

# The Thin-Capitalization Rules and Multinationals' Financing and Investment decisions

-Experience from Dutch Legislation-

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## Abstract

The tax planning behavior of multinationals by means of intracompany loans is worldwide of high political concern and attention. To restrict these tax planning opportunities, the vast majority of the European and OECD companies have legislated thin-capitalization rules. This paper analyzes the impact of the Dutch thin-capitalization rule on multinationals' financing and investment decisions. Theory predicts that limitations of deductibility of interest owed to related entities impact the capital structure and investments. The empirical analysis, based on a large firm-level panel dataset of multinationals from 2003 to 2006, supports a significant reduction of internal debt ratios, but finds no evidence for an adverse effect on investments. Furthermore, the results indicate that the Dutch based multinationals reduced their internal debt ratios by increasing their equity levels and not by reducing their excessive internal debt levels. Hence, the Dutch thin-capitalization rule did reduce internal debt ratios, but was not effective in curbing tax planning via intrafirm financing.

Keywords: Multinationals, Thin-Capitalization Rules, Capital Structure, Internal Debt, Investments, Firm-Level Data

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## Chapter 1 Introduction

In most countries, interest expenses are deductible from the corporate income tax and dividends are not. For tax purposes, this makes debt a more attractive source of finance than equity, to the degree depending on the height of the tax rate. Accordingly, corporate income tax (CIT)<sup>1</sup> plays a role in the choice of debt and equity. Many studies have already shown the relevance of taxes in the determination of a corporation's capital structure (see e.g. Modigliani and Miller (1958, 1963) as well as e.g. Desai, Foley and Hines, (2004). Desai et al. (2004) study the financial structure of U.S. outbound investment and suggest that ten percent higher local tax rates are associated with 2.8 percent higher debt/asset ratios. The current tax systems, however, are nationally and internationally so complex and versatile that every firm faces its unique tax situation; marginal effective tax rates<sup>2</sup> differ for every firm in every country. This means that taxes have a distinct role and effect on every company.

Tax situations differ significantly between purely domestic firms and multinationals. For domestic firms, only the domestic tax system is relevant and they optimize their capital structure accordingly for tax purposes. The multinationals, however, face another dimension in that they are exposed to the different national tax systems of the distinct countries in which their affiliates are active. This makes their situation more complicated than a domestic firm, but at the same time provides them with enhanced opportunities for tax planning, by either shifting profits to low tax countries or shifting costs to high tax countries (Moore and Ruane (2005)).

Like purely domestic firms, multinationals can vary their overall indebtedness, but they are not restricted to external lending. Desai, Foley and Hines (2004) show for US controlled affiliates that multinationals have a wide range of tax planning opportunities since they can also use internal lending. They can use intracompany loans to and from their foreign affiliates and change the allocation of their total debt and interest costs. This way they respond to the differences in national tax rates and choose a combination of capital structures that minimizes the overall tax burden (Buettner (2007) and Huizinga (2007)). In the extreme case a multinational could choose to have all its financing activities in a low taxed country; the interest they'll receive for this internal debt will face

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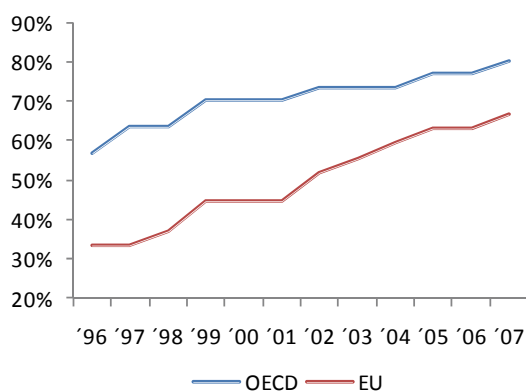
<sup>1</sup> In Dutch: Vennootschapsbelasting (VPB)

<sup>2</sup> The marginal effective tax rate is a function of the statutory tax rate, non debt tax shields, probability of losses, international tax rules, organizational form and other (tax) rules (Graham(2006))

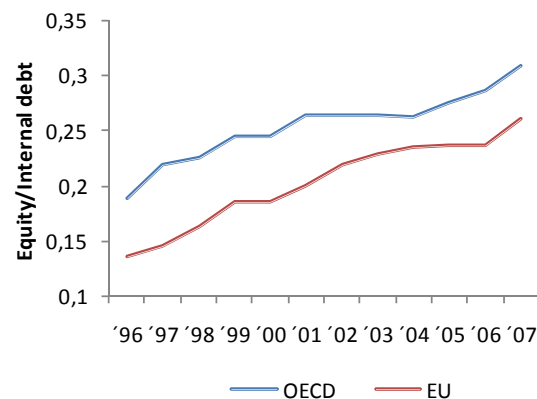
a low tax rate. The paid interest will be deducted from the base of the active subsidiaries facing a ‘normal’ tax rate, e.g. in the Netherlands. Apart from the adverse effects on a country’s tax revenue (Desai (2005)), this enhanced opportunity for tax saving can give multinationals an advantage over domestic companies and distort the decision to operate internationally rather than domestically. (Bucovetsky and Haufler (2006))

These negativities have driven governments (especially those of high taxing countries) to impose restrictions on a multinational’s tax planning possibilities. With respect to debt-shifting, many reacted with the imposition of thin-capitalization rules, limiting interest deduction if the debt-to-equity ratio of an affiliate surpasses a certain threshold. The US was one of the first to enact a thin-cap rule. By now the imposition of thin-capitalization regulations is widespread among European and OECD countries and many reformations (to more rigorous regulation) have taken place<sup>3</sup>. China has just introduced its thin-cap rule in 2008. Figure 1 and Figure 2<sup>4</sup> illustrate the increased use of the thin-cap rules<sup>5</sup> and the tightening of the thresholds among the OECD and EU countries from 1996 to 2007.

**Figure 1: Share of countries imposing Thin Capitalization Rules**



**Figure 2: Average Threshold Level for Internal Debt**



Despite this worldwide tendency and measures to limit the tax planning behavior of multinationals, an article in the Financial Times on the 28th of August 2007 headed “One-third of biggest (UK) businesses pay no tax”. The impact of this article was significant and

<sup>3</sup> For example Germany, France, UK

<sup>4</sup> For both figures, detailed information on thin-capitalization rules is taken from Buettner et al. (2007) and the International Bureau of Fiscal Documentation (IBFD).

<sup>5</sup> Countries are included that do not have an official thin capitalization regulation, but have a treatment of internal debt that effectively has the same result. E.g. Austria uses the ‘substance over form’ criteria and labels the interest related to internal debt, which could not have been acquired through a third party, as dividend. Hence, the dividend cannot be deducted. This treatment of internal debt effectively has the same result as a specific thin-capitalization regulation.

lead to Dutch parliamentary questions.<sup>6</sup> Approximately one year later, the Dutch Central Bureau of Statistics<sup>7</sup> (CBS) analyzed the effective corporate income tax rates of Dutch corporations. Results of this research could not prove the perspective that big, internationally oriented corporations face a lower effective corporate tax burden, but did find strong indications. In response to these indications, on the 15th of December 2008 the state secretary of treasury, Jan Kees de Jager, proposed some new rigorous measures to the Dutch parliament in order to further restrict the tax planning possibilities of multinationals<sup>8</sup>. This proposal has recently (15th of June 2009) been followed by a consultation document to the parliament comprising further restriction of interest deductibility of multinationals. The perspective of the current interest deduction restriction is that it is not effective enough against the erosion of the corporate income tax base in general. It is suggested that the reason for the flaw is that it does not affect non-related party debt and that it does not cope with the actual purpose of the capital, especially when it is used to finance assets that do not generate taxable income (due to the exemption system). The fiscal authorities perceive this to be a ‘mismatch’, since the costs of the capital are deductible and the gains exempted.

The consultation document proposes two variations for further restriction that are estimated to generate an additional two billion<sup>9</sup> for the state;

-Restrict the deductibility of interest of debt (both internal and external) incurred for the acquisition of participations. Secondly, in case two entities enter into a fiscal unity making the participation fiscally no longer visible, excessive interest related to the acquisition cannot be deducted from the profits of the acquired firm.

-Introduction of an earnings stripping rule<sup>10</sup>. The deductibility of all types of interest (e.g. internal, third-party) is restricted as far as it surpasses 30% of the EBITDA<sup>11</sup>.

All are measures that are supposed to further restrict the tax planning opportunities of multinationals, while the actual effect of the original measure of 2004 (the Dutch thin

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<sup>6</sup> Paul Tang 16-01-2008 Parliamentary questions (kamervragen) 30812, 31165, 31586 and Agnes Kant Beschouwingen september 2008.

<sup>7</sup> Centraal Bureau voor de Statistiek, 20 oktober 2008, De effectieve druk van de vennootschapsbelasting 2001-2006

<sup>8</sup> Jan Kees de Jager, 15 dec. 2008, Verdeling VPB-druk en renteproblematiek

<sup>9</sup> This is equal to a 10% increase of the state's corporate income tax returns

<sup>10</sup> The earnings stripping rule has already been introduced in Germany in 2008

<sup>11</sup> Interest under 30% of EBITDA is judged to be businesslike. For the exact quantification of this threshold the Dutch tax authorities simply copied the existing German earnings stripping rule threshold.

capitalization rule) is still unknown. Did it have the intended effect of lowering excessive internal debt levels? Did it result in adverse consequences for multinationals' investments? Clarification on the actual impact and company responses to the Dutch current TCR is valuable and maybe essential information for determining the impact and efficiency of a new measure.

Furthermore, empirical studies on the TCR consequences are few. Wamser and Overesch (2006) suggest that the German Thin-cap reform of 2001<sup>12</sup> induces significantly lower intra-firm debt-levels of inbound investments. In addition, Weichenrieder and Windischbauer (2008) find that tightening the regulation in 2001 in Germany had some limiting effect on leverage and that multinationals used a holding company structure to work around this regulation. Buettner et al. (2007) look at thin-cap rules in general and suggest they are effective in curbing tax planning via intracompany loans. It is questionable if these studies' results are to be translated to the Dutch situation, since the rigorous enactment, as well as the actual content of the Dutch rule was not similar to the one in Germany. Secondly, the different (fiscal) circumstances of the Netherlands and Germany in general suggest different effects.

The lack of empirical studies of the Dutch TCR as a capital structure determinant, along with the significant political attention and relevance of the topic as we speak, brings me to the research question:

*“What were the empirical reactions of Dutch multinationals to the introduction of the Dutch thin-cap regulation in 2004”.*

The first aspect of this question deals with effectiveness of the Dutch TCR in general; did the implementation of the regulation reduce the share of related party debt of Dutch based multinationals?

The second aspect deals with particular reactions of the restricted firms. Firstly, through which channels did the multinationals react? Have they increased equity and/or did they reduce the intercompany loans? Secondly, did the firms facing an interest deduction restriction reduce investments due to an increased cost of capital?

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<sup>12</sup> The safe haven for non-holding companies was reduced from 3:1 to 1,5:1 and the safe haven for holding companies was reduced from 9:1 to 3:1

The main objective of this study is to provide empirical evidence for the answers of these questions and increase the understanding of the effect of the TCR. The empirical analysis employs a comprehensive fiscal micro-level panel dataset of all Dutch based multinationals made available for research by the Dutch Ministry of Finance.

The study is structured as follows: Firstly, in chapter 2 an overview is given of the relevant financial theory on capital structure. The main theories that explain the determinants of capital structure are discussed as well as the context of the TCR and its potential effect on capital structure and investments. Thereafter, in chapter 3, a theoretical model derives some empirical predictions about the consequence of imposing a TCR for capital structure choice and investments. Chapter 4 presents the research methodology and chapter 5 introduces the data and descriptive statistics. Finally, results are discussed in chapter 6, to end up with general conclusions and recommendations for further research in chapter 7.



## Chapter 2 Financial Theory

### 2.1 Introduction to capital structure

The capital structure of a firm is a mix of different securities, which can be issued in countless combinations. In general, a firm can choose among many alternative capital structures; it can vary its debt, issue convertibles and preference shares, arrange lease finance, use equity warrants, and sign forward contracts. All securities are broadly categorized into debt securities and equity securities<sup>13</sup>. Given that firms try to maximize their value, it is relevant to know whether a firm's capital structure has an impact on the value maximizing decision process.

Till now, many theories have emerged on the debt-equity choice in the value maximizing decision process. The irrelevance theory of Modigliani and Miller (1958), proving that under perfect and frictionless capital market conditions the choice between debt and equity financing has no material effects on the value of the firm, was a cornerstone in capital structure theory and the logic is still widely accepted. Nevertheless, the significant amount of attention to capital structures and financial instruments practically show the relevance of financing for firm value (Myers (2001)). That is why there are various theories of capital structure that try to explain the variation. Today's leading theories on optimal capital structure simply drop the Modigliani Miller (MM) assumptions of perfect markets; the trade-off theory emphasizes taxes, costs of financial distress and agency costs and the pecking order theory emphasizes differences in information.

In this chapter all main theories will be discussed in detail. Secondly, the main ideas on capital structure are extended by the potential effect of the TCR on capital structure.

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<sup>13</sup> Hybrid securities combine some of the characteristics of both debt and equity securities. They are not further taken in consideration for the ease of argumentation

## 2.2 Main theories on capital structure

### 2.2.1 The Modigliani-Miller Irrelevance Theorem

The Modigliani-Miller Theorem is a cornerstone of modern corporate finance. It addresses the question whether financial decisions impact the value of the firm. Fundamentally, it is an irrelevance proposition; it suggests that under certain conditions, the financial decisions are irrelevant in determining its value. Modigliani himself explains the results as follows:

...with well-functioning markets (and neutral taxes) and rational investors, who can ‘undo’ the corporate financial structure by holding positive or negative amounts of debt, the market value of the firm – debt plus equity – depends *only* on the income stream generated by its assets. It follows, in particular, that the value of the firm should not be affected by the share of debt in its financial structure or by what will be done with the returns – paid out as dividends or reinvested (profitably). (Modigliani, 1980)

The MM theorem comprises four distinct propositions, each under the condition of absence of all market imperfections, such as asymmetric information, capital market frictions<sup>14</sup>, tax differences and incomplete markets.<sup>15</sup> The first proposition establishes that a firm’s capital structure has no impact on its market value. The value of the unlevered firm ( $V_U$ ) equals the value of the levered firm ( $V_L$ ), which on its turn equals the sum of the value of its debt ( $D$ ) plus the value of its equity ( $E$ );

$$V_U = V_L = D + E \quad (1)$$

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<sup>14</sup> E.g. transaction costs, asset trade restrictions or bankruptcy costs

<sup>15</sup> A market is complete when all cash flows for a trading strategy can be replicated by a similar synthetic trading strategy.

The market value of any firm is independent of its capital structure and is given by capitalizing its expected return ( $CF$ ) at the weighted average cost of capital ( $r_a$ );

$$V_U = V_L = D + E = \sum_{t=1}^{\infty} CF_t / r_a \quad (2)$$

The value of the firm thus originates from the cash flow generating abilities of the asset side of the firm and not from the liability side. Subsequently, firm value can only be enhanced by either increasing the cash flow generated by this asset side, or by lowering its weighted average cost of capital<sup>16</sup> (abbreviation: WACC). MM proves the above equation (2) by showing that any discrepancy in firm value of two firms, facing the same risk class but different capital structures, will be restored through arbitrage. An investor could buy and sell stocks and bonds in such a way as to exchange one income stream for another stream, identical in all relevant respects (e.g. risk class) but selling at a lower price (MM (1958)). In other words, without incurring any additional risk, investors can costlessly replicate a firm's financial actions. Every investor can mimic the returns of investing in a levered company by applying an alternative investment strategy that consists of a combination of borrowing on personal account and buying shares in an unlevered firm of the same risk class. Adversely, every investor can mimic the returns of investing in an unlevered company by applying an alternative investment strategy that consists of a combination of buying risk free bonds and shares in a levered firm of the same risk class. The possibility of selling and buying bonds gives investors the ability to 'undo' leverage increases and decreases. Subsequently this possibility prevents the value of one firm to be consistently different than another based on its capital structure.

