statistic)	0,00
	Dependent Variable: LOG_Intercompany receivables			
Variable	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy	1,44	0,45	3,18	0,00
LOG_Turnover	0,28	0,04	6,88	0,00
Effects Specification:	year and company			
R-squared		0,75	F-statistic	9,04
Adjusted R-squared		0,67	Prob(F-statistic)	0,00

From table 10 can be derived that proposition 4 partly can be rejected. Based on the results of the upper half of table 10 it can be concluded that after the introduction of the Dutch thin-capitalization rules the direct investments in participations of treatment group compared to the control group has not significantly been decreased in the period 2004-2006. The direction of the coefficient however indicates that there is a negative relation, i.e. the direct investments in participations has decreased over the period 2004-2006. However, the coefficient is not significant and therefore it has no explanatory power. Subsequently, the outcomes of the second half of table 10 shows that due to the introduction of the Dutch thin-capitalization rules in 2004 the intercompany receivables of the treatment group compared to the control group has significantly been increased with 1,44 points over the period 2004-2006. Based on this evidence the second part of proposition 4 can not be rejected. In conclusion it can be stated that the treatment group have not significantly decreased their direct investments in participations, but have significantly increased their intercompany receivables.

Section 6.5: Empirical results for testing proposition 5

The following table provides the empirical results for testing proposition 5.

Table 11 – Empirical evidence in relation to proposition 5

Variable	Dependent Variable: LOG_Fiscal value of total assets			
	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy	0,41	0,20	2,04	0,04
LOG_Turnover	0,35	0,02	22,45	0,00
Effects Specification:	year and company			
R-squared	0,74	F-statistic		8,52
Adjusted R-squared	0,65	Prob(F-statistic)		0,00

From table 11 can be concluded that after the introduction of the Dutch thin-capitalization rules in 2004 the fiscal assets of the treatment group compared to the control group has increased by 0,41 points over the period 2004-2006. This empirical evidence shows that proposition 5 can be rejected and implies that the investments of the treatment group measured by the total fiscal assets have not decreased, but even increased. Subsequently, it can be concluded that the increased costs of capital due to the introduction of the Dutch thin-capitalization rules has effectively not negatively influenced the investments and that there were good investments that still had a positive net present value.

Furthermore, this proposition is also tested by taking the log of the total commercial assets as the dependent variable as the total fiscal assets do not represent the fair market value of the assets. This test is done for the same selection of the treatment group and selection of the control group as for testing proposition 3 (a) the second way due to the non-availability of data. The following table provides the empirical results in this respect.

Table 12 – Empirical evidence in relation to proposition 5 of different companies

Variable	Coefficient	Std. Error	t-Statistics	Prob.
Dependent Variable: LOG_Fiscal value of total assets				
Thincap dummy	0,37	0,17	2,13	0,03
LOG_Turnover	0,23	0,01	15,74	0,00
Effects Specification:	year and company			
R-squared	0,84	F-statistic		15,93
Adjusted R-squared	0,79	Prob(F-statistic)		0,00
Dependent Variable: LOG_Commercial value				
Variable	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy	0,28	0,09	3,08	0,00
LOG_Turnover	0,00	0,00	0,84	0,40
Effects Specification:	year and company			
R-squared	0,94	F-statistic		48,13
Adjusted R-squared	0,92	Prob(F-statistic)		0,00

Table 12 shows that after the introduction of the Dutch thin-capitalization rules in 2004 the fiscal assets of the selection of the treatment group compared to the selection of the control group has increased by 0,37 points over the period 2004-2006. It also shows that after the introduction of the Dutch thin-capitalization rules in 2004 the commercial assets has increased by 0,28 points. Hence, proposition 5 is rejected on the basis of this evidence. Subsequently, it can be concluded that the increased costs of capital due to the introduction of the Dutch thin-capitalization rules has also effectively not negatively influenced the investments for the selection of both groups and that there were good investments that still had a positive net present value. Furthermore, it is remarkable to see that the fiscal value of total assets have increased relatively more compared to the commercial value of total assets of the selection of the treatment group. The implication of this insight is taken into account in the overall conclusion of this thesis in the next chapter.