The second MM proposition establishes that the cost of equity capital is a linear function of the debt-equity ratio;

$$r_e = r_a + \frac{D}{E}(r_a - r_d) \quad (3)$$

When the D/E ratio increases, both the expected return on equity ( $r_e$ ) and debt ( $r_d$ ) rises due to increased risk. The WACC ( $r_a$ ) stays constant since the risk of the firm's assets

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<sup>16</sup> This equals the risk class' expected return on assets  $r_a$  in equilibrium.

and thus the required return on those assets does not change due to changing capital structures. Equation (3) is graphically illustrated in figure 3<sup>17</sup>:

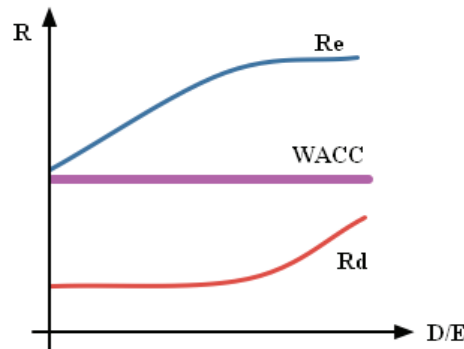


Figure 3

The course of  $r_e$  and  $r_d$  is explained by the following<sup>18</sup>:

A higher leverage enhances the chance of default and both the shareholders and debt holders require compensation for this additional risk taken. Since debt is senior to equity, the additional costs of default due to increasing debt levels are distributed differently for  $r_e$  and  $r_d$ . At low D/E levels, the costs of default are not borne by the debt holders, since they represent a small share and will be remunerated first. With relatively high D/E ratios, however, the chance that the lost value of a bankrupt firm is not fully absorbed by the junior equity is significant and the debt holders will subsequently bear part of the bankruptcy costs.

Both the expected return on equity and debt comprise the WACC. As seen in figure 3, the WACC stays constant. This is the basic identity of M&M Proposition I and II; the capital structure of the firm does not affect its total value, since it does not change the firm's risk class.

Due to the thesis' focus on capital structure, in depth elaboration on the third and fourth proposition, concluding on a firm's dividend and financial policy respectively, is not relevant. The third proposition establishes that firm market value is independent of its dividend policy. Dividend policy only changes the mix of E and D in the financing of the

<sup>17</sup> This graph has an indicative purpose and should not be interpreted literally.

<sup>18</sup> For completeness of argumentation the factor of bankruptcy costs is temporarily considered in the explanation. Further elaboration on bankruptcy costs and capital structure is found in chapter 2.3.1

firm. The fourth proposition suggests that equity-holders are indifferent about the firm's financial policy. In order to decide on an investment, a firm should expect a rate of return at least equal to  $r_a$ , no matter where the finance comes from.

The results of MM (1958) might seem irrelevant since none of the conditions is met in the real world. However, implicitly it raises an important question as under what conditions corporate financing matters. It tells us where to look for determinants of optimal capital structure and how those factors might affect optimal capital structure.

### 2.2.2 Taxes and capital structure

The original paper of Modigliani and Miller already enlightens the role of taxes in the fundamentals of the irrelevance theory. The correction article of MM (1963) and the article of Miller (1977) address the issue of taxes more specifically; the presence of corporate and personal taxes is accredited and seen as a source of discrepancy for  $V_U$  and  $V_L$ . All the remaining conditions underlying MM-1 are assumed to hold throughout.

With respect to the presence of corporate income taxes, debt finance is preferential over equity finance since interest can and dividends cannot be deducted from a firm's taxable base<sup>19</sup>. Substituting debt for equity then reduces the company's payment to the government and increases the returns to the shareholders. The actual gain from corporate leverage ( $G_L$ ), also known as the tax shield, is linear with the amount of debt to the degree depending on the height of the corporate tax rate ( $t_c$ );

$$G_L = V_L - V_U = D * t_c \quad (4)$$

MM's correction article thus concludes that regarding corporate taxation, debt financing is value enhancing<sup>20</sup>, since it increases the firm's after-tax returns<sup>21</sup>.

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<sup>19</sup> This treated of debt and equity is known as the classical tax treated and is in place in most countries.

<sup>20</sup> DeAngelo and Masulis (1980) modify this conclusion in that they suggest that the presence of corporate tax shield substitutes for debt, such as accounting depreciation, depletion allowances, and investment tax credits, implies a market equilibrium in which each firm has a unique interior optimum leverage decision

However, Miller (1977) introduces the aspect of personal income taxes and provides opportunities for equity financing. A tax system imposing higher taxes on interest than on equity income<sup>22</sup> (partly) eliminates the gain from corporate leverage, to the degree depending on the height of divergence of the personal taxes. When  $t_d > t_c * t_e$ , the gain from corporate leverage even turns negative<sup>23</sup>. Mathematically, the overall effect of taxes on firm value is expressed as follows:

$t_e$  = Tax rate on equity income

$t_d$  = Tax rate on interest

$$G_L = V_L - V_U = D \left( 1 - \frac{(1-t_c)(1-t_e)}{(1-t_d)} \right) \quad (5)$$

Theoretically, as seen in equation (5), when  $(1-t_d)$  does not equal  $(1-t_c)(1-t_e)$ , owners of a corporations can benefit from changing their capital structure.

Practically however, since tax rates differ among investors themselves<sup>24</sup>, every individual firm attracts a specific clientele group that faces equilibrium  $(1-t_d) = (1-t_c)(1-t_e)$  given the firm's particular capital structure and resulting proportion of equity/debt payments. Miller (1977) argues that any situation in which the owners of corporations could increase their wealth by substituting debt for equity (or vice versa) would be incompatible with market equilibrium. Hence, changes in capital structure affect the ownership pattern and not the firm's overall market value (Bailey (2008)). With this theory, Miller (1977) reasserts the original standpoint that debt policy is irrelevant, even with taxes.

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(with or without leverage-related costs). This theory offers a plausible taxes-based argument for the trade-off framework, regardless of the presence of bankruptcy and agency costs.

<sup>21</sup> It must be mentioned that while the implication is logically coherent, it is contrary to observation. This is due to the prediction's negligence of bankruptcy costs. Further elaboration on bankruptcy costs will follow in chapter 2.2.3.1

<sup>22</sup> I.e. dividends and capital gains

<sup>23</sup> In practice this could be the case the case when a firm's taxable base is zero due to losses. Hence,  $T_c$  would effectively be zero.

<sup>24</sup> Such differences could occur because some classes of investors (e.g. insurance companies or pension funds) receive favourable tax treated or as a result of a progressive tax system.

### 2.2.3 *The static tradeoff theory of capital structure*

The tradeoff theory of capital structure refers to the idea that a company chooses how much debt finance to use by balancing the costs and benefits. The theory primarily deals with three concepts: costs of financial distress, agency costs and real option costs.

#### 2.2.3.1 *The costs of financial distress*

According to the proposition of MM's 1963 correction paper, firm value is an increasing function of debt and firms should fully exploit the tax saving benefits of debt. However, the higher the debt obligation, the higher the risk of financial distress. A firm experiences financial distress when the firm is unable to cope with the debt holders' obligations. If the firm continues to fail in making payments to the debt holders, the firm can even become insolvent and consequently incur the direct<sup>25</sup> and indirect<sup>26</sup> costs of financial distress. The ex-ante costs of financial distress, which are a function of the probability of financial distress and the costs incurred in case of financial distress, should be considered in deciding on the optimal capital structure (Miller 1977). Kraus and Litzenberger (1973) consider a balance between the dead-weight costs of financial distress and the tax saving benefits of debt in the determination of a capital structure. The mathematical illustration of formula (4) including financial distress costs is as follows<sup>27</sup>:

$$G_L = V_L - V_U = D * t_c - PV(C_{fd}) \quad (6)$$

In particular, a firm that is trying to maximize the value for its shareholders will choose a debt level that equalizes the marginal cost of debt that results from these financial distress costs with the marginal benefit of debt that results from tax benefits. This is point D/E\* in Figure 4<sup>28</sup>:

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<sup>25</sup> These costs can be seen as transaction costs of negotiating between debt holders, equity holders and the firm in case of bankruptcy or debt restructuring (Warner (1977))

<sup>26</sup> E.g. staff leaving, lost sales, inability to obtain external financing, poor liquidation values, foregone investment opportunities.

<sup>27</sup> To be chronologically coherent with the theoretical development of capital structure determinants, formula (4) instead of formula (5) is used as a base for formula (6)

<sup>28</sup> This graph has an indicative purpose and should not be interpreted literally.

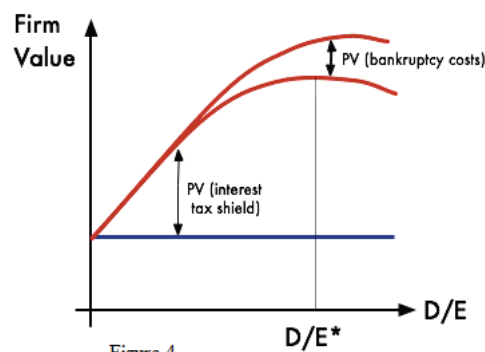


Figure 4

Although the existence of bankruptcy costs is theoretically sound, empirical studies of the magnitude of bankruptcy costs are almost non-existent. Warner (1977), in his study of 11 railroad bankruptcies between 1930 and 1955, estimates the average costs of bankruptcy as a fraction of the value of the firm three years prior to bankruptcy to be 2.5% (with a range of 0.4% to 5.9%). The average dollar costs were \$1.88 million. Both of these measures seem remarkably small and are consistent with the belief that bankruptcy costs themselves are unlikely to be the major determinant of corporate capital structures. (Jensen and Meckling (1976))

### 2.2.3.2 The agency theory of capital structure

The original ‘black box’ theory of the firm entails the view that the firm is a value maximizing<sup>29</sup> entity, meeting the relevant marginal conditions with respect to inputs and outputs. This theory, however, is inadequate to explain the conflicting objectives of the company’s distinct participants, who maximize their own utility given their property rights<sup>30</sup>. The participants facing different property rights are basically the debt holders, equity holders and employees<sup>31</sup>. Jensen and Meckling (1976) suggest that perfect alignment of interests is impossible when multiple property rights are present. Subsequently, in the agency relationship<sup>32</sup>, principals incur monitoring and bonding costs

<sup>29</sup> Value maximizing from shareholder (principal) point of view, not from the stakeholders’ perspectives.

<sup>30</sup> Property rights specify how costs and rewards are allocated among the participants of a company.

<sup>31</sup> Other participants (stakeholders) such as such as government, suppliers and customers are not considered due to irrelevance for argumentation.

<sup>32</sup> The agency relationship is defined as a contract under which one or more persons (the principal(s)) engage another person (the agent) to perform some service on their behalf which involves delegating some decision making authority to the agent



to minimize the self interest seeking behavior of the agent and to maximize the alignment to their interest. Jensen and Meckling (1976) define the total agency costs as the sum of the monitoring and bonding expenditures, as well as the residual loss resulting from the remaining divergence in interest between the principal and the agent.

There are two different types of conflict between participants that result in agency costs; the shareholder-bondholder conflict (agency costs of debt) and the shareholder-management conflict (agency costs of outside equity).

#### 2.2.3.2.1 *The agency costs of debt*

Bondholders incur agency costs due to the wealth transfer possibilities of the shareholders. Debt-type claims are non-residual claims and affect the behavior of the shareholders in a way that they seek maximization of the residual claim.

Firstly, when a firm is close to bankruptcy, shareholder value can be altered by increasing the dividend payment at the expense of the non-residual claim. The higher the leverage of the firm, the higher the shareholder incentive and the higher the agency costs to restrain this wealth transfer.

Furthermore, high leverage ratios give shareholders the incentive to engage in activities (investments) which promise very high payoffs if successful even if they have a very low probability of success and a negative expected return. The majority of the upside of this high risk investment is captured by the shareholders, while the downside will be borne by the creditors (Narayanaswamy 1999). The switch to higher than agreed upon risk activities is known as asset substitution. Diamond (1989) and Hirshleifer and Thakor (1992) show that reputation moderates the asset substitution problem, since managers or firms have an incentive to pursue relatively safe projects out of reputation considerations.

Finally, bondholders face the problem of underinvestment<sup>33</sup> (or debt overhang) (Myers (1977)), which is the mirror image of the asset substitution problem, in that shareholders

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<sup>33</sup> Both the asset substitution (overinvestment) and the underinvestment problem can mathematically be explained using the Black-Scholes option pricing model. The division of firm value between share and bondholders makes the claim of each one of them similar to having options on the firm value. Changing the risk profile (volatility) of a firm in financial distress will transfer value between the option of the bondholder and the option of the shareholder.

Berkovitch and Kim (1990) relate the two problems to one another by presenting a unified model; they demonstrate how financial contracts (e.g. seniority), which may alleviate the under-investment incentive, affect the over-investment incentive. I.e. debt can be used to trade off the overinvestment and underinvestment effects.

of a firm in financial distress, have no incentive to contribute new capital in low-risk projects with a positive expected return to avoid transferring wealth from themselves to debt holders. Shareholders bear the entire cost of the investment but the returns from the investment may be captured mainly by the debt holders. The underinvestment problem is the basis for the real options costs of debt. It explains why it is rational for firms to limit borrowing, even when there is a genuine tax advantage to corporate borrowing and capital markets are strictly perfect, efficient, and complete.

Part of the value of a firm is accounted for by the present value of options to make further investments on possibly favourable terms. This value depends on the rule for deciding whether the options are to be exercised. A firm with risky debt<sup>34</sup> outstanding, and which acts in its shareholders' interest, will follow a different decision rule than one which can issue risk-free debt or which issues no debt at all. The firm financed with risky debt will, in some states of nature, pass up valuable investment opportunities<sup>35</sup> - opportunities which could make a positive net contribution to the market value of the firm. Issuing risky debt reduces the present market value of the firm by inducing a future strategy that is suboptimal in the sense just described.

The loss in market value is absorbed by the firm's current stockholders. Thus, in the absence of taxes, the optimal strategy is to issue no risky debt. If there is a tax advantage to corporate borrowing, the optimal strategy involves a trade-off between the tax advantages of debt and the costs of the suboptimal future investment strategy. (Myers (1977))

By monitoring and inclusion of various covenants, bondholders try to restrain wealth transfer to the shareholders. These actions along with the residual wealth transfer lead to the total agency costs for debt holders. As long as they recognize their existence, they will take them into account in determining the yield to maturity on the issue and therefore the seller of the claim (the shareholders) will bear the costs<sup>36</sup>.

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<sup>34</sup> Think of senior debt or mezzanine financing.

<sup>35</sup> This would be in case of a firm in financial distress where most of the payoff of a new positive NPV project would go to the risky debt holders.

<sup>36</sup> Assuming perfectly competitive capital markets.

### 2.2.3.2.2 *The agency costs of outside equity*

Shareholders (principals) incur additional costs to minimize the self interest seeking behavior of the management (agents). Depending on the share of inside equity<sup>37</sup>, management will only bear a fraction of the costs of any non-pecuniary benefit<sup>38</sup> they take out and only benefit a fraction of new profitable projects they undertake. In other words, outside equity provides an incentive to managers to spend on perquisites and a disincentive to extensively devote personal effort in finding profitable investments. Owners discipline the managers through monitoring and align mutual interests by linking the manager's payoff to firm value<sup>39</sup>. As the manager's dependence on firm value rises, the marginal costs of his perquisites rise, as well as his personal benefit of profitable investments. The subsequent improvement of behavior increases shareholder value. The incentive for shareholders to monitor and grant options will exist as long as the marginal benefit exceeds the marginal costs<sup>40</sup>.

Another aspect that can discipline managers in overinvestment for personal benefit, is debt financing (Jensen and Meckling (1986)). Interest payments decrease the free cash flow available to managers and subsequently decrease the space for investments (free cash flow theory); debt disciplines management in their spending decisions.

It can be concluded that the static tradeoff theory of capital structure comprises the process of deciding on a capital structure by balancing the financial distress and agency costs of debt against the agency costs of equity. The static theory suggests that firms have a target or optimum leverage, where the marginal costs of equity equals the marginal cost of debt and that due to the exponential growth of the costs of both debt and equity, extremes are not feasible. The theory has been empirically proved<sup>41</sup> by many studies.

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<sup>37</sup> Inside equity is the equity in the hands of the management. All other equity is referred to as outside equity.

<sup>38</sup> E.g. an extra computer, purchasing from friends, charitable contributions, a company jet, etc

<sup>39</sup> By granting shares and options.

<sup>40</sup> The existing shareholders will bear the entire wealth effects of these expected costs as long as the equity market anticipates these effects.

<sup>41</sup> Among others Taggart (1977), Jalilvand and Harris (1984), Auerbach (1985) and Fama and French (2002).