Section 6.6: Robustness checks

This section discusses some robustness checks that are performed in order to make sure that the empirical evidence found in the previous sections of this chapter stays the same if some assumptions are stressed or changed. The first check that is performed relates to the inclusion of the independent variable log of the fiscal value of the total assets in order to control for size of the companies. First, all the test for each propositions have been done without including this additional independent variable. The results of these regressions can be found in Appendix C. From these results it can be concluded that in general leaving out the log of the turnover does not influence the significance of the other coefficients. Furthermore, the sign of the other coefficients has not changed. The only difference that can be found relates to the actual size of the value of the coefficients. This implies that the empirical evidence found with respect to the significance and the direction of the effect in the previous sections is robust.

As mentioned in previous sections the second way of testing proposition 3 (a) and testing proposition 5 have taken the commercial figures into account. However, these commercial figures were not available for all companies. The other propositions are also tested on this selection of companies to check whether the results of testing proposition 3 (a) and 5 are representative. These results can be found in Appendix B. From these results can be concluded that in general the relevant coefficients did not change. Furthermore, the sign of the significant coefficients also did not change. However, the actual size of the coefficient is different due to a different group of companies. From this robustness check, i.e. effectively taken into account another treatment group and control group, can be concluded that the results of testing proposition 3 (a) and 5 and the empirical evidence found with respect to the significance and direction of the effects found in the previous sections is robust.

A robustness check is performed to see in which years the most effects where present in relation to the formulated propositions. The results in this respect can be found in Appendix D. From these results it can be concluded that the effects found in relation to proposition 1 and 2 are mainly caused by the reactions of the treatment group compared to the control group in the year 2006. The overall results of testing proposition 1 and 2 are therefore robust. Furthermore, for each year proposition 3 (a) is rejected, which is not in line with the overall result and makes the results for this proposition less robust. In relation to proposition 3 (b) this robustness check shows that eventually in 2004 the profit reserves significantly decreased with 0,62 points for the treatment group compared to the control group. However, the profit reserves increased significantly with 0,66 points for the year 2006. Therefore, it can be concluded that proposition 3 (b) can not be rejected for the year 2006. The results for testing proposition 4 are all insignificant. Intuitive this can be explained by the fact that the increase of internal receivables, i.e. the overall effect found, takes some time to realize. The results in relation to proposition 5 show that in 2004 and 2005 a significant increase of the fiscal value of total assets is present for the treatment group compared to the control group. However, a decrease is present in the year 2006. Therefore, it can be concluded that proposition 5 can not be rejected for the year 2006, but can be rejected for the year 2004 and 2005. Furthermore, the results found in relation to the commercial figures are all insignificant, which indicates that the results including the commercial figures are not reliable. From this robustness check it can be concluded that the overall results found in the previous section are robust, but that some propositions can not be rejected for the year 2006.

Another robustness check is performed to see if the treatment group reacted more strongly in the years 2004 and 2005 instead of the period 2003-2006 used in this study. The results in this respect can be found in Appendix E. From these results it can be concluded that the effects found in relation to proposition 1 and 2 in the years 2004 and 2005 are insignificant such that proposition 1 and 2 are rejected. Furthermore, for the years 2004-2005 proposition 3 (a) is rejected, which is not in line with the overall result and makes the results for this proposition less robust. In relation to proposition 3 (b)

this robustness check shows that in 2004 and 2005 the profit reserves significantly decreased with 0,42 points for the treatment group compared to the control group. Therefore, it can be concluded that proposition 3 (b) can be rejected for the years 2004 and 2005. The results for testing proposition 4 for the years 2004 and 2005 show that significance of the coefficients and the sign are in line with the overall result and the results found are therefore robust. The results in relation to proposition 5 show that for the years 2004 and 2005 a significant increase of the fiscal value of total assets is present for the treatment group compared to the control group. Therefore, it can be concluded that proposition 5 can be rejected for the year 2004 and 2005. Furthermore, the result found in relation to the commercial figures is insignificant, which indicates that the results including the commercial figures are not reliable. From this robustness check it also can be concluded that the overall results found in the previous section are robust and that it was relevant to include the year 2006 for the testing the propositions.

The last robustness check relates to the characteristics of the methodology used. As the differences-in-differences method has been used the specific year and specific company effects have been fixed. As a robustness check the tests were performed without including the specific year and specific company effects. It was expected that the outcomes of the regressions became ambiguous as a lot of other effects are present, e.g. tax rate differences and company specific factors. Based on the results the expectation was correct. Without including the specific year and specific company effects the results were completely different than the outcomes of the normal regressions. For example the estimated coefficient became much larger for all dependent variables. This is logical as the intuition behind the specific year and specific company effects is that there are effects that in each your for each company should have been the same and that there are affects that affect each company in each year. Therefore, including the specific year and specific company effects is indeed a necessary fundamental underlying assumption for the performed regressions.

Section 6.7: Conclusion

This chapter has presented the results for testing each proposition. First, it is found that due to the introduction of the Dutch thin-capitalization rules the ratio of internal debt against equity of the treatment group has been decreased and that this can be explained by an increase in the fiscal equity portion. Second, the results prove that the relatively increase in the fiscal equity portion has been driven by relatively larger extraordinary profits of the treatment group and has not been driven by not distributing the profit reserves. Hence, the release of the fiscal hidden reserves as part of the extraordinary profits is the driver behind the increase of the fiscal equity as was suggested by earlier studies. Subsequently, the empirical evidence shows that the treatment group have not significantly decreased their direct investments in participations, but have significantly increased their intercompany receivables. The results for the last proposition indicate that the proposition is rejected

as the investments of the treatment group measured by the total fiscal assets even increased, instead of decreased. The last part of this chapter has provided some robustness checks in respect of the empirical evidence found. From these robustness checks can be concluded that the empirical evidence found in relation to testing the propositions is indeed robust. Furthermore, the checks show that for the year 2006 the increase in the fiscal equity portion can be explained by not distributing the profit reserves and that a decrease in the investments is present for the treatment group compared to the control group. The next chapter a summary and a general conclusion, which takes these results into account.

Chapter 7: Summary and conclusion

Section 7.1: Summary

This thesis has started with explaining the main theories in relation to the capital structure of a company. By taking the Modigliani and Miller theory as a starting point it was eventually stated that due to tax shield in principle companies should be financed with as much debt as possible. Besides the tax shield some other disadvantages and advantages are present. The tradeoff theory takes the disadvantages of the cost of financial distress and agency costs into account. The free cash flow theory addresses the advantage of disciplining management through minimizing the free cash flow. In contrast to the advantages and disadvantages of debt the pecking order theory suggest that companies pursue a specific order that results in the specific capital structure. Furthermore, the Dutch thin-capitalization rules can be summarized as a restriction of the deductibility of the interest payments when the ratio of debt against equity exceeds a certain threshold.

Subsequently, a theoretical model, based on earlier models, has been used to demonstrate the implications of the introduction of thin-capitalization rules on companies' financing and investment decisions. Three propositions were formulated based on this model that relate to companies' financing decisions. The first proposition states that due to the introduction of the Dutch thin-capitalization rules the ratio of internal debt against equity of the treatment group has been decreased. Second, the decrease in the ratio is caused by an increase in the fiscal equity portion. Third, the increase in the equity portion is realized by (a) extraordinary profits or respectively by (b) not distributing the realized profits. Subsequently, two propositions were formulated that relate to companies' investment decisions. First, the direct investment in participations have been decreased and the intercompany receivables have been increased. Secondly, the overall investments of the Dutch 'restricted' companies have been reduced.

The methodology used to test these propositions is the differences-in-differences estimator. Subsequently, the dataset has been taken from the Corporate Income Tax Information System and selected on the basis of different selection criteria. This has resulted in a research sample that consisted of a total of 481 Dutch companies of which 173 companies where part of the treatment group and 308 companies of the control group. The treatment group represents more than 10% of all the Dutch companies that were effectively restricted in 2004 due to the Dutch thin-capitalization rules.

In general it is remarkable that from the data can be shown that the amount of restricted interest due to the thin-capitalization rules has increased since the introduction of the rules in 2004. This implies that the other benefits of using internal debt were even bigger than the additional costs of the non-

deductibility of the interest payments. Subsequently, it can be argued that from a business rational, i.e. a commercial point of view, it was not excessive to finance the companies with that much internal finance in contrast to the argumentation of the Dutch government. Relating this to the goal of preventing the erosion of the Dutch corporate income tax base it can be argued that the rules were effective. In other words, a lot of interest payments were due to the rules effectively not deducted from the corporate income tax base and have resulted in higher corporate income tax revenues for the Dutch government or lower tax losses available for carry forward.