#### 2.2.4 *The Pecking Order Theory*

The theory is based on the principle that information is not equally distributed among the management and its outside investors. The firm's managers know more about the value of its assets and growth opportunities than outside investors and the type of financing signals this inside information (Ross (1977)). It is assumed that management acts in the interest of the existing shareholders. Subsequently, managers that believe their equity to be undervalued will prefer to use retained earnings or debt to finance a new project, since the issue of undervalued equity would mean a transfer of wealth from the old shareholders to the new shareholders. Adversely, managers that believe their equity is overvalued will issue new equity to finance a project. Hence, new investors will experience a decision to issue securities as a signal that it is overvalued and that they pay too much. This problem leads to a pooling market equilibrium in which new shares can only be offered at a marked-down price. The subsequent loss of value is referred to as the information cost of the equity issue<sup>42</sup>. The information costs would have been nihil would the project have been financed with retained earnings, which are not sensitive to mis-pricing and valuation errors.

Firms try to minimize these costs of asymmetric information; their financing decision follows a pecking order in which the need for financing is first resolved with internal funds (mainly reinvested earnings), then by new issues of debt and finally by new issues of equity (Harris and Raviv (1991))<sup>43</sup>. Following this financing pattern limits the inefficiencies caused by informational asymmetries (Myers and Majluf (1984)), since the risk and sensitivity to mis-pricing and valuation errors decline respectively.

#### 2.3 *The Dutch thin-capitalization regulation and capital structure*

The thin capitalization regulation is a very specific national fiscal rule of the CIT, which limits the deduction of interest under special conditions. Firms facing such a restriction lose a certain amount of the tax benefit of debt and above theories imply they will change their capital structure accordingly. This suggests that the thin-cap is a very specific capital

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<sup>42</sup> The information costs may even be of such dimensions, that a firm allows a profitable investment to pass due to the lack of internal financial resources and overrun of debt capacity.

<sup>43</sup> Empirical evidence for the pecking hierarchy is given by Baskin (1989), Shyam-Sunder and Myers (1999) and Haan and Hinloopen (2003)

structure determinant. This chapter elaborates on the current Dutch TCR and prior empirical research on its effect on capital structure and investments.

### 2.3.1 *The current Dutch TCR*

The Dutch thin-cap was enacted on the first of January 2004<sup>44</sup> as a direct reaction to the Bosal Holding verdict of the European Court of Justice (ECJ)<sup>45</sup> on the 18<sup>th</sup> of September 2003. As a consequence of this verdict, excessive debt financing of foreign participations was no longer controlled. To counter the threat of erosion of the Dutch tax base, the TCR was introduced only four months after the verdict of the European Court.

For Dutch tax purposes, interest on related-party debt is not tax-deductible if a company that belongs to a group is over-leveraged. The TCR can therefore only affect firms which have debt from related parties<sup>46</sup> and which belong to a group as identified by the fiscal authorities<sup>47</sup>. Since there is no transitional arrangement, the regulation also implies the loans incurred before 2004.

The tax authorities allow firms to choose between two methods in calculating whether and by how much it is over-leveraged. Unless explicitly chosen for in the declaration, the *fixed-ratio* method is applied; excess debt is identified if the average yearly fiscal debt exceeds the average yearly fiscal equity<sup>48</sup> by *three to one* and this excess is more than €500.000. If excess debt is identified, only the balance of incoming and outgoing related party interest is not deductible.<sup>49</sup>

The *concern-ratio* is applied when explicitly chosen for by the tax-payer in the declaration. It implies that the (commercial<sup>50</sup>, average) *debt/equity ratio of the firm cannot exceed the debt/equity ratio of the group as a whole*<sup>51</sup>. Again, the deductibility is limited to the balance of interest that is due to related parties only. The intention of this additional test is to offer an escape to the firms of the financial industry, where ‘excessive’ debt

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<sup>44</sup> Art 10d Wet VPB 1969. See appendix A for the complete article

<sup>45</sup> HvJ EG C-168/01 (Bosal Holding); art. 13 lid 1 Wet VPB 1969 had to be dropped since it was judged to be in conflict with European law.

<sup>46</sup> Fiscal authorities identify as ‘related party’: a) an entity in which the tax-payer holds a stake of at least 33% b) an entity which holds a stake of at least 33% in the tax-payer. For the complete definition of ‘related party’ see art. 10a lid 4 Wet VPB 1969, appendix B

<sup>47</sup> Art. 10d lid 2 Wet VPB 1969; if the tax-payer is not part of a group as identified in art. 24b book 2 BW, the TCR is not applicable.

<sup>48</sup> Reserves approved by the fiscal authorities are not considered equity.

<sup>49</sup> Art. 10d lid 3 Wet VPB 1969

<sup>50</sup> Debt and equity are defined according to the annual report.

<sup>51</sup> Art. 10d lid 5 Wet VPB 1969

financing is common. For the banking sector the concern-ratio often offers an escape from the fixed ratio.

### 2.3.2 *Prior empirical research*

Although few and not focusing on the Dutch TCR specifically, the literature does provide some evidence regarding the effectiveness of a thin-cap rule. Wamser and Overesch (2006) suggest that the German thin-cap reform of 2001<sup>52</sup> induces significantly lower intra-firm debt-levels of inbound investments. However, Weichenrieder and Windischbauer (2008) find that tightening the regulation in 2001 in Germany had some limited impact on leverage, possibly because multinationals used a holding company structure to work around this regulation. Buettner et al. (2007) look at thin-cap rules in 36 European and OECD countries and suggest they are effective in curbing tax planning via intercompany loans. Thorough analysis of these articles show areas of improvement in methodology and no direct translation of the results to the Dutch case in particular.

#### *Wamser and Overesch (2006)*

Part of their study analyses the effect of the two German thin-cap reforms of 2001 and 2004, using inbound Foreign Direct Investment (FDI) of Germany. Although more rigorous in 2001, both reformations entail a tightening of the regulation. The methodology of Wamser and Overesch's study requires the identification of companies that are actually restricted. However, the MiDi database used does not enable them to identify single companies in the data which are restricted by the TCR and forces them to identify the treated group based on pure commercial debt-to-equity ratios. Consequently, their treated group and results include inaccuracies in the sense that not all treated corporations were really affected. Furthermore, the study's results are not to be translated directly to the Dutch situation, since the rigorous enactment, as well as the actual content of the Dutch rule, were not similar to the reformations of 2001 and 2004 in Germany. This study is on the introduction of the regulation with a tighter instant threshold; the results are expected to be more significant.

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<sup>52</sup> The safe haven for non-holding companies was reduced from 3:1 to 1,5:1 and the safe haven for holding companies was reduced from 9:1 to 3:1

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*Buettner et al. (2007)*

Part of this study analyses the effect of the existence and tightening of thin-capitalization rules on the subsidiaries of German multinationals in 36 countries in the time period between 1996 and 2004. Buettner et al suggest that both the introduction and the tightening of a TCR reduce the amount of intercompany loans used. Secondly, they distinguish the German affiliates that are restricted by a TCR and the ones that are not in order to test differences in tax sensitivities. A regression shows significant tax sensitivity of internal debt for those affiliates that do not face binding restrictions. This difference in the effects of the tax rate supports the view that a restricting TCR removes the tax incentive for tax planning via intercompany loans.

Although they do not specify exactly how they distinguish between restricted and non-restricted firms, it is probable that they used the commercial data of the MiDi database, since this is their main database. This would suggest that waterproof selection could not have been made and results are blurred.<sup>53</sup>

Since 4.85% out of their observations<sup>54</sup> is from the Netherlands, results are modestly applicable to the Dutch TCR.

*Weichenrieder and Windischbauer (2008)*

In line with Wamser and Overesch (2006), Weichenrieder and Windischbauer (2008) find a reduction of debt-equity ratios due to the 2001 German reformation, but limited. As a possible reason for the limited impact, they suggest that multinational firms circumvented the regulation by using holding company structures. They identify their treated group just like Wamser and Overesch using debt-to-equity ratios of the MiDi database.

Furthermore, although Weichenrieder and Windischbauer acknowledge that any decrease in relative use of intercompany loans after the TCR introduction must be corrected for common time trends, they do not correct for changes in intercompany loans due to changing intercompany tax rates. Both their treated group and their control group face the same changes in the German corporate income tax since all firms are located in Germany. However, their lenders are dispersed worldwide and therefore every German firm faces a distinct intercompany tax rate difference, depending on the location of the lender. Changes in statutory tax rate differences affect internal leverage and since the control group has

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<sup>53</sup> Buettner et al. (2007) strengthen this assumption by writing: ‘...This allows us to distinguish affiliates which are most likely subject to binding thin-capitalization restrictions...’

<sup>54</sup> Buettner et al (2007), page 16

lenders located in different countries, they face other tax rate differences. A movement of internal leverage due to changing (international) tax rate differences is not corrected for in this study and subsequently the results are blurred and the study is open to improvement. Regarding the applicability of its results to the Dutch case, similar points as Wamser and Overesch (2006) can be enlightened; the German case does not translate one-to-one with the Dutch case.

Concluding, it can be stated that all of the prior empirical research on thin-cap regulation lack a sound identification of restricted firms with the use of the German MiDi database. Furthermore, it is unclear to what extent the results are applicable to the Dutch case specifically.

## 2.4 Conclusion

In this chapter the evolution of the main theories of capital structure have been reviewed to give a clear insight and understanding of a firm's capital structure and its determinants. Taking the assumptions of Modigliani and Miller's 1958 irrelevance theory as a starting point, many additional empirical studies have by now proven the effect of capital structure on firm value. However, the currently leading theories of trade-off and pecking order contradict; the intuition of the pecking order theory, that the observed amount of debt reflects a cumulative result of financing decisions over time (Shyam-Sunder and Myers (1999)), is in contrast with the target capital structure presumption of the tradeoff theory. Empirical researches on sovereignty of one of the theories show mixed results<sup>55</sup> and subsequently no conclusion can be drawn. Both contradicting theories on capital structure remain leading in recent corporate finance and Myers (2002) statement holds; "there is no universal theory of capital structure and no reason to expect one".

Secondly, this chapter discussed the TCR as a potential capital structure determinant. Regarding the Dutch TCR, no one-on-one translation can be made from the present studies and hence the company responses to the Dutch TCR specifically remain open for further study.

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<sup>55</sup> E.g. Shyam-Sunder and Myers (1999) and Dang (2005)



## Chapter 3 Theoretical implication of capital structure determinants

### 3.1 Introduction

In addition to previous chapter identifying the relevant capital structure determinants, this chapter mathematically elaborates on the actual impact of the capital structure determinants. The focus will primarily be on the specific capital structure determinant ‘TCR’. First, a theoretical model<sup>56</sup> is presented that derives an empirical prediction about the consequence of imposing a TCR on the ratio of internal debt and equity<sup>57</sup>. In the second part of this chapter an empirical prediction is presented on the actual investment changes due to the TCR.

### 3.2 Capital structure determinants and the internal debt ratio

Given the presence and values of corporate taxation<sup>58</sup>, the costs of debt (bankruptcy costs, agency costs and information costs) and the benefits of debt (the FCF-theory), subsidiaries adopt an optimal internal debt ratio; optimal in a sense that the group’s total value or economic profit<sup>59</sup> is maximized. For simplicity and ease of argumentation, it is temporarily assumed that the group consists of only two entities, a parent and its subsidiary, and that the parent holds 100% of the equity<sup>60</sup>. The theoretical models will give the intuition of the actual impact of the determinants on the group’s internal financing decision, besides the practical line of reasoning and empirical results of previous chapter. Based on this model

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<sup>56</sup> The model is a combination of the models used by Overesch and Wamser (2006) and Buettner et al. (2007).

<sup>57</sup> It must be noted that although the Dutch TCR test comprises both internal and external debt, the focus of this study is on the impact of the regulation on internal debt ratio and not on the external debt ratio. The reason is that internal debt ratio movements are expected to be more significant, since the actual restriction eventually limits itself to internal interest. Furthermore, a movement in external financing is principally more costly and time-consuming and has the consequence that it affects the group’s total capital. A reaction comprising internal debt is initially more at hand.

<sup>58</sup> It is assumed that multinationals do not take into account the taxation of dividend, interest and capital gains at the investor level. Private investors are generally subject to such taxation, but the internationally dispersed ownership of the shares of a multinational firm makes it difficult for these firms to take taxation at the personal level into account when deciding on their financing (Huizinga, 2007)

<sup>59</sup> Economic profit is a widely used method of measurement for firm value

<sup>60</sup> Lower equity stakes would not change the intuition of the model and unnecessarily complicate the model.

and its derivations, a hypothesis is formulated on the effect of the specific capital structure determinant TCR on a firm's capital structure.

Secondly, an hypothesis is formulated on the investments consequences of the TCR.

### 3.2.1 Corporate taxation and internal debt

The impact of corporate taxation on a subsidiary's capital structure can be explained by the following model. For the structure of argumentation, it is first assumed that the subsidiary's capital is financed with equity and external debt; internal debt is considered later on. The parent is based in country 1 and carries out activities in host country 2 through its subsidiary. The total economic profit function ( $\pi^s$ ) of the subsidiary is given by:

$$\begin{aligned} \pi^s = & f(k_2)(1-t_2) \\ & - (i_2\lambda_2k_2)(1-t_2) - rk_2(1-\lambda_2) \end{aligned} \quad (1)$$

$k_2$  denotes the invested capital of the subsidiary. The net profit is a function of this invested capital, corrected for the local statutory corporate income tax rates of the host country ( $t_2$ ). The second line reports the costs of capital. The first term in the second line reports the interest costs where  $i_2$  is the rate of interest for debt issued in the subsidiary's country and  $\lambda_2$  denotes the share of capital financed with external debt. It is multiplied by  $1-t_2$  as the debt is tax deductible. The second term in this line captures the return on equity where  $r$  is the exogenous required rate of return<sup>61</sup>. Note that interest is deductible and equity is not. The total net profit of the subsidiary minus the costs of debt and equity constitute the subsidiary's total economic profit. Through capital gains or dividends this profit is available to the parent<sup>62</sup>.

<sup>61</sup> The required rate of return is exogenous since a single firm cannot influence the demand and supply of the enormous capital market.

<sup>62</sup> The sum capital gains and dividends to the parent equals  $\pi^s$  if the repatriated foreign profits are tax-exempt. The exemption system is in place in most European countries and Canada. Under the credit system, it would be the same be the same if  $t_2 > t_1$ . Otherwise, the affiliate's tax rate increases to  $t_1$  (depending on the time of retention) to give the after tax value of the capital gains and dividend to the parent.

However, the parent company has the option of financing a share ( $\mu_2$ ) of the subsidiary's invested capital ( $k_2$ ) with internal debt instead of intra-firm equity. The internal debt ( $\mu_2 k_2$ ) is remunerated at a practically fixed arm's length<sup>63</sup> interest rate ( $i_1$ ) of the parent's country 1. The total amount of internal interest, denoted by  $i_1 \mu_2 k_2$ , is deductible at the subsidiary's corporate tax rate ( $t_2$ ) and taxed at the parent's rate ( $t_1$ ).<sup>64</sup> Hence, the group's tax consequence of internal debt amounts to:

$$i_1 \mu_2 k_2 (t_2 - t_1)$$

Depending on the difference between the corporate tax rates ( $t_2 > t_1$  or  $t_2 < t_1$ ), internal debt will theoretically either lead to additional or less<sup>65</sup> economic profit. Adding internal debt to equation (1) gives:

$$\begin{aligned} \pi^s &= f(k_2)(1 - t_2) \\ &- (i_2 \lambda_2 k_2)(1 - t_2) - r k_2 (1 - \lambda_2 - \mu_2) \\ &+ i_1 \mu_2 k_2 (t_2 - t_1) \end{aligned} \quad (2)$$

### 3.2.2 The costs and benefits of debt

As chapter 2 suggests, there are additional costs and benefits associated with the use of internal and external debt. The costs of debt arise from the agency problem, information asymmetry and financial distress.<sup>66</sup> The cost function  $c_2(\lambda_2, \mu_2)$  has the property of increasing at an increasing rate with the debt ratio (i.e. convex);

<sup>63</sup> Art 8b Wet VPB 1969. This fiscal principle states the obligation to related parties of business like treated of one another.

<sup>64</sup> Strictly speaking, one should use marginal tax rates in these computations. However, in this case, adopting statutory tax rates simplifies argumentation and doesn't change the intuition.

<sup>65</sup> This is practically unlikely due to possibility to substitute internal leverage for the almost equivalent external leverage.