Based on the above methodology and research sample the empirical evidence provides some remarkable insights. First of all due to the introduction of the Dutch thin-capitalization rules the ratio of internal debt against equity has indeed significantly decreased. The decrease of the ratio can be explained by a significant increase in the fiscal equity portion of these companies. Subsequently, the increase in the fiscal equity portion cannot be explained by the increase in the profit reserves, but can be explained by the extraordinary profits. This proves that the companies have still distributed their normal profits to their shareholders and did not added them to their profit reserves in order to get rid of the deductibility restriction on the interest payments. Furthermore, it proves that the release of the fiscal hidden reserves as part of the extraordinary profits is the driver behind the increase of the fiscal equity as was suggested by earlier studies.

Other remarkable insights relate to the companies' investment decisions. The empirical evidence proves that the direct investments in participations have not significantly been decreased, but on the other hand the intercompany receivables have significantly been increased. The empirical evidence proves that the companies did not sell their whole value of direct investments in participations against intercompany receivables. Furthermore, the companies have increased their intercompany receivables in order to get rid of the deductibility restriction on the interest payments. Subsequently, the empirical evidence proves the last proposition, i.e. that the investment of the Dutch companies should have been decreased due to the introduction of the Dutch thin-capitalization rules, is rejected. The evidence shows that even the total assets have increased and this implies that the costs of capital have not substantial increased in relation to the investments opportunities. However, it can also imply that the pecking order theory is of much more relevant for those companies than the other theories in explaining the capital structure of Dutch companies. The empirical evidences found have been tested on robustness by performing different checks. All these checks prove that the empirical evidence is indeed robust. As a general remark it can be stated that fiscal rules, such as thin-capitalization rules for sure influence the companies' financing and investment decisions.

Section 7.2: Conclusion

This section provides a possible explanation for the empirical evidence found in this thesis. Furthermore, it answers the formulated research hypothesis and highlights some points for further research.

An explanation for the empirical evidence found could be that the treatment group have sold some of their participations to a newly incorporated entity for the fair market value. The fair market value was at that time above their acquisition price and hence, they realised a profit. As most of the companies in the treatment group are holding and investment companies the realised profit qualifies as a normal profit and thus not as an extraordinary profit. This is in line with the empirical evidence found. Subsequently, the fair market value was partly paid as a capital contribution and partly by an intercompany receivable. The part of the capital contribution equals the original acquisition price and the realised profit equals the part of the intercompany receivable. Therefore, this is also in line with the empirical evidence found in relation to proposition 4, i.e. not an increase or decrease in the direct investments in participations, but an increase in the intercompany receivables. Furthermore, this restructuring of the asset side of the companies' balance sheet also results in a higher total assets value as the realised profit on the participation has been accounted for on the balance sheet as an intercompany result. Based on the analysis in relation to the formulated propositions and the empirical evidence found this is the most sound and plausible explanation.

The formulated research hypothesis in the introduction of this thesis is:

"How did the introduction of the Dutch thin-capitalization rules influence the financing and investment decisions of Dutch companies?"

It can be concluded that the introduction of the Dutch thin-capitalization rules has influenced the financing decision of Dutch companies in the sense that they have relatively increased their equity, but did not decreased their intercompany financing. Subsequently, the investment decision of Dutch companies have been influenced in the sense that they have increased their intercompany receivables and hence, also increased their total assets base. The introduction of the Dutch thin-capitalization rules has thus for sure not overall negatively influenced the investment decisions of Dutch companies.

Furthermore, the most important point of further research can be found in performing a study that tries to highlight the real intentions and reactions of the treatment group with the use of interviews with the responsible management of all of those companies at that time, i.e. a qualitative research. Combining this qualitative research with the empirical evidence found in this thesis on the basis of a quantitative research can give insights in the real reactions of the companies and hence, should highlight the

underlying argumentations of the found reactions of those companies. Furthermore, it is also interesting to see for the Dutch government whether the introduction of the Dutch thin-capitalization rules had a negative or positive influence on the fiscal attractiveness of the Netherlands. In relation to the companies' financing and investment decisions, further research can focus on whether companies have changed their investment scope, for example did companies changed their investment strategies to more riskier investments? Or did companies invested more in less riskier projects?

Regarding both the financing and investment decision this thesis provides insights in the reaction of Dutch companies to the introduction of the Dutch thin-capitalization rules. As these insights are specific for the Netherlands it is interesting to see whether companies in other countries have reacted accordingly to this study. For example, how did the introduction of the French interest deductibility limitations as per January 1st, 2007 influence the financing and investment decisions of French companies? Or how did the introduction of the Chinese interest deductibility restriction rules as per 2009 influence the financing and investment decisions of Chinese companies?