<sup>66</sup> It must be stated that the costs of debt are lower for internal debt than for external debt. The lenders are simultaneously shareholders and subsequently will act at the expense of one another, depending on the actual stake. In a 100% participation, the costs of internal debt will be close to zero. Although, in the Netherlands, other costs arise with the use of internal debt; the higher the share of internal debt the higher the risk that interest is not deductible for tax purposes. In conclusion it can be stated that with widely dispersed ownership stakes, the properties of the cost function generally hold.

$$c_{2,\mu} = \frac{dc_2}{d(\lambda_2, \mu_2)} > 0, \quad c_{2,\mu\mu} = \frac{d^2c_2}{d^2(\lambda_2, \mu_2)} > 0 \quad (3)$$

The gains from the use of debt are found in the free cash flow (FCF) theory; fixed annual interest payments discipline management in their spending behavior. The properties of the gain function  $g_2(\lambda_2, \mu_2)$  are that the gains from leverage increase at a decreasing rate (i.e. concave);

$$g_{2,\mu} = \frac{dg_2}{d(\lambda_2, \mu_2)} > 0, \quad g_{2,\mu\mu} = \frac{d^2g_2}{d^2(\lambda_2, \mu_2)} < 0 \quad (4)$$

Hence, the economic profit function (2) becomes:

$$\begin{aligned} \pi = & f(k_2)(1-t_2) \\ & - (i_2\lambda_2k_2)(1-t_2) - rk_2(1-\lambda_2-\mu_2) \\ & + [i_1\mu_2(t_2-t_1) - c_2(\lambda_2, \mu_2) + g_2(\lambda_2, \mu_2)]k_2 \end{aligned} \quad (5)$$

### 3.2.3 The implication to the subsidiary's capital structure

The optimal share of internal debt of the subsidiary is where the marginal costs equal the marginal benefits. This optimal share is defined by the first order condition:

$$r + i_1(t_2 - t_1) - c_{2,\mu}(\lambda_2, \mu_2) + g_{2,\mu}(\lambda_2, \mu_2) = 0 \quad (6)$$

Accordingly, the share of internal debt is determined by the corporate tax rate difference of the parent and subsidiary, the internal lending rate and the cost of equity. Let me remind that intra-firm lending rates are bound to the fiscal restriction of the arms length principle and don't have a high degree of freedom. The marginal effect on internal debt of a change in the corporate tax rate in the home country ( $t_1$ ) is obtained by differentiating the first order condition (6):

$$\frac{d\mu_2}{dt_1} = \frac{-i_1}{c_{2,\mu\mu}(\lambda_2, \mu_2) - g_{2,\mu\mu}(\lambda_2, \mu_2)} < 0 \quad (7)$$

The derivative is always negative. The share of internal debt moves inversely with the tax rate of the home country. This is in line with the economic intuition that a higher tax on interest creates a disincentive for the use of (internal) debt. On the contrary, an increase in corporate tax in the host country ( $t_2$ ) is expected to give an incentive to increase internal debt, since it affects the value of tax deductibility of interest. This intuition is obtained by derivation of formula (5):

$$\frac{d\mu_2}{dt_2} = \frac{i_1}{c_{2,\mu\mu}(\lambda_2, \mu_2) - g_{2,\mu\mu}(\lambda_2, \mu_2)} > 0 \quad (8)$$

In conclusion, with the condition of  $t_2 > t_1$ , an increasing difference in corporate tax rates leads to an increased incentive for transition of equity into internal debt (i.e. profit shifting) for the economic profit maximizing group. This is mathematically illustrated by the following derivation:

$$\frac{d\mu_2}{d(t_2 - t_1)} = \frac{i_1}{c_{2,\mu\mu}(\lambda_2, \mu_2) - g_{2,\mu\mu}(\lambda_2, \mu_2)} > 0 \quad (9)$$

The simplified economic explanation of profit shifting is that the tax base of the low-taxed lender is increased as the tax base of the high-taxed borrower is decreased to minimize the group's effective tax rate.

### 3.2.4 *The model in international perspective*

As enlightened in previous paragraph, the benefits of internal debt are triggered by statutory tax rate differences.<sup>67</sup> Within national borders, variety in statutory tax rates is mostly non-existent.<sup>68</sup> Most variety is found across borders and this implies that mainly multinationals can benefit from profit shifting through the use of internal debt.

<sup>67</sup> Strictly speaking, not statutory, but marginal corporate tax rate differences lead to the actual benefit of internal debt. However, 'marginal tax rates' is a concept based on many assumptions and are invalid to act as a base for a long term capital structure strategy. Therefore, the statutory tax rates are used in a firm's long term financing decisions and in this research.

<sup>68</sup> An exception is, for example, the US where the different states have own fiscal authorities.

For clarity purposes, till now it was assumed that a group consisted of only two entities, a parent and its subsidiary. However, practice shows more complex organizational structures. Many multinationals have multiple entities that are exposed to different national tax rates. This enables multinationals to shift the lending activities to their low taxed related entities and artificially create or increase the wedge between the tax rate of the borrower and the lender; all within one group and maximizing total economic profit by eroding the tax base of the highly taxed entities. These activities can even take the extreme measures; raising financing companies in tax havens. Furthermore, it was assumed that the parent held a 100% stake. Practice, however, shows complex ownership structures with multiple shareholders and diverse equity stakes. Both the multinational's fragmented ownership and dispersed organizational structure do not change the intuition of the theoretical model based on two entities with a 100% stake. Shareholders with lower stakes can still benefit from internal debt, but to the proportion of their stake, and the dispersed organizational structures of multinationals only provide more opportunities to benefit from internal debt. As enlightened in chapter 2, the perception that multinationals face a significant lower effective corporate tax burden than domestic firms is of significant political concern.

### 3.2.5 *Introduction of the thin-cap regulation to the model*

Jurisdictions defend against tax base alleviation via (equity refinanced) internal debt by imposing thin-cap rules and limiting the interest deduction of internal debt of the borrower. Any internal interest above a certain threshold<sup>69</sup> cannot be deducted from the tax base and this implies an increased tax liability of:

$$i_1(\mu_2 - \overline{\mu_2})t_2\varphi_2k_2$$

<sup>69</sup> It must be noted that this threshold is determined differently among countries, according to the specific regulation. For instance, in Germany the ratio is determined by internal debt:equity and the absolute internal debt threshold is computed accordingly. However, as seen in chapter 2.3.3., the Dutch TCR looks at the debt:equity ratio first and then limits deductibility to the internal debt if the ratio is passed. The identification of the absolute internal debt threshold in the Netherlands requires an additional step compared to Germany.

$\overline{\mu}_j$  denotes the threshold and  $\mu_j - \overline{\mu}_j$  equals the excessive debt.  $\varphi_2$  denotes whether the rule is effectively binding and takes a value of either 1 or 0. If the threshold is passed (i.e.  $\mu_2 - \overline{\mu}_2 < 0$ )  $\varphi_2 = 1$  and if the subsidiary complies with the ratio (i.e.  $\mu_2 - \overline{\mu}_2 > 0$ )  $\varphi_2 = 0$ . Extending the profit function (5) with the additional tax payments arising from excess debt<sup>70</sup> gives:

$$\begin{aligned} \pi^2 = & f(k_2)(1-t_2) \\ & - (i_2\lambda_2k_2)(1-t_2) - rk_2(1-\lambda_2-\mu_2) \\ & + \left[ i_1\mu_2(t_2-t_1) - i_1(\mu_2-\overline{\mu}_2)t_2\varphi_2 - c_2(\lambda_2, \mu_2) + g_2(\lambda_2, \mu_2) \right] k_2 \end{aligned} \quad (10)$$

### 3.2.5.1 The thin-cap regulation and capital structure

The optimal share of internal debt (4) is now given by<sup>71</sup>:

$$\frac{\delta\pi^2}{\delta\mu_2} = r + i_1(t_2 - t_1 - t_2\varphi_2) - c_{2,\mu}(\lambda_2, \mu_2) + g_{2,\mu}(\lambda_2, \mu_2) = 0 \quad (11)$$

Assuming an (internal) debt level complying with the limits ( $\varphi_2 = 0$ ) both the corporate tax rate of borrower and the lender influence the optimal internal debt ratio. As enlightened in equation (6) the tax rate of the borrower is positively correlated to internal debt since an increase of the rate increases the tax shield benefits. Before the introduction of the TCR, thinly capitalized firms optimized their capital structures given equation (4). With the introduction of the TCR, these firms unexpectedly faced a binding and enforced interest deductibility restriction. Hence, they experienced a significant increase of their

<sup>70</sup> Although this is strictly speaking the profit consequence for the group, for simplicity reasons this profit consequence is attributed to the borrower's profit ( $\pi^2$ ). This does not change the reasoning and intuition derived.

<sup>71</sup> For simplicity reasons the cases on the margin of switching are excluded (i.e.  $\frac{\delta\varphi_2}{\delta\mu_2} = 0$ ) and the external

debt is assumed to be insensitive to internal debt finance (i.e.  $\frac{\delta\lambda_2}{\delta\mu_2} = 0$ )

costs of their internal debt to the degree of  $t_2$ <sup>72</sup> and a new optimal capital structure (see equation 9) with a lower internal debt stake. In order to optimize the capital structure given the new unexpected conditions, the firms will reduce their debt levels.

*Hypothesis 1: With the introduction of the Dutch thin capitalization regulation in 2004, the share of internal debt of Dutch-based subsidiaries with unexpected excess internal debt has decreased.*

It must be noted that a binding and enforced TCR eliminates the tax incentive for additional internal debt, since the additional interest payments are taxed twice: on the level of the lender as well as the borrower. From a tax perspective, this makes equity and external debt favorable to internal debt. However, that does not mean that an optimal capital structure cannot include restricted internal debt. Depending on the magnitude of  $g_2(\lambda_2, \mu_2)$ , i.e. the non-tax benefits of (internal) debt<sup>73</sup>, excess internal debt can be justified. Note that the first hypothesis only states that given an optimal capital structure (including the gains from debt), the unexpected introduction of a binding and enforced TCR will reduce internal debt ratios.

In relation with the first hypothesis, expecting a decrease in the share of internal debt in reaction to a binding TCR, the following sidestep can additionally be stated and analyzed. The objective of the firm would be to reduce its share of internal debt to the ratio insinuated by the regulation<sup>74</sup>. The firm has two options to achieve this; increasing the equity and/or decreasing the internal leverage. All actions to comply with the ratio yield to a different capital structure composition and possibly a different amount of invested capital.<sup>75</sup> Choosing the option of only reducing the internal leverage or increasing the equity would decrease or increase the invested capital respectively. However, the amount of invested capital is primarily set by operations (or assets) and is fixed on short term. This means that subsidiaries that decrease the internal debt ratio to approach the terms of the

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<sup>72</sup> In the Dutch case an increase of 29,6% in 2004

<sup>73</sup> E.g. the need for short term cash, the FCF-theory

<sup>74</sup> A Dutch based multinational theoretically also has the option of reducing its share of external debt. However, as noted in the second chapter, this study's focus is on internal debt, since a reaction in this area is more likely

<sup>75</sup> This is the case when not all reimbursement of the internal leverage is financed with new equity.



TCR, on short term keep their asset at least at the original level and hence primarily increase internal debt's substitute, namely internal equity.

### 3.2.5.2 *The thin-cap regulation and investments*

Besides the effect on capital structure, the TCR might also have affected the cost of capital. Consider the first order condition for capital;

$$f_k(k_2)(1-t_2) + i_2\mu_2(t_2 - t_1) + g_2(\lambda_2, \mu_2) = (i_2\lambda_2)(1-t_2) + r(1-\lambda_2 - \mu_2) + c_2(\lambda_2, \mu_2) + i_1(\mu_2 - \overline{\mu_2})t_2\varphi_2 \quad (12)$$

Accordingly, the marginal benefits of invested capital on the left hand side equals the marginal costs of capital on the right hand side. The last term however, only adds to the cost of capital if the firm has excess debt ( $\mu_2 > \overline{\mu_2}$ ) and the TCR is enforced ( $\varphi_2=1$ ). This will alter the cost of capital and hence negatively influence the investments. The net present value (NPV) of projects simply drop and many projects are not economically profitable anymore.

*Hypothesis 2: The Dutch based firms facing excess debt reduced their investments in reaction to the increased cost of capital due to a binding and enforced TCR.*

In line with this hypothesis, Buettner et al. (2007) find a reduction in investments as a result of both the introduction of a TCR rule and the tightening of the threshold. However, Weichenrieder and Windischbauer (2008) do not find this relation for the tightened German TCR. Empirical study is ambiguous on this matter.

## 3.3 Conclusion

In this chapter two empirical predictions have been formed based on theoretical models. Both the share of internal debt and investments of Dutch-based subsidiaries with unexpected excess internal debt are expected to decrease in reaction to the TCR. Following chapters are build around these hypotheses.

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## Chapter 4 Methodology

Regarding the first hypothesis, the analysis should reveal the relation of the ratio of internal leverage of subsidiaries to excess internal debt, due to the introduction of the Dutch TCR in 2004.

In order to empirically test the hypotheses mentioned in previous chapter, a ordinary least squares (OLS) regression is run using a panel-level dataset of the Dutch based subsidiaries. This data provides information on the capital structures of the Dutch based subsidiaries as well as interest-deduction restrictions due to the TCR. Along with the introduction of the TCR in 2002, this dataset provides two sources of empirical variation and enables research on the effect of the TCR.

The regression analysis uses ICL as the endogenous variable. ICL is the ratio of intrafirm debt; the amount of debt from affiliated firms, to the average yearly equity of the firm<sup>76</sup>. However, modifications have to be made for the ICL ratio to be applicable in the regression. Firstly, the values for the ratio are theoretically unlimited. With the denominator (fiscal equity) and nominator (internal debt) approaching zero, the ratio reaches unlimited values. Therefore, the maximum of ICL is respectively set at 100 and the minimum at 0,01. Secondly, on first hand, the ICL ratio cannot be used directly in the regression, since the denominator of the ratio can fiscally turn negative<sup>77</sup>. In case of a negative equity, the assumed negative relation of ICL with the exogenous variable TCR is not valid. Hence, an average fiscal equity of 1€ is assumed to be the minimum. This is in line with the implementation of the Dutch fiscal authorities<sup>78</sup>.

As enlightened in previous chapter, many variables affect the capital structure ratio and it is conceivable that even without the introduction of the TCR, other reasons for a reduced use of intercompany loans were present<sup>79</sup>. In order to define the effect of only the 2004 TCR in particular, all effects caused by other explanatory variables must be filtered out.

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<sup>76</sup> It must be noted that this is not literally the ratio as applied by the Dutch TCR, comprised by both the internal debt ratio and the external debt ratio. However, since internal debt and (internal) equity are both internal sources of finance and subsequently substitute relatively cheap and quick for each other, it is expected that the ICL ratio movements in reaction to the TCR are more severe than the external debt/equity ratio movements. Furthermore, it is only the internal debt that loses deductibility due to a TCR restriction and a reaction comprising internal debt is hence on average more at hand.

<sup>77</sup> Firms can fiscally have a negative equity because of hidden reserves in, among others, real estate and stock.

<sup>78</sup> Art. 10d lid 8 Wet VPB 1969

<sup>79</sup> E.g. the cut in Dutch corporate tax from 34.5% to 31.5% in 2005 may have made debt, and therefore intercompany loans, less attractive.

This can be done using a difference-in-differences (DID)<sup>80</sup> approach; the time difference of ICL of the treated group (companies restricted by the TCR in 2004, i.e. a debt ratio above the threshold and with related party debt) is adjusted for the time difference of ICL of a control group. The control group consists of corporations identical to the treated group on key aspects, but different on the aspect that they comply with the threshold and are effectively not restricted.

Firstly, to distinguish between the treated group (TG) and the control group (CG), the dummy  $D_{tcr}$  is created. The properties are as follows:

$$D_{tcr} = 1 \text{ if ICL} > \text{threshold in 2004}$$

$$D_{tcr} = 0 \text{ otherwise}$$

The dummy takes the value one for the treated group and zero for the control group. Secondly, the period after the TCR implementation must be distinguished from the period before implementation in order to surface the time difference of ICL. A time dummy  $D_{04/05/06}$  is created marking the years 2004, 2005 and 2006 in which the regulation was effective, but taking the value zero in 2003<sup>81</sup>.

$$D_{04/05/06} = 1 \text{ in 2004, 2005 and 2006}$$

$$D_{04/05/06} = 0 \text{ in 2003}$$

Finally, the variables used in the regression are built by interacting the treated group (TG) and the control group (CG) dummy:

$$TG_{04/05/06} = D_{tcr} \cdot D_{04/05/06}$$

$$TC_{04/05/06} = (1 - D_{tcr}) \cdot D_{04/05/06}$$

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<sup>80</sup> See Cameron and Trivedi (Microeconometrics: methods and applications (2005)) for a detailed description of this approach.

<sup>81</sup> See chapter 5.1.1 for elaboration on the choice not to include 2003.

With these variables the regression is built:

$$ICL_{it} = t_t + f_i + b_i \cdot TG_{04/05/06} + u_{it} \quad (13)$$

$b_i$  is called the difference-in-difference estimator. It estimates the time difference (of 2004, 2005 and 2006 with respect to 2003) of ICL for the treated group and the control group and then takes the difference in the time difference. For a consistent estimation of  $b_i$  the year specific effects ( $t_t$ ) and the firm specific effects ( $f_i$ ) must be fixed<sup>82</sup>. In conclusion it can be stated that the output of the regression will give the change in absolute value of ICL within the treated group due to the implementation of the TCR.

By changing the endogenous variable ICL to log of equity and log of internal debt, it can be seen how the treated group reacted to the TCR restriction on the liability side of the balance. The log of the variables is taken to reflect the relative growth rate (elasticity) instead of the absolute values. The regressions of log equity and log internal debt are respectively given by:

$$\text{Log\_Equity}_{it} = t_t + f_i + b_i \cdot TG_{04/05/06} + u_{it} \quad (14)$$

$$\text{Log\_IL}_{it} = t_t + f_i + b_i \cdot TG_{04/05/06} + u_{it} \quad (15)$$

To avoid losing firms with zero or negative equity values or zero internal debt, the minimum is set at one euro.<sup>83</sup>

Changing the endogenous variable to log of fixed assets and financial assets reveals the reactions regarding investments.<sup>84</sup> However, it has to be taken into account that an actual investment (seen in asset movements) is the result of a time consuming investment decision process. Hence, investment consequences of an increased cost of capital generally surface later in time, in case 2005 and 2006. The time dummy for fixed and

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<sup>82</sup> The DID approach requires common trends for  $b_i$ . On first hand, it can be stated that the effect of fixing the firm specific effects is highly important for this study since the selection of the treated and control group based on debt-to-equity ratios ( $D_{TCR}$ ) simultaneously means that the groups are not randomly formed and that it is probable that the different groups behave differently in advance regarding capital structure issues. This effect is cancelled out of the results if it is fixed.

<sup>83</sup> This follows the methodology used in many studies. Among others Weichenrieder and Windischbauer (2008)

<sup>84</sup> Because no information about actual purchases of capital or about depreciation is given in the data, balance sheet information is relied upon for each individual firm's stock of capital.

financial assets as dependent variable therefore takes the value zero in 2004 and  $b_i$  measures the change of investments in 2005 and 2006 compared to the year 2004. Again, the control group corrects for other influential factors on investment.<sup>85</sup> The regressions of log fixed assets and log financial assets are respectively given by:

$$\text{Log\_Fixed\_Assets}_{it} = t_t + f_i + b_i \cdot TG_{05/06} + u_{it} \quad (16)$$

$$\text{Log\_Financial\_Assets}_{it} = t_t + f_i + b_i \cdot TG_{05/06} + u_{it} \quad (17)$$

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<sup>85</sup> For example depreciation allowances and hourly labor costs

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## Chapter 5 Data and Descriptive Statistics

### 5.1 *The dataset*

The micro data on multinational firms is primarily taken from the VIS<sup>86</sup> database compiled by the Dutch tax authorities. It comprises a total of 300 thousand taxpaying firms and is updated every three months. Currently, the dataset provides company accounts and fiscal information of all Dutch corporate income taxpayers from 1991 till 2006. Especially the specific information on fiscal aspects and the panel structure make the dataset valuable for this specific empirical analysis. However, it must be noted that before 2004 the tax authorities did not require the declaration to be completed digitally. This means that the VIS database shows some occasional gaps and inaccuracies from 1991 to 2004. Hence, additional information is gathered from Reach Database, compiled by Bureau van Dijk<sup>87</sup>. Reach provides company accounts, ratios, activities, ownership and management for 400,000 Dutch companies.

#### 5.1.1 *The selection of the treated group*

The specific fiscal data on each Dutch based firm allows for an accurate identification of the treated group. As elaborated on in chapter 4, this is the group that is effectively restricted by the TCR; its debt ratio exceeds the threshold and it has related party debt that is subsequently restricted. By selecting the treated group on the VIS Database item ‘Interest article 10d Vpb’<sup>88</sup>, the difficulties and inaccuracies of having to select them through commercial capital structure ratio analysis<sup>89</sup> are circumvented. Furthermore, it

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<sup>86</sup> Vennootschapsbelasting Informatie Systeem or Corporate Income Tax Information System.

<sup>87</sup> Since REACH provides commercial data and the VIS provides fiscal data, the additional data gathered from REACH is checked on differences. It must be noted that for many items the fiscal data equals the commercial data.

<sup>88</sup> I.e. the actual amount of interest that cannot be deducted from the taxable base due to the TCR.

<sup>89</sup> This is due to the fact that the determination of internal/external debt and equity for fiscal matters is subject to different aspects than the determination for commercial purposes. For instance, in the case of back-to-back finance, in which external debt is borrowed by a subsidiary and simultaneously secured by a deposit of the parent, the loan is commercially labeled as an external liability, but for fiscal matters it is often a matter of negotiation. Trade accounts payable due to internal deliveries of input goods are fiscally excepted as a kind of internal debt and commercially not. The use of the available commercial data on capital structures would subsequently lead to inaccuracies in the determination of TCR restricted interest.

avoids the high complexity of having to analyze the group as a whole for the concern ratio.

In the total group of firms enlightened by the item ‘Interest article 10d Vpb’ for the years 2004 till 2007, the following enhanced selection is made for the treated group:

Firstly, in determining the total non-deductible interest, the Dutch Fiscal authorities take the sum of three different interest deduction limitations<sup>90</sup>. A firm is only effectively restricted by the TCR if the sum is positive. Firms with negative values on the item ‘Balance of non-deductible interest’ are excluded from the treated group.

Secondly, in order to surface the actual effect of the TCR, feasibility limits the treated group to the firms that were restricted by the TCR unexpectedly and hence found their cost of capital to rise unexpectedly. Firms that have run into a TCR restriction deliberately<sup>91</sup>, initially balanced the additional costs of capital to the benefits of financing with debt and found it desirable to pass the TCR threshold. In order to measure the effect of the TCR on this group, their financing decision should be corrected for a similar financing decision not facing a TCR constraint. This process would incur high complexity and is beyond the scope of this research. The sample size of the treated group therefore limits itself to TCR restrained firms that were hit by the TCR unexpectedly and subsequently did not account for the additional costs of capital in their financing decision. These are generally the firms coping with a TCR restriction in the year of the introduction of the regulation, namely 2004. It must be noted that the firms are expected not to have anticipated to the TCR already in 2003 since the actual content of the TCR was unclear till late 2003. The TCR was a reaction of the Dutch tax authorities to the obvious and expected Bosal Holding verdict of the ECJ of 18 Sept. 2003. However firms did generally not have an option to anticipate, since the actual content of the reparation legislation remained unclear. The TCR proposal was presented to the Parliament only on the 13<sup>th</sup> of October and approved on the 13<sup>th</sup> of November. This left the firms with practically no room to anticipate in 2003 already.

Hence, the reaction of the restricted firms and the following capital structure movements in 2004, 2005 and 2006, corrected for the normal market movement, expose the pure reaction to the TCR.

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<sup>90</sup>Namely: art. 10a Wet Vpb 1969, art. 15.4 Wet Vpb 1969 and art. 10d Wet Vpb 1969.

<sup>91</sup> E.g. firms knowing of the TCR’s existence and impact in their financing decision process

Firms running into the TCR in the years 2004 and onwards are assumed to have accounted for the additional costs of capital in their financing decision process and are excluded from the treated group.

Thirdly, in order to assure the consistency of the data of the treated group, the firms' fiscal (or financial) years have to be similar. The commonly used fiscal years are calendar years and therefore all firms that do not have their fiscal year from the first of January to the end of December for 2004 to 2007 are excluded.

Fourthly, in the selection of the treated group the firms are excluded that do not incur additional costs of capital if faced with an interest deduction restriction, since these firms will not have the incentive to react to the restriction and change their capital structure accordingly. This intuition is backed by Ramb F. and A.J. Wiechenrieder (2005) whose empirical results show that subsidiaries that on average are profitable react more strongly to changes in the German corporate tax rate than this is the case for less profitable firms. When a firm's taxable profit<sup>92</sup> is (close to) zero or negative, the restriction of interest deduction will practically not lead to additional costs since the alternative of full deduction would have led to losses and would not directly have led to a tax shield benefit<sup>93</sup>. However indirectly, due to the Dutch fiscal regulation of one year carry back and seven years carry forward, these interest deductions leading to losses could lead to tax shield benefits if profits were (to be) made one year prior or seven years after the loss. This implies that a TCR restricted firm would indeed incur additional costs if the balance of taxable profits of one year prior until seven years after the restriction is positive. The VIS database allows for selection on taxable profit, but availability of data only allows looking one year prior to three years after 2004, i.e. 2003 to 2006. Therefore, firms that overall show relatively small taxable profit or two or more consecutive negative taxable profits for 2003 until 2006, are excluded from the treated group.

Finally, in order to assure that companies have a real incentive to react to the TCR restriction, the restricted amounts must be of actual significance. To assure the significance and relevance of the interest that cannot be deducted the threshold is set to

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<sup>92</sup> Taxable profit (in Dutch 'belastbaar bedrag') is a firm's fiscal profit at time  $t=1$  corrected for losses incurred seven years prior or one year after  $t=1$ . This is fiscally called the carry-forward and carry-back.

<sup>93</sup> Insights are that multinationals shift profits away from TCR restrained subsidiaries to minimize the additional costs of limited interest deductibility.



5% of fiscal profits or absolutely more than € 10.000 of interest restricted. Firms under both thresholds for the years 2004, 2005 and 2006 are excluded from the treated group. Furthermore, the remaining treated group is manually corrected for outliers. Firms with restricted interest/profit ratios exceeding 7,5 for multiple years or showing extremely high variability are manually selected and excluded.

As the restricted interest/profit ratio increases the actual impact of the TCR restriction increases and capital structure reactions should become more excessive. Segmenting the treated group according to these numbers in the empirical analysis should reveal differences in the empirical significance of the capital structure adaptation.

The five exclusions leave a the treated group of 178 firms, observed over the period 2003 to 2006

### *5.1.2 The selection of the control group*

Regarding the control group, the selection criteria set are that they resemble the treated group on key items, except for the impact of the TCR.

The following specific selection is made for the creation of the control group:

Firstly, in order to make sure their behavior is not influenced by the TCR, none of the control group's firms can be close to an interest deduction restriction due to the TCR for the years 2004 until 2006. Hence, the selection threshold is set at a safe fiscal debt-to-equity ratio of 2:1 and all firms above in 2004, 2005 or 2006 are excluded.

Secondly, just like the treated group, the control group firms' fiscal (or financial) years have to be similar. All firms that do not have a fiscal year from the first of January to the end of December for 2004 to 2006 are excluded.

Thirdly, in the selection of the treated group the firms are excluded that do not incur additional costs of capital when faced with an interest deduction restriction, since these firms will not have the incentive to react to the restriction and change their capital structure accordingly. This criterion is the same for the control group. The control group is at safe distance from the TCR, but must have a potential TCR restriction as an influential

factor in their financing decisions, for their behavior to resemble the treated group. Subsequently, firms that overall show relatively small profits or two or more consecutive losses in 2003 to 2006, are excluded from the control group.

Fourthly, as mentioned in chapter 5.1.1, the treated group has a significant proportion of internal debt. Subsequently, to resemble the treated group, the control group must have internal debt as a real financing option. The VIS-database allows for selection on this criterion through selection on the internal debt items ‘debt to related entities’, ‘debt to participations’ and ‘debt to shareholders’<sup>94</sup>. In order to assure the relevance of this item for the firm, the threshold is set at a sum €100.000 for these items. Firms under this threshold are excluded from the control group.

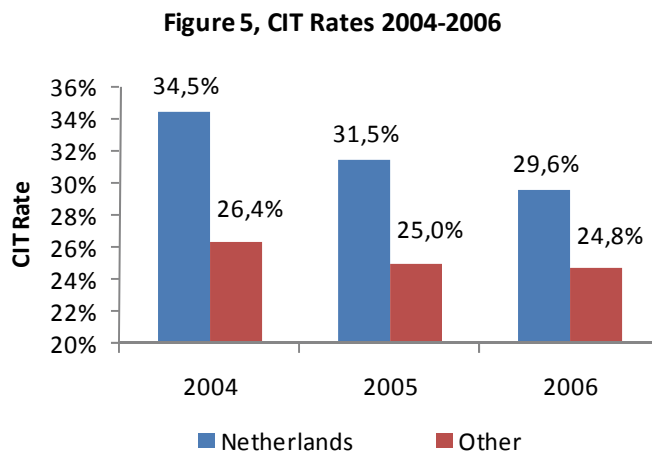
The four exclusions leave a control group of 204 firms, observed over the period 2003 to 2006.

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<sup>94</sup> Literally in the VIS-database ‘Schulden verbonden lichamen’, ‘Schulden aan aandeelhouders’ and ‘Schulden aan deelnemingen’ respectively.

### 5.1.2.1 Flaws of the control group

Over the years 2004 to 2006, the treated group, comprised of Dutch based foreign controlled subsidiaries, has been exposed to national and cross border corporate tax rate fluctuations. Figure 5<sup>95</sup> shows the evolution of the Dutch corporate income tax (CIT) rate over the years 2003 to 2006, compared to 44 other countries (comprised of OECD, EU, US, tax havens and other countries)<sup>96</sup>.



As seen in the figure, the Dutch corporate income tax has dropped significantly more than average. As seen in equation (6) in chapter 3.4, corporate taxation of the host country ( $t_2$ ) is expected to move positively with internal debt. This was confirmed by Desai, Foley, and Hines (2004) who suggest that ten percent higher local tax rates are associated with 2.8 percent higher debt/asset ratios, with internal borrowing particularly sensitive to taxes. Higher corporate tax levels at the borrower's location lead to an increase in tax shield value of debt.

<sup>95</sup> The data on statutory corporate income tax rates is taken from various sources. Part of it is derived from global tax surveys performed by PriceWaterHouseCoopers provided by IBFD, the International Bureau of Fiscal Documentation. Part of it is provided by a study by de Mooij and Nicodème, who retrieved their information from Eurostat.

When establishing the tax rates of countries in which the corporate tax rates depends on regional tax rates, the average tax rate of all regions is used (e.g. Germany, Switzerland and Canada). The highest marginal tax rate is used from countries that do not imply a flat corporate income tax rate (e.g. Canada and the USA). All rates include possible surcharges. An overview of the used statutory corporate income tax rates is given in appendix C.

<sup>96</sup> See appendix C for the distinct countries included.

Since both the treated group's firms as well as the control group's firms are located in the Netherlands, both the groups experience similar national corporate tax rate fluctuations and the effect on internal debt is cancelled out. However, internationally both groups are exposed to different rates.

As implied by derivation (7) of chapter 3, the corporate tax rates at the lenders location is inversely related to the use of internal debt on the borrower's location<sup>97</sup>. The changing internal leverage ratio of the treated group as a result of changing statutory tax rates at the lender's location must theoretically be corrected for in order to surface the pure effect of the TCR. In line with the methodology used in this research, this would entail selecting a control group with exactly the same international tax rate exposure or adding an extra control variable for foreign CIT rates.

Depending on location of the lender of internal debt, each treated group firm has experienced different statutory tax rate differences over the timeframe. The VIS and REACH database do not provide information on the location of the lender. Manually retrieving this data over the years in order to insert a tax rate difference control variable in the regression is not realistic given the scope of this study. Subsequently, selecting a control group with equal international tax rate exposure is not realistic. It is acknowledged and accepted in this study that noise on this aspect is present<sup>98</sup>.

## 5.2 *Descriptive Statistics*

This section provides an overview of the main variables used in the regression analyses. First it elaborates on all the restricted firms to enlighten the meaning of the TCR in general in the Netherlands and to the surface possible homogeneity of firms that run into the TCR in general. What has happened with total amount of restricted interest after the implementation of the TCR in 2004? Do firms that are restricted show comparable characteristics regarding size and business activity?