However, as a general remark it can be concluded from this study that the thin-capitalization rules definitely affect the companies' financing and investment. Therefore, each company should take into account the (proposed) new fiscal legislation, be prepared for it and act on it in order to be in an optimal financing and investment situation, but also the government which is implementing the fiscal legislation should take into account that companies could be affected and have the possibility to take responsive actions.

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Appendix A: Article 10d of the Corporate Income Tax Act

1. In case a taxpayer has a surplus of liabilities in a certain year, the interest payable on loans –including expenses on loans – will not be tax deductible when calculating the taxable profit of a year for the portion that it is equal to the ratio between the surplus of liabilities and the average amount of liabilities.

2. The first paragraph will not be applicable, in case the taxpayer is not, with other companies, a member of a group as mentioned in article 24b of book 2 of the Dutch Civil Code.

3. The amount of interest that will not be tax deducible as a result of paragraph 1, is maximised at the amount of interest payable on loans directly or indirectly received from affiliated companies of the taxpayer, minus the interest received on loans granted to such companies.

4. As surplus of liabilities as mentioned in paragraph 1 is at hand to the extent that the average liabilities of the taxpayer exceed three times the amount of the equity and this amount exceeds the threshold of EUR 500,000. For the application of paragraph 1 in connection with the first sentence liabilities is defined as the balance between the loans payable and loans receivable and the fiscal equity excludes the fiscal reserves.

5. In case the taxpayer chooses as such by filing its corporate income tax return, the surplus of liabilities is defined as the difference between the average amount of the taxpayer's liabilities and three times its average equity, times the ratio in line with the group. For the application of paragraph 1 in combination with the first sentence, the amount of liabilities is determined by the financial statements, drafted according to the rules of title 9, book 2 of the Dutch Civil Code, or according to similar foreign legal rules. In case assets belong or are included in a partnership or subsidiary as mentioned in article 15, the liabilities and equity are defined on the basis of the consolidated balance sheet, in which the assets of the partnership or subsidiary separately are included for the application of the second sentence.

6. The ratio as mentioned in paragraph 5 is the average amount of liabilities divided by the average amount of equity according to the consolidated financial statements of the group, as mentioned in article 24b of book 2 of the Dutch Civil Code or any other similar foreign rule, of which the taxpayer forms part. In case the taxpayer is part of more than one group, the criterion is the group with the highest amount of balance total.

7. For the application of this article, the term loan is limited to loans of which the interest should be included in the taxable income without the application of this article or articles 14a, paragraph 8, 14b, paragraph 6 and 15 ad.

8. The averages as mentioned in this article are determined by the balance position at the beginning and the end of the financial year, in which case the average amount of equity is at least EUR 1.

9. The reduction of corporate income tax for the purpose of prevention of double taxation is calculated without taking into account paragraph 2, 3 and 5.

10. For the purposes of the calculation of the reduction of corporate income tax based on the rules on prevention of double taxation, the total amount of interest that is qualified as non-deductible on the basis of paragraph 1, will not be taken into account for a higher amount than the amount of interest that has become non-deductible on the basis of paragraph 1.

11. By governmental decree, additional rules can become applicable with respect to the application of paragraph 9 and 10.

Appendix B: Results of tests for different groups of companies

Results in relation to proposition 1 and 2:

	Dependent Variable: Ratio			
Variable	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy	-5,22	1,13	-4,63	0,00
LOG_Fiscal assets	0,30	0,20	1,46	0,15
Effects Specification:	year and company			
R-squared	0,52	F-statistic		3,71
Adjusted R-squared	0,36	Prob(F-statistic)		0,00

	Dependent Variable: LOG_Internal Financing			
Variable	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy	0,00	0,50	0,00	0,99
LOG_Fiscal assets	0,89	0,09	9,80	0,00
Effects Specification:	year and company			
R-squared	0,60	F-statistic		4,35
Adjusted R-squared	0,46	Prob(F-statistic)		0,00

	Dependent Variable: LOG_Fiscal Equity			
Variable	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy	2,82	0,41	6,81	0,00
LOG_Fiscal assets	0,77	0,07	10,36	0,00
Effects Specification:	year and company			
R-squared	0,85	F-statistic		16,34
Adjusted R-squared	0,80	Prob(F-statistic)		0,00