Secondly, the group of restricted firms is limited to the sample group according to the selection criteria of chapter 5.1. and key numbers are presented and elaborated on. Finally, the total sample is split into the treated group and the control group and the two group are compared on parity.

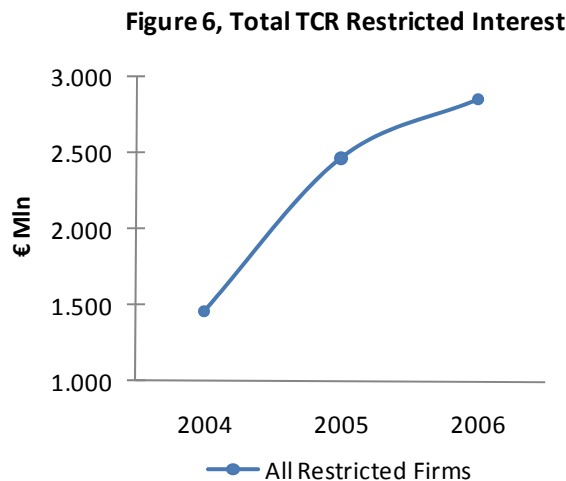
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<sup>97</sup> Given that the statutory tax rate of the borrower is higher than the lender.

<sup>98</sup> This is the same flaw as Weichenrieder and Windischbauer (2008) identified in chapter 2.3.4.3.

### 5.2.1 All TCR restricted firms

Figure 6 depicts the sum of TCR restricted interest in 2004 to 2006 in the Netherlands that cannot be deducted due to the TCR.<sup>99</sup>



Remarkable is the insight that the total amount has almost doubled to 3000 million euro in two years. It can be concluded that the rule has its effect regarding payoff to the state and that the grounds for implementation (threats of tax base erosion through debt allocation) were at least just. However, questions remain on the aspects whether the rule is effective enough. It does not prevent tax base erosion through behavioral changes of multinationals. The significant growth of restricted interest reveals a behavior of Dutch multinationals that is generally not pointed towards reduction of internal debt levels, even with a TCR. This means that the TCR actually protects the Dutch tax base via ‘reparation’ and not via ‘prevention’. Further tightening the TCR by changing the threshold or even the form of the regulation<sup>100</sup> would further discourage internal debt financing and prevent tax base erosion instead of repairing it. This would alter the effectiveness of the regulation. Furthermore, the course of figure 6 justifies the current hot political debate on the treated of internal debt and its proposed tightened deductibility restriction<sup>101</sup>.

<sup>99</sup> Due to the introduction in 2004, the dataset provides actual amounts of TCR restriction only from 2004 and onwards.

<sup>100</sup> For example to an earnings stripping rule

<sup>101</sup> See chapter 2.3.3. for elaboration on the debate and repairing proposals.

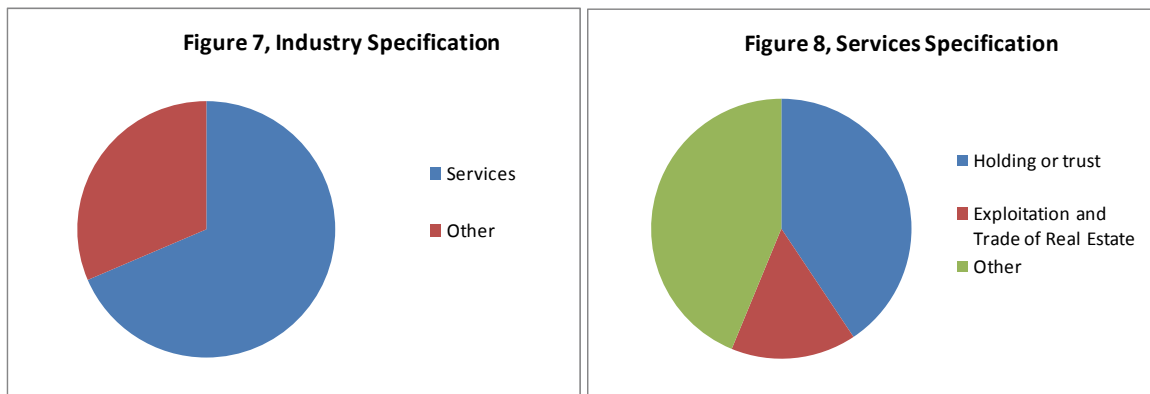
Table 1 provides some descriptive statistics of all the firms that were TCR restricted in 2004. In total, the firms that were restricted by the Dutch TCR in 2004 amounts to 1722. These firms are observed for three consecutive years (2004, 2005 and 2006) leaving 5166 observations in total.

Table 1, all TCR restricted firms

Variable	Observations	Firms	Average
Turnover (in € Mill.)	5166	1722	16
Taxable profits (in € Mill.)	5166	1722	2
Total assets (in € Mill.)	5166	1722	39

The average turnover, taxable profits and total assets reveal that in general the firms that run into the TCR restriction are of middle size. Hence, it is remarkable that on average the big multinationals seem to have avoided the regulation with reasonable debt-to-equity ratios in 2004.

An industry analysis among the nine Standard Industry Classification (SIC) codes (Figure 7 and 8) shows a remarkable tendency towards service firms and especially holdings, trusts and exploitation and trade of real estate.



The fact that a high proportion of the restricted firms are holdings and trusts is not surprising because these firms are fundamentally instruments to optimize fiscal and legal issues.

### 5.2.2 *Sample Statistics*

The sample is formed out of the 300.000 firms of the VIS database on the selection criteria set in chapter 5.1.1. (treated group) and 5.1.2. (control group), leaving a total sample of 382 firms. Observing these firms for four consecutive years (2003 to 2006) builds up to 1528 observations. Table 2 provides an overview of the sample characteristics. Given are the number of observations, number of firms, average, median, standard deviation, minimum and maximum for all main variables.

Table 2, Sample statistics

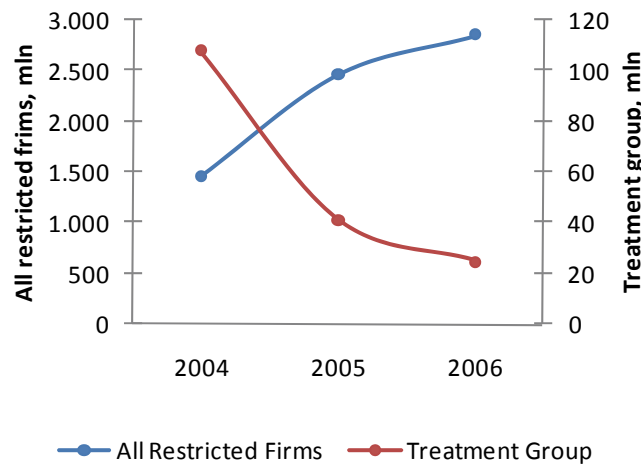
Variable	Observations	Firms	Average	Median	Std.deviation	Min.	Max.
ICL	1528	382	21.24	0.60	39.22	0.01	100
Internal debt (in € mill.)	1528	382	18	3	70	0	1279
External debt (in € mill.)	1528	382	5	0	17	0	490
Equity (in € mill.)	1528	382	31	4	119	-181	1952
Fixed Assets (in € mill.)	1528	382	30	3	142	0	2970
Financial assets (in € mill.)	1528	382	12	0	50	-7	759

It must be noted that the statistics are based on fiscal data. This allows for the equity and the financial assets to become negative. Both the column maximum and the differences between the averages and medians show that the sample comprises of some firms that have disproportionate high levels for the variables. Further analysis in subsequent chapters will reveal if these firms are evenly distributed among the treated group and the control group.

### 5.2.3 *Treated group statistics*

The first empirical question is whether the introduction of the Dutch TCR in 2004 triggered a reduction in intercompany loans of Dutch based multinationals with excessive debt. A treated group was selected according to theoretical selection criteria. Figure 9 provides the course of the sum of the TCR restricted interest of the treated group and of all restricted firms over 2004 to 2006 in the Netherlands.

Figure 9, TCR Restricted Interest



Contrary to all restricted firms, the treated group shows a decrease of 108 to 25 million of total restricted interest.. Table 3 provides further insights to this discrepancy between the groups by splitting the total restriction up in the amount of firms restricted and the average restriction per firm.

Table 3, Descriptive Statistics Treatment Group and All Restricted Firms

	Treatment Group			All Restricted Firms		
	2004	2005	2006	2004	2005	2006
Total Restriction ( in million €)	108	41	25	1,458	2,466	2,850
# of firms restricted	178	115	64	1,722	2,340	2,540
Average restriction per firm (in € x 1000)	605	358	390	846	1,054	1,122

Contrary to the trend of the treated group, the All Restricted Firms group shows an increasing number of TCR restricted firms as well as an increasing average amount of restriction per firm. Further analysis of this group reveals that out of the 1722 firms that were restricted in 2004 only 749 were also restricted in 2006. This means that 1791 firms that were not restricted in 2004, walked into the TCR in 2005 and 2006 combined, summing up to 2540 firms in 2006. Along with the increase of the average restriction per firm, these 1791 newly restricted firms account for a significant part of the increase in the total restriction. A possible explanation for this increase would be the presence of some other reason for the use of internal debt other than taxation.

This is not the case for the treated group. The table enlightens that 65% of the firms of treated group got rid of their TCR restriction at the end of 2006. Of the remaining TCR restricted firms, the average restriction decreased remarkably. Although the treated group



shows this significant drop in total restriction, it is conceivable that even without the introduction of the TCR, a moderating time trend or other reasons for a reduction were present. The results must therefore be compared to the results of the control group.

#### 5.2.4 Comparison of treated group and control group

The control group was selected to adjust for other influential factors on capital structure. Table 4 gives an overview of the variables of the two groups in 2004. All variables except ICL and number of firms are denoted in Euros.

Table 4, comparison of groups (2004)

Variable	Treatment Group		Control Group	
ICL	62,11	100,00	0,42	0,24
Total leverage (avg./median)	34.831.746	3.591.249	18.903.133	5.406.568
External debt (avg./median)	6.327.080	0	5.941.793	0
Internal debt (avg./median)	28.504.666	2.387.222	12.961.340	3.588.896
Equity (avg./median)	-530.741	0	39.327.568	11.836.605
Fixed assets (avg./median)	25.566.369	1.058.421	29.392.982	6.226.551
Financial assets (avg./median)	7.307.340	0	8.173.924	52.249
Turnover (avg./median)	19.540.083	782.043	49.835.110	21.339.457
# of Firms	178		204	

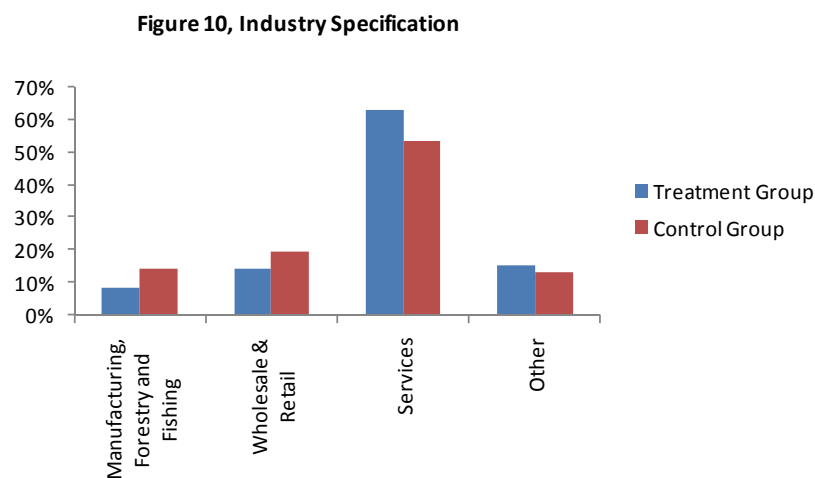
Table 4 enlightens that the treated group has a remarkably high average and median ICL; the internal debt levels are disproportionate to the equity. On the contrary, the internal debt of the control group is notably smaller than the equity, which means that the ICL is far below one. This is the logical consequence of the selection criteria of both groups.

Further elaboration of the ratios shows that the average and median external debt of both groups is comparable. In relation to firm size (indicated by total assets and turnover), the proportion of external debt stays comparable. This suggests that the treated group is not abundantly borrowing from external sources and that the external debt is rational in a business sense. Only the average internal debt of the treated group is remarkably higher than the control group and both the average and median equity is outstandingly lower. This is even more extreme when it is put in relation to the average and median firm size of the treated group. Hence, the causes of a TCR restriction are mainly found in the low (even negative) equity levels and possibly the excessive amounts of internal debt. On first hand the average negative equity levels of the treated group insinuate that increasing equity is the inevitable reaction to improve the internal debt ratio. Getting rid of the

restriction while negative equity levels are maintained will require fully repaying the internal debt, which is a far more expensive and time-consuming manner. Furthermore, because it implies fiscal data, there is an obvious and very efficient way to increase equity which would be to release the hidden reserves<sup>102</sup>. Hence, in conclusion it can be stated that the descriptive statistics along with the potential presence of hidden reserves in assets strongly insinuate a reaction in the area of increasing equity<sup>103</sup>.

In addition, table 4 shows that the average fixed assets/financial assets ratio of the two groups is quite similar and that the restricted firms are smaller in terms of turnover. Overall, the medians of all variables are smaller than the averages. This means that the sample comprises of some relatively big firms. Since it is the case for both groups, the meaning of this discrepancy for the results is relatively low.

Further specification of the distribution of the firms of both groups among the SIC is found in figure 10 underneath.



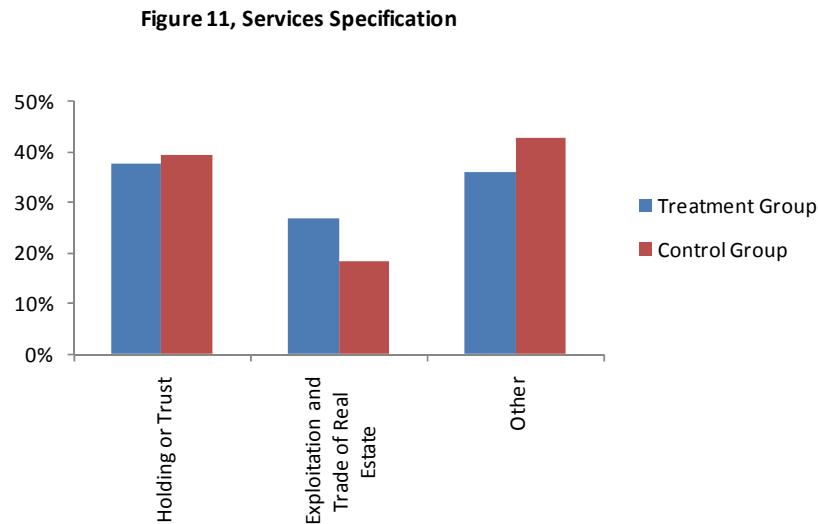
As seen the distribution among industries is comparable for the treated group and the control group. The industry 'services' comprises most the firms for both groups. The item 'other' consists of the remaining seven industries of the SIC<sup>104</sup>.

<sup>102</sup> The aspect of fiscal hidden reserves and equity is further elaborated on in the descriptive statistics of equity later on in this chapter.

<sup>103</sup> Additionally, the same descriptive statistics were analyzed for the treated group split up into the firms with negative equity and the firms with positive equity. Except for the difference in average and median equity, no other noteworthy differences surfaced. Hence, conclusions cannot be further specified and altered.

<sup>104</sup> See appendix D for all SIC codes and the distribution of the firms

Since 'services' has an enormous scope, ranging from financial intermediation to renting activities, and is the most relevant industry of the sample, a closer look of this industry is given in figure 11 underneath.



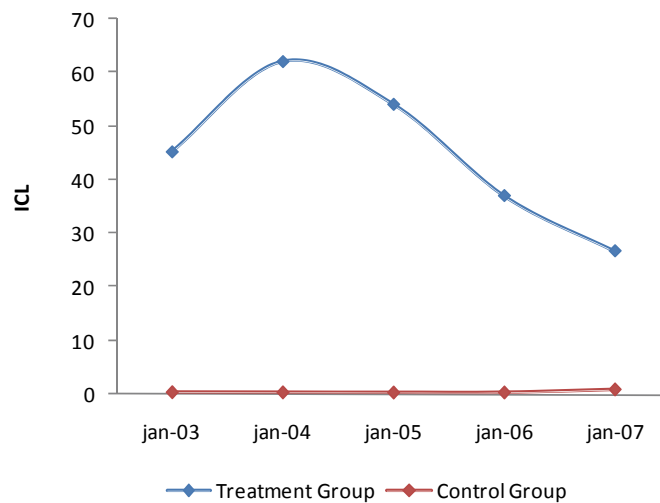
It is in line with expectations that the biggest stake of the treated group is comprised by the 'Holding or Trust' segment, since practice shows that a holding structure is widely used for profit shifting through debt allocation<sup>105</sup>.

Again, the distribution of both groups is comparable and hence it can be stated that the control group is well comparable to the treated group regarding industry distribution.

Figure 12 provides some descriptive evidence for the treated and control group by depicting the ratio ICL over time. Simple eyeball econometrics suggest that the introduction of the TCR on the first of January 2004 was followed by a remarkable decrease in internal debt levels over the years 2004, 2005 and 2006. This is in line with Figure 9, showing that the total restricted interest dropped over the years 2004 to 2006. The course of the ICL of the control group is generally constant with a slight increase towards 2006.

<sup>105</sup> In the course of an acquisition, a holding is created that will acquire the participation. In the Dutch case (with a relatively high CIT rate) it is often favorable to over-leverage the holding with internal debt and to shift the profits out of the Netherlands. It must be noted that there is an exception; in case Dutch based multinationals can apply for the fiscal regulation of the Concern Financing Regime (CFR, allowing for the formation of reserves of up to 80% of profits) it may not be favorable to over-leverage an acquisition. However, this exception holds primarily for the past since practice shows limited use of the CFR in recent years and this special Dutch regime will be dropped in 2010 since it is judged to be conflict with European Law by the ECJ.

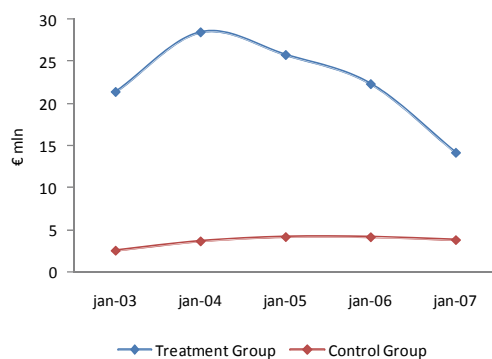
**Figure 12, ICL 2003-2006**



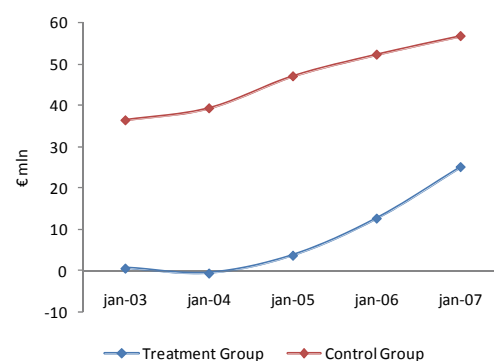
First remarks regarding this figure and the first hypothesis are that the firms did reduce their internal debt ratios as expected. Facing the 2004 interest reduction restriction, the firms changed the increasing trend of the year 2003 with a sudden and drastic turn in 2004. The following remarkable drop in ICL in the following years is in line with expectations. Furthermore it suggests that the treated group was indeed unexpectedly hit by the TCR in 2004.

Further analysis splits up the ICL in internal debt and equity. The drop in ICL must have been the consequence of a decrease in internal debt and/or an increase in equity. This is exactly what figures 13 and 14 reveal.

**Figure 13, Internal Leverage 2003-2006**



**Figure 14, Equity 2003-2006**



Over the years where the ICL decreased, namely 2004, 2005 and 2006, the internal debt levels of the treated group have decreased and the equity has increased, both absolute and relative to the control group<sup>106</sup>.

The high increase in equity to 25 million is remarkable in comparison with the treated group's negative average equity levels in 2004. Fiscally, a firm has two options to instantly<sup>107</sup> increase equity; issue shares or release the assets hidden reserves<sup>108</sup>. Although taxed on release, hidden reserves are an efficient manner to rapidly increase equity and hence lower the internal debt ratio. It must be noted however that this freefall of reserves to increase in equity does not provide the firm with liquidity to pay off some of its internal debt. Contrary, the issue of new shares to increase equity would provide additional liquidity and allow for repayment of internal debt to amplify the effect on the internal debt ratio. The actual use of both options to increase equity will highly depend on firm specific characteristics<sup>109</sup>. Hence, it cannot be concluded what the base was for the increase in equity over 2004 to 2006.

Regarding the second hypothesis expecting a reduction in investments, figure 15 and 16 give further insight.

Figure 15, Fixed Assets 2003-2006

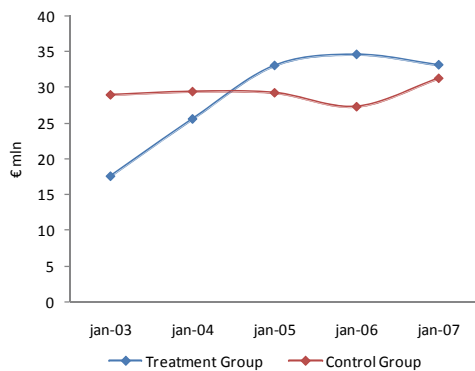
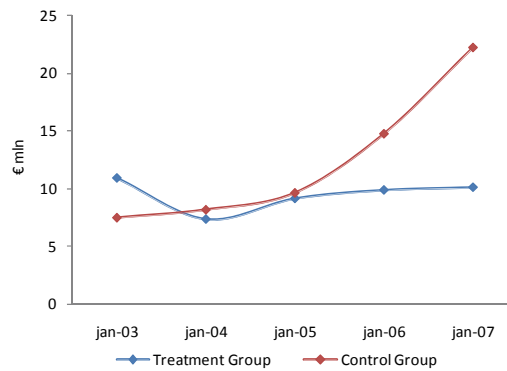


Figure 16, Financial Assets 2003-2006



<sup>106</sup> The increase of the control group's equity reveals that factors other than the TCR are present that have influenced equity over 2003 to 2006.

<sup>107</sup> Over the longer term a firm has the option of increasing equity through retained earnings.

<sup>108</sup> Hidden reserves can be present in (among others) real estate and stock due to the fiscal 'principle of care' (in Dutch: voorzichtigheidsbeginsel) stating that profits do not have to be taken if they are not yet realised. This principle allows for undervaluation of assets on the fiscal balance and the build-up of hidden reserves.

<sup>109</sup> E.g. the actual amount of thin-capitalization, current market value of shares, amount of hidden reserves, (information)costs of a new issue, etc.

Both the increasing trends of the fixed and financial assets over 2004 are flattened in 2005 and 2006. Furthermore the trends are contrary to the control group from 2005 onwards. This insinuates a brake on investments and is on first sight in line with expectations. However care must be taken on conclusions, since the course of fixed and financial assets is not to be translated directly to future investment decisions. As enlightened in previous paragraph, the use of fiscal data allows for the build-up of hidden reserves in assets. A release of these hidden reserves to increase equity boosts the book value of the assets and hence blurs the translation of the course of the fixed and financial assets to investments decisions. What can be noted is that the release of hidden reserves is most probably a single, non-repeated action in reaction to the TCR in 2004, since it's relatively easy and quick to execute. The course of the assets in the subsequent years is therefore more representative for the influence of the TCR on investment decisions; investment is a function of the lagged TCR. This theory could explain the relatively higher increase of fixed and financial assets in 2004 in comparison with the control group, followed by a diverging trend in 2005 and 2006 between the control and treated group.

### 5.3 *Conclusion*

This chapter revealed the first insights on key numbers of all the restricted firms, the total sample and the control and the treated group. Revealing is the fact that the amount of restricted interest has almost doubled from 2004 in two years. This stresses the actual significance of protecting your tax base from profit shifting through international debt allocation. Secondly, it is not surprising that a high proportion (30%) of the TCR restricted firms are holdings and trusts, since holdings and trusts are primarily just a pin to optimize fiscal and legal aspects for multinationals.

Eyeball insights of the figures suggest that the treated group reacted according to expectations on the variables ICL, equity and internal debt over the years 2004 to 2006. Furthermore, the control group behaved remarkably different on those variables. Hence, the regression results are expected to be in line with the first hypothesis.

The differences of the treated and control group on the course of the financial and fixed assets are not clear though. Possible released hidden reserves may be blurring the course of the assets of the treated group in 2004 to 2006. The regressions of next chapter will enlighten the actual coefficient and significance of the treated group's variable movement.

## Chapter 6 Empirical Results

In this chapter the main results will be quantified and discussed based on empirical analysis. The empirical analysis involves panel OLS regressions, which includes firm fixed and year fixed effects.

First, the TCR effects on capital structure and investments are analysed and explained. Secondly the main empirical results are compared to the results of prior empirical research. Finally, some additional tests are run for further insights and to check for robustness of the model.

### 6.1 The thin-cap regulation and capital structure

Table 5 presents the basic regressions concerning the capital structure variables ICL, log internal debt and log equity. Furthermore, it shows the accompanying standard errors for all variables and the explanatory power ( $R^2$ ) for each regression. As noted in previous chapter, the results are additionally controlled for size since the average and median turnover of the control group is significantly higher (see table 4)<sup>110</sup>. Size is controlled for by the variable turnover.

Table 5: Differential effects on capital structure

	ICL	Log internal debt	Log equity
b1: TG_04_06	-23,64***	-0,48	1,83***
Std. Error	2,6	0,48	0,39
b2: Log TURNOVER	0,54***	0,59***	0,44***
Std. Error	0,19	0,04	0,03
R <sup>2</sup>	77%	56%	83%
Observations	1528	1528	1528
Firms	382	382	382
Firm fixed effects	yes	yes	yes
Year fixed effects	yes	yes	yes

**Annotations:** \*\*\*significant at 1% level, \*\*significant at 5% level

First, consider the column in table 5 that uses ICL as the dependent variable. The highly significant negative coefficient of the variable TG\_04\_06 indicates that firms facing a

<sup>110</sup> It must be noted that controlling for size is indeed important since it proved to have a notable influence on the coefficient of Log internal debt and Log equity.

interest deductibility restriction due to the TCR introduction in 2004, significantly reduced their internal leverage ratio over 2004, 2005 and 2006, relative to firms that did not face this restriction. This result empirically confirms the first hypothesis that firms with excess debt reduced their internal debt ratios with 24 points in reaction to the TCR introduction. On first hand, a reduction of the ICL of 24 seems remarkably high. Chapter 6.1.1 will elaborate on this number and put it in right perspectives. The high  $R^2$  of 77% reflects that a large amount of variation of the internal leverage ratio of the treated group is explained by the introduction of the TCR.

The next two columns with log internal debt and log equity as the dependent variables, reveal that the reduction in ICL is the consequence of a highly significant increase in equity and not a decrease in internal debt. The expected negative coefficient of internal debt turns out to be insignificant. The increase in equity confirms what was already insinuated based on the descriptive statistics in chapter 5.2.4 revealing negative average equity levels of the treated group. Apparently firms find an increase in equity (probably by a release of hidden reserves) to be the most efficient manner to respond to the restriction and subsequently do not (have to) seek for the solution in the area of internal debt. The coefficient of 1.83 means that firms facing an interest deductibility restriction due to the TCR introduction in 2004, significantly increased their equity by 183% over 2004, 2005 and 2006, relative to firms that did not face this restriction.

### *6.1.1 Practical implication of the ICL and equity movements*

Previous chapter reveals a drop of 24 points of the ICL and an increase of 183% of equity relative to the control group. Following example puts these results into perspective<sup>111</sup>.

As enlightened in table 4 of previous chapter, the median equity level of the treated group was zero. For calculation of the ICL a minimum of 1 euro equity is assumed.<sup>112</sup> This means that the median firm with 2,4 million € internal debt starts out with an enormous ICL ratio which is maximized to a 100. As seen in chapter 6.1, statistical analysis proves that firms reacted with an increase in equity and not with a decrease of internal debt. Hence, the median firm reduced its ICL with 24 points to 76 by reaching a positive equity

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<sup>111</sup> For ease of argumentation it is assumed that the control group has a perfectly constant course of ICL over the years 2003 to 2006. See figure 12 for the true course.

<sup>112</sup> This methodology is also applied by the fiscal authorities in computing the ratio.



of 31 thousand €<sup>113</sup>. This increase of 31 thousand € equity is easily realizable to the median firm in perspective to a turnover of 780 thousand €. Overall it can be stated that any firm with low or negative equity and some internal debt could have easily reduced its ICL by 24 points with an increase of its equity. As suggested in previous chapter, the fastest and easiest way would have been to release (some of the) the hidden reserves. Hence it can be stated that given the low average equity level of the treated group, an ICL decrease of 24 is not disproportionately high.

The results are in line with Weichenrieder and Windischbauer (2008), Overesch and Wamser (2006) and Buettner et al. (2007), all finding a negative relation between the implementation and/or tightening of a TCR and internal debt ratios. However, the actual magnitude of the coefficient is remarkably smaller in prior empirical studies. The big difference can well be explained by the fact that they use commercial data that does not allow for the presence of hidden reserves and negative equity. Hence, their equity levels are initially overestimated and the results do not capture a reaction in the area of releasing hidden reserves to boost equity. Since the TCR ratios are indeed computed with fiscal data and releasing hidden reserves is subsequently an option to improve the internal debt ratio, it can be concluded that the results of the studies are underestimated. This conclusion is backed by the results of this study, showing higher absolute reductions of ICL and higher significance. The explanatory power of both Weichenrieder and Windischbauer (2008) and Buettner et al. (2007) is comparable to the 77% of this research.

Furthermore, Weichenrieder and Windischbauer (2008) also find a significant increase in equity, but with a magnitude of only 14%. The outstandingly higher increase of equity (183%) found in this study insinuates that indeed a (major) part of the equity increase can be explained by the release of hidden reserves.

## 6.2 *The thin-cap regulation and investments*

Table 6 presents the basic regressions concerning the investment variables fixed assets and financial assets.

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<sup>113</sup> It must be noted that an increase of equity from 1 € to 31 thousand € cannot be translated directly to the 233 % increase found by the statistical analysis. Due to the used research methodology this 233 % should be interpreted in relation to the control group. As figure 14 illustrates, the control group itself shows a remarkable increase in equity from 2003 to 2006. The treated group increased its equity by 233 % relative to the increase of the control group.

Table 6: Differential effects on investments

	Log Fixed assets	Log Financial assets
b1: TG_05_06	-0,54*	-0,45
Std. Error	0,3	0,41
b2: Log TURNOVER	0,71***	0,30***
Std. Error	0,03	0,04
R <sup>2</sup>	88%	87%
Observations	1146	1146
Firms	382	382
Firm fixed effects	yes	yes
Year fixed effects	yes	yes

**Annotations:** \*\*\*significant at 1% level, \*\*significant at 5% level, \*significant at 10% level

In relation to the control group, the treated group shows a decrease of the fixed and financial assets for 2005 and 2006. Both the coefficients have the expected sign, but only the decrease in fixed assets shows significance at a 10% confidence level. It can be concluded that there is weak statistical proof that the introduction of the TCR and its subsequent increase of capital costs caused a reduction of investments (in fixed assets) of 54%.

However, it is possible that this result is underestimated. As insinuated in the descriptive statistics, the fiscal value of assets can be altered through investments as well as the release of hidden reserves. In line with the finding of a significant increase of equity of the treated group (see table 5), this weakly significant decrease in fixed assets could well have been adversely effected by the release of hidden reserves as a manner to boost the equity. Unfortunately, is not possible to quantify the adverse effect of hidden reserves due to the limited the scope of this research and its databases. Hence, the effect of the TCR on investments remains open due to the ambiguous effect of hidden reserves on the fiscal value of assets.

At most it can be concluded that the results are underestimated, depending on the degree of the release of hidden reserves.<sup>114</sup> It must be noted that the magnitude of this noise is expected to be less for the financial assets than the fixed assets, since practice reveals that many hidden reserves are found in real estate<sup>115</sup>.

<sup>114</sup> To fully clarify this issue one could use the market values of fixed assets instead of fiscal values; hidden reserves will not be present and subsequently the pure effect of the TCR on fixed asset investments is surfaced.