Results in relation to proposition 3 (a) (first way):

	Dependent Variable: LOG_Extraordinary Profits			
Variable	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy	-0,26	0,62	-0,42	0,68
LOG_Fiscal assets	0,88	0,36	2,47	0,01
Effects Specification:	year and company			
R-squared	0,76	F-statistic		5,43
Adjusted R-squared	0,62	Prob(F-statistic)		0,00

Results in relation to proposition 3 (b):

	Dependent Variable: LOG_Profit Reserves			
Variable	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy	0,56	0,19	3,00	0,00
LOG_Fiscal assets	0,04	0,03	1,20	0,23
Effects Specification:	year and company			
R-squared	0,95	F-statistic		50,20
Adjusted R-squared	0,94	Prob(F-statistic)		0,00

Results in relation to proposition 4:

	Dependent Variable: LOG_Direct investments in participations			
Variable	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy	0,22	0,45	0,48	0,63
LOG_Fiscal assets	0,26	0,08	3,22	0,00
Effects Specification:	year and company			
R-squared	0,91	F-statistic		30,42
Adjusted R-squared	0,88	Prob(F-statistic)		0,00

	Dependent Variable: LOG_Intercompany receivables			
Variable	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy	2,02	0,64	3,17	0,00
LOG_Fiscal assets	0,48	0,11	4,22	0,00
Effects Specification:	year and company			
R-squared	0,75	F-statistic		8,61
Adjusted R-squared	0,66	Prob(F-statistic)		0,00

Appendix C: Results of tests without controlling for size

Results in relation to proposition 1 and 2:

Variable	Dependent Variable: Ratio			
	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy	-3,89	1,02	-3,81	0,00
Effects Specification:	year and company			
R-squared	0,46	F-statistic		2,50
Adjusted R-squared	0,27	Prob(F-statistic)		0,00

Variable	Dependent Variable: LOG_Internal Financing			
	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy	1,06	0,42	2,55	0,01
Effects Specification:	year and company			
R-squared	0,53	F-statistic		3,32
Adjusted R-squared	0,37	Prob(F-statistic)		0,00

Variable	Dependent Variable: LOG_Fiscal Equity			
	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy	3,11	0,33	9,51	0,00
Effects Specification:	year and company			
R-squared	0,84	F-statistic		15,53
Adjusted R-squared	0,79	Prob(F-statistic)		0,00

Results in relation to proposition 3 (a) (first way):

Variable	Dependent Variable: LOG_Extraordinary Profits			
	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy	-0,04	0,45	-0,82	0,41
Effects Specification:	year and company			
R-squared	0,77	F-statistic		5,59
Adjusted R-squared	0,63	Prob(F-statistic)		0,00

Results in relation to proposition 3 (a) (second way) of different companies:

Variable	Dependent Variable: LOG_Differences commercial versus fiscal value of assets			
	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy	-0,68	0,37	-1,82	0,07
Effects Specification:	year and company			
R-squared	0,91	F-statistic		17,62
Adjusted R-squared	0,86	Prob(F-statistic)		0,00

Results in relation to proposition 3 (b):

Variable	Dependent Variable: LOG_Profit Reserves			
	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy	0,16	0,13	1,24	0,22
Effects Specification:	year and company			
R-squared	0,95	F-statistic		45,02
Adjusted R-squared	0,93	Prob(F-statistic)		0,00

Results in relation to proposition 4:

Variable	Dependent Variable: LOG_Direct investments in participations			
	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy	-0,13	0,30	-0,44	0,66
Effects Specification:	year and company			
R-squared	0,92	F-statistic		34,07
Adjusted R-squared	0,89	Prob(F-statistic)		0,00

Variable	Dependent Variable: LOG_Intercompany receivables			
	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy	1,28	0,44	2,89	0,00
Effects Specification:	year and company			
R-squared	0,76	F-statistic		9,57
Adjusted R-squared	0,68	Prob(F-statistic)		0,00

Appendix D: Summarized results of tests specified by year

Results in relation to proposition 1 and 2:

Variable	Dependent Variable: Ratio			
	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy 2004	2,30	1,03	2,23	0,03

Variable	Dependent Variable: Ratio			
	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy 2005	-2,20	1,03	-2,15	0,03

Variable	Dependent Variable: Ratio			
	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy 2006	-4,18	1,03	-4,07	0,00

Variable	Dependent Variable: LOG_Internal Financing			
	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy 2004	1,89	0,36	5,23	0,00

Variable	Dependent Variable: LOG_Internal Financing			
	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy 2005	0,16	0,36	0,43	0,67

Variable	Dependent Variable: LOG_Internal Financing			
	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy 2006	-1,68	0,36	-4,65	0,00

Variable	Dependent Variable: LOG_Fiscal Equity			
	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy 2004	-1,85	0,32	-5,84	0,00

Variable	Dependent Variable: LOG_Fiscal Equity			
	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy 2005	1,39	0,32	4,39	0,00

Variable	Dependent Variable: LOG_Fiscal Equity			
	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy 2006	3,21	0,31	10,40	0,00

Results in relation to proposition 3 (a) (first way):

Variable	Dependent Variable: LOG_Extraordinary Profits			
	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy 2004	-0,34	0,42	-0,82	0,41

Variable	Dependent Variable: LOG_Extraordinary Profits			
	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy 2005	-0,14	0,42	-0,33	0,75

Variable	Dependent Variable: LOG_Extraordinary Profits			
	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy 2006	0,23	0,45	0,52	0,60

Results in relation to proposition 3 (a) (second way) of different companies:

Variable	Dependent Variable: LOG_Differences commercial versus fiscal value of assets			
	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy 2004	0,35	0,36	0,97	0,34

Variable	Dependent Variable: LOG_Differences commercial versus fiscal value of assets			
	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy 2005	-0,52	0,37	-1,40	0,16

Variable	Dependent Variable: LOG_Differences commercial versus fiscal value of assets			
	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy 2006	-0,45	0,36	-1,24	0,22

Results in relation to proposition 3 (b):

Variable	Dependent Variable: LOG_Profit Reserves			
	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy 2004	-0,62	0,11	-5,74	0,00

Variable	Dependent Variable: LOG_Profit Reserves			
	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy 2005	0,00	0,10	-0,07	0,95

	Dependent Variable: LOG_Profit Reserves			
Variable	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy 2006	0,66	0,10	6,50	0,00

Results in relation to proposition 4:

	Dependent Variable: LOG_Direct investments in participations			
Variable	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy 2004	0,09	0,29	0,30	0,76

	Dependent Variable: LOG_Profit Reserves			
Variable	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy 2005	-0,28	0,28	-0,99	0,32

	Dependent Variable: LOG_Profit Reserves			
Variable	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy 2006	-0,25	0,29	-0,87	0,38

	Dependent Variable: LOG_Intercompany receivables			
Variable	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy 2004	0,26	0,45	0,57	0,57

	Dependent Variable: LOG_Profit Reserves			
Variable	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy 2005	0,71	0,44	1,59	0,11

	Dependent Variable: LOG_Profit Reserves			
Variable	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy 2006	0,32	0,45	0,73	0,47

Results in relation to proposition 5:

	Dependent Variable: LOG_Fiscal value of total assets			
Variable	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy 2004	1,27	0,23	5,53	0,00

	Dependent Variable: LOG_Profit Reserves			
Variable	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy 2005	0,66	0,23	2,88	0,00

	Dependent Variable: LOG_Profit Reserves			
Variable	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy 2006	-1,15	0,23	-5,00	0,00

Results in relation to proposition 5 of different companies:

	Dependent Variable: LOG_Fiscal value of total assets			
Variable	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy 2004	0,51	0,20	2,57	0,01

	Dependent Variable: LOG_Fiscal value of total assets			
Variable	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy 2005	0,61	0,20	3,07	0,00

	Dependent Variable: LOG_Fiscal value of total assets			
Variable	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy 2006	-0,67	0,20	-3,35	0,00

	Dependent Variable: LOG_Commercial value of total assets			
Variable	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy 2004	0,08	0,09	0,90	0,37

	Dependent Variable: LOG_Commercial value of total assets			
Variable	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy 2005	0,08	0,09	0,89	0,38

	Dependent Variable: LOG_Commercial value of total assets			
Variable	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy 2006	0,12	0,09	1,31	0,19

Appendix E: Results of tests with Thincap dummy for 2004-2005

Results in relation to proposition 1 and 2:

Variable	Coefficient	Std. Error	t-Statistics	Prob.
	Dependent Variable: Ratio			
Thincap dummy 2004-2005	0,58	0,89	0,65	0,52
LOG_Turnover	-0,19	0,08	-2,34	0,02
Effects Specification:	year and company			
R-squared	0,45	F-statistic		2,46
Adjusted R-squared	0,27	Prob(F-statistic)		0,00
	Dependent Variable: LOG_Internal Financing			
Thincap dummy 2004-2005	2,45	0,35	7,06	0,00
LOG_Turnover	0,29	0,03	9,35	0,00
Effects Specification:	year and company			
R-squared	0,57	F-statistic		3,96
Adjusted R-squared	0,43	Prob(F-statistic)		0,00
	Dependent Variable: LOG_Fiscal Equity			
Thincap dummy 2004-2005	0,16	0,29	0,57	0,57
LOG_Turnover	0,18	0,03	6,87	0,00
Effects Specification:	year and company			
R-squared	0,83	F-statistic		14,99
Adjusted R-squared	0,78	Prob(F-statistic)		0,00

Results in relation to proposition 3 (a) (first way):

Variable	Coefficient	Std. Error	t-Statistics	Prob.
	Dependent Variable: LOG_Extraordinary Profits			
Thincap dummy 2004-2005	-0,36	0,38	-0,95	0,34
LOG_Turnover	0,00	0,03	-0,03	0,97
Effects Specification:	year and company			
R-squared	0,77	F-statistic		5,58
Adjusted R-squared	0,63	Prob(F-statistic)		0,00

Results in relation to proposition 3 (a) (second way) of different companies:

Variable	Coefficient	Std. Error	t-Statistics	Prob.
	Dependent Variable: LOG_Differences commercial versus fiscal value of assets			
Thincap dummy 2004-2005	-0,28	0,32	-0,87	0,38
LOG_Turnover	-0,10	0,04	-2,83	0,00
Effects Specification:	year and company			
R-squared	0,91	F-statistic		17,82
Adjusted R-squared	0,86	Prob(F-statistic)		0,00

Results in relation to proposition 3 (b):

Variable	Coefficient	Std. Error	t-Statistics	Prob.
	Dependent Variable: LOG_Profit Reserves			
Thincap dummy 2004-2005	-0,42	0,09	-4,69	0,00
LOG_Turnover	0,00	0,00	0,76	0,44
Effects Specification:	year and company			
R-squared	0,95	F-statistic		45,89
Adjusted R-squared	0,93	Prob(F-statistic)		0,00

Results in relation to proposition 4:

Variable	Coefficient	Std. Error	t-Statistics	Prob.
	Dependent Variable: LOG_Direct investments in participations			
Thincap dummy 2004-2005	0,37	0,26	1,43	0,15
LOG_Turnover	0,04	0,02	1,77	0,08
Effects Specification:	year and company			
R-squared	0,92	F-statistic		34,12
Adjusted R-squared	0,89	Prob(F-statistic)		0,00

	Dependent Variable: LOG_Intercompany receivables			
Variable	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy 2004-2005	1,20	0,39	3,06	0,00
LOG_Turnover	0,24	0,04	6,77	0,00
Effects Specification:	year and company			
R-squared	0,75	F-statistic		9,03
Adjusted R-squared	0,67	Prob(F-statistic)		0,00

Results in relation to proposition 5:

	Dependent Variable: LOG_Fiscal value of total assets			
Variable	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy 2004-2005	1,01	0,17	5,90	0,00
LOG_Turnover	0,34	0,02	22,10	0,00
Effects Specification:	year and company			
R-squared	0,75	F-statistic		8,77
Adjusted R-squared	0,66	Prob(F-statistic)		0,00

Results in relation to proposition 5 of different companies:

	Dependent Variable: LOG_Fiscal value of total assets			
Variable	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy 2004-2005	0,73	0,15	4,92	0,00
LOG_Turnover	0,23	0,01	15,76	0,00
Effects Specification:	year and company			
R-squared	0,85	F-statistic		16,42
Adjusted R-squared	0,80	Prob(F-statistic)		0,00
	Dependent Variable: LOG_Commercial value			
Variable	Coefficient	Std. Error	t-Statistics	Prob.
Thincap dummy 2004-2005	0,12	0,08	1,51	0,13
LOG_Turnover	0,01	0,01	0,86	0,39
Effects Specification:	year and company			
R-squared	0,94	F-statistic		47,65
Adjusted R-squared	0,92	Prob(F-statistic)		0,00