<sup>115</sup> Interview Prof. P. Kavelaars

### 6.3 Additional tests for further insights and model robustness

As revealed in table 4, the average equity level of the treated group is negative and the median is zero. Out of the 178 firms of this group, 104 firms have a negative or zero equity in 2004. On first hand it can be stated that it is at least remarkable that firms have a negative or zero fiscal equity and that it is thinkable that they have reacted differently to the ICL than the “healthy” restricted firms with positive fiscal equity. Table 6 presents the results of an additional regression where the treated group has been split up in the firms with zero or negative equity (TG\_NegEquity\_04\_06) and the firms with positive equity (TG\_PosEquity\_04\_06).<sup>116</sup>

Furthermore, the results of a Wald Test are presented that reveal whether the coefficients differ significantly.

Table 6: Differential effects on capital structure

	ICL	Log internal debt	Log equity
b1: TG_NegEquity_04_06	-22,09***	-0,88	1,03**
Std. Error	3,18	0,59	0,48
b2: TG_PosEquity_04_06	-25,28***	-0,06	2,68***
Std. Error	3,25	0,60	0,49
b:3 TURNOVER	0,55***	0,58***	0,44***
Std. Error	0,19	0,04	0,03
R <sup>2</sup>	77%	56%	83%
Observations	382	382	382
Firms	1528	1528	1528
b1=b2	3,20	-0,82	-1,65***
Std. Error	3,79	0,70	0,57
Firm fixed effects	yes	yes	yes
Year fixed effects	yes	yes	yes

**Annotations:** \*\*\*significant at 1% level, \*\*significant at 5% level

Very remarkable is the result that the restricted firms with negative equity did indeed react differently than the restricted firms with positive equity. Where firms with positive equity reacted to the restriction by increasing their equity with 268%, the restricted firms with negative equity reacted by only increasing equity with 103%; a significant difference between the groups of 165%.<sup>117</sup>

<sup>116</sup> This side test is practically the same as splitting up the treated group into firms with a high ICL (>100) and the firms with lower ICL (<100), since the firms with ICL >100 are practically only firms with negative equity levels.

<sup>117</sup> Based on the descriptive statistics revealing a clear distribution of the treated group’s firms towards the holdings and trusts segment, a similar regression and Wald Test was run for the treated group split up into

A plausible explanation for this difference would be that the ability to increase equity through the release of hidden reserves or new share issues of firms with negative equity is simply not as good as the ability of ‘healthier’ firms with positive equity. The fact that they have a negative fiscal equity reveals that the firms have been in heavy weather and incurring losses in prior years. Firstly, this does not facilitate the attainment of new equity investments. Secondly, to compensate for these losses, the firms had the option of releasing (some of) the hidden reserves, resulting in lower levels of hidden reserves for this group in general. Concluding, it can be stated that the result is sound since it is logical that firms with negative fiscal equity would be less capable of increasing equity through release of the hidden reserves and new equity issues. Although insignificant, it can be seen that this group did react more severe with a reduction of their internal debt.

Further building on the revelation of this side-test highlighting distinct equity levels, it is imaginable that firms with different internal debt levels show diverse reaction patterns as well. Table 7 presents the results of an additional regression analysis measuring the effects of the TCR on ICL, internal debt and equity for the treated group split up into firms with relatively high internal leverage (TG\_highil\_04\_06) and firms with relatively low internal leverage (TG\_Lowil\_04\_06). The dividing line for relative high and low internal leverage is set at an internal debt/total assets ratio of 0.8<sup>118</sup>.

Furthermore, the table reports on the significance of the coefficient differences.

Table 7: Differential effects on thin capitalization

	ICL	Log internal debt	Log equity
b1: TG_Highil_04_06	-24.64***	-1.30**	1.35***
Std. Error	2,93	0,54	0,44
b2: TG_Lowil_04_06	-21.69***	1,11	2.76***
Std. Error	3,70	0,68	0,56
b:3 TURNOVER	0.53***	0.58***	0.44***
Std. Error	0,19	0,04	0,03
R <sup>2</sup>	77%	57%	83%
Observations	382	382	382
Firms	1528	1528	1528
b1=b2	-2,95	-2.41***	-1.40**
Std. Error	3,99	0,73	0,61
Firm fixed effects	yes	yes	yes
Year fixed effects	yes	yes	yes

**Annotations:** \*\*\*significant at 1% level, \*\*significant at 5% level

firms of the holding and trust segment and firms of the other industries. No significant differences were found between these groups. See appendix E for the results.

<sup>118</sup> This ratio is arbitrarily chosen for a good proportional division of the treated group to firms with relatively high and low internal leverage.

The regression surfaces new remarkable insights.

First, consider the results in itself with respect to the results of the combined group presented in table 5. Regarding significance, the results are in line with table 5 except for the significant reduction of internal leverage of the treated firms with relative high internal debt. These firms did indeed reduce their internal debt with 130% in reaction to the TCR. Furthermore, although weakly insignificant, the firms with low internal debt do not show a reduction of internal debt levels. Regarding equity it can be stated that the high internal leverage (high il) firms reacted stronger than the group combined and the low internal leverage (low il) weaker.

Secondly, consider the reactions of the high il and low il group with respect to each other. The high il firms did indeed react significantly different from the low il firms regarding internal debt and equity. Relative to the low il firms, the high il firms reduced their internal debt with 241% in reaction to the TCR. This is a coherent result based on the idea that firms with relatively high internal debt levels have more room and a bigger incentive for a reduction of internal debt than firms with relatively lower levels. Furthermore, in line with expectations based on the significant relative reduction of internal debt of the high il firms to lower the ICL, table 7 shows a contrary result regarding reactions in the area of equity. The high il group reacted significantly less with an increase of equity than the low il group; they increased equity with 140% less. In conclusion it can be stated that the firms with relative high internal debt reacted to the TCR and reduced their ICL by significantly reducing their internal debt and increasing their equity. The firms with relatively low internal debt reacted with only a fierce increase of equity.

Till now, all differential effects on thin capitalization have been presented with the years 2004 to 2006 clustered, since the main objective of this study was the overall effect of the TCR. However, it is likely that reactions in the distinct years have been different and analysis of each year separately will further improve the insights and understanding of the TCR effects.

Table 8 presents the effects of the TCR on ICL, Log internal debt, Log equity, log Fixed assets and Log Financial assets for the years 2004 (TG\_04), 2005 (TG\_05) and 2006 (TG\_06) separately. Several remarkable aspects surface.

Table 8: Differential effects on capital structure and investments per year

	ICL	Log internal debt	Log equity	Log Fixed assets	Log Financial assets
b1: TG_04	-7,96***	0,12	0,82**	0,07	0,09
Std. Error	2,53	0,48	0,4	0,36	0,41
R <sup>2</sup>	92%	75%	92%	91%	93%
b1: TG_05	-17,50***	-0,16	2,17***	-0,21	-0,3
Std. Error	2,71	0,49	0,41	0,33	0,45
R <sup>2</sup>	89%	66%	91%	91%	0,92
b1: TG_06	-10,04***	-1,16**	0,39	-0,29	-0,2
Std. Error	2,77	0,54	0,44	0,37	0,42
R <sup>2</sup>	85%	80%	91%	91%	92%
Observations	764	764	764	764	764
Firms	382	382	382	382	382
Firm fixed effects	yes	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes	yes

**Annotations:** \*\*\*significant at 1% level, \*\*significant at 5% level

First, let's consider the results presented in columns ICL, Log internal debt and Log equity with respect to the overall results of table 5. The effect of the TCR on ICL of 2004, 2005 and 2006 combined was -23.64 points. Table 8 reveals that an outstanding proportion of this effect is found in 2005. Though, all years show highly significant results. Regarding Log internal debt, the overall result is insignificant. Remarkably, it can be seen that the restricted firms significantly reduced their internal debt in 2006; a decrease of 116% in response to the TCR. Furthermore, table 8 reveals that the majority of the equity increase was in 2005 and that a smaller but significant proportion of the increase occurred in 2004. Secondly, let's consider what these additional findings insinuate. The drop in ICL is outstandingly bigger in 2005 than in 2004. Possibly, the TCR introduction was not well anticipated by many restricted firms<sup>119</sup>. The ICL increase in 2004 and 2005 is mainly explained by an increase in equity and not a decrease in internal debt. The year 2006 shows contrary results; a significant decrease in internal debt and no significant reaction of equity. It is revealing that the restricted firms did indeed react with internal debt and that it occurred after movement of the equity. Possible explanations for this course of action are that changing internal debt is more time consuming and costly than changing equity through the release of hidden reserves. Hence, it is more efficient (faster and cheaper) to initially react with the release of hidden reserves. On the long term, internal debt might have been lowered with the use of additional liquidities.

Furthermore, the revelation that no reduction in internal debt is seen in the years of equity increase, namely 2004 and 2005, insinuates that the increase in equity is probably achieved through release of hidden reserves. Since the release of hidden reserves does not

<sup>119</sup> This is in line with the findings of Overesch and Wamser (2006), also finding a delay in reactions.

generate additional liquidities, there is no way of lowering your internal debt simultaneously. This is what most likely would have happened when the equity would have been raised instantly through the issue of new shares to maximize the effect on the internal debt ratio.

Although changes of fixed and financial assets prove to be insignificant for each year, it can be mentioned that the assumed lag of one year, used in the research methodology, seems to be just. Both types of assets change from a positive coefficient sign in 2004 to a negative coefficient sign the following years. However, it must be stressed again that the results of the TCR on investments remains ambiguous since noise of the release of hidden reserves may be present.

To additionally test for model robustness, the main regression was run without fixing the time and firm specific effects<sup>120</sup>. The effect of fixing firm specific effects was found to be high. As already stressed in chapter 4, due to the chosen methodology the importance of fixing the firm specific effects is high. The essential selection of a treated and control group based on debt-to-equity ratios simultaneously means that the groups are not randomly formed and that it is probable that the different groups behave differently in advance regarding capital structure issues. The significant influence on results of fixing the firm specific effects confirms the importance of fixing these effects for validity purposes of this study's results. Regarding year specific effects, it can be stated that the influence on results is small.

Furthermore, a regression was run including the variable movements of 2003 to the TCR reactions<sup>121</sup>. Subsequently, the results reflect the reactions to the TCR of 2003, 2004, 2005 and 2006 combined with respect to 2002. Results reveal that firms generally did not anticipate and subsequently justify not to include the variable movements of 2003 in the overall TCR reaction.

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<sup>120</sup> The tables are presented in appendix F and G respectively.

<sup>121</sup> See Appendix H.

## Chapter 7 Summary and conclusions

In the last decade, many European and OECD countries have been imposing thin-capitalization regulations to restrict the tax planning possibilities of multinationals through intracompany cross-border loans. Although the shape of the regulations differs among countries, the essence is comparable in that it is intended to limit profit-shifting by restricting the deduction of interest related to excessive internal leverage. This paper studies the effect of the imposition of the Dutch TCR on capital structure and investments.

Theory suggests that in reaction to the introduction of the TCR in 2004, restricted Dutch based multinationals would decrease their internal debt ratios and reduce their future investments due to the adverse effects on cost of capital.

Overall, analysis of the internal debt ratios confirms that these multinationals reduced their internal debt ratios in reaction to the TCR. The ratios were primarily reduced by an increase of equity of 183% (probably a release of hidden reserves) and not by a decrease in internal debt levels.

However, further analysis on this capital structure response refines this overall conclusion. Firstly, by splitting up the reactions to an initial phase and a second phase through analysis of the effects of the distinct years, it was revealed that firms did react with a significant reduction of internal debt, but only after an even bigger first reaction in the area of equity in 2004 and 2005. The subsequent insinuation is that the process of reducing internal debt is more costly and time consuming than an increase of equity through the release of hidden reserves. Secondly, according to expectations, the fraction of the restricted firms with relatively high internal debt levels were indeed found to have reacted significantly with an overall reduction of internal debt of 130%. Furthermore, it was revealed that the multinationals with positive fiscal equity reacted significantly stronger through an increase of equity (namely 165%) than the multinationals with negative fiscal equity. A plausible explanation is that firms with negative fiscal equity would be less capable of increasing equity through release of the hidden reserves and new equity issues than the 'healthier' firms with positive equity. These three additional findings notably nuance the overall results of the equity increase.



Regarding the expected adverse effect of the TCR on investments, results do not reveal a reduction of investments. This is probably due to the noise created by the release of hidden reserves.

Various practical implications follow from the overall results. The effect of the Dutch TCR has been proven by a particular set of firms that did not plan to get hit by the TCR and reacted by changing their capital structure towards the threshold. Contrary to the trend of this particular group, figures revealed a growing sum of restricted interest in the Netherlands. Putting the proven effect of the TCR in perspective of the growing sum of restricted interest in the Netherlands over the last years, it can be stated that the rule on average reduced the growth of excessive internal debt financing. This enlightens that the effect of the rule is that it partly repairs profit shifting instead of preventing it and that excessive internal debt is still found to be favorable despite the interest deduction restriction. On its turn, this justifies the political plea for further restriction.

Secondly, there is the question whether the rule has had its intended effect. The rule was shaped to provide a disincentive to the use of excessive internal debt; internal debt issued for the sole purpose of profit shifting and subsequently eroding the Dutch base and distorting the fair competition with domestically operating firms. It can be concluded that because of the specific shape of the regulation targeting a debt-to-equity ratio, the regulation did not achieve the intended result. Although it did have effect in that internal debt ratios were reduced, it did not reduce the actual levels of excessive debt. Hence, the Dutch thin-capitalization rule did reduce internal debt levels, but was not effective in curbing tax planning via intrafirm financing. The restricted companies kept their original internal debt levels, and hence their profit shifting activities, intact by reacting through an increase of fiscal equity. The current two propositions for further restriction are an improvement on this matter, since equity levels are no longer part of the regulation. One restricts all interest related to the acquisition of a participation and the second variation relates the amount of deductible interest to operating profit.

In sum, it can be stated that both the grounds for further restriction as well as the proposed shapes are justified based on this studies results. However, ambiguity remains for the adverse effect of further restriction on investments.

## Limitations & Recommendations

The major limitation of this study is the inability to retrieve the pure investment reactions to the TCR. As noted in the descriptive statistics, the used database accounts fiscal data and hence allows for the presence of hidden results. The release of these hidden reserves boosts the level of the fixed and financial assets and subsequently creates noise in the results. The use of a database based on commercial data, that does not recognize hidden reserves, would allow for the measurement of the pure reaction to the TCR and possibly a valid proof for the theoretical prediction of an adverse effect of the TCR on investments. This could be of significant contribution to tax policy in general and to the implications of the new Dutch interest restriction propositions specifically.

Additionally, the use of commercial data could clarify the driver of the equity increases. At the moment it remains a (reasonably funded) assumption that the proven increase of equity was mostly due to a release of hidden reserves and not a new share issue. Empirical proof on this matter would allow for more specific and accurate conclusions.

Furthermore, all results could be qualitatively improved by additionally controlling for foreign CIT rate fluctuations. It is theoretically and empirically established that a changing CIT rate difference of two related entities changes the capital structure of both.

As mentioned in the descriptive statistics, the flaw of the control group is that it most probably does not control for movements of the CIT rate at the lender's location. All countries of the internal debt providers and their CIT rate movement over the years could be identified and inserted as a control variable. This is actually the next obvious step in improving the quality of the study.

Other limitations of this study can be found in the methodology and the subsequent size of the treated group. The chosen methodology of selecting the companies that were unexpectedly hit by the TCR introduction required a rigorous selection to 178 firms out of the 1762 TCR restricted firms in 2004. Recommendations lie in the area of improving the validity of the results by choosing a methodology allowing for the maintenance of the majority of the restricted firms. Possibly even all the restricted firms.

Regarding the competency of the data, the following limitations were present. Firstly, the specific amount of restricted interest due to the TCR is not computed based on the VIS

database. Therefore, a proxy was used in this study that was expected to capture the reactions of the multinationals. Accuracy of the results could be enhanced if the specific items of the TCR test would be used. Secondly, the item ‘related party debt’ of the database is inaccurate and incomplete and hence the proxy ‘internal debt’ was used. Retrieving this data in company accounts could again alter the accuracy of the results. It must however be stated that the VIS database is the only firm level fiscal database of the Netherlands and that feasibility generally limits empirical research to the use of databases. Therefore, regarding the data of this study, it can be concluded that the dataset could practically not have been improved.

General recommendations for further research are in the area of the current TCR and the recently proposed more stringent legislation regarding interest deductibility. Regarding the current TCR, this study enlightened and proved the effect on capital structure and in a sense the benefits for the state’s treasury. However, it is highly probable that the rule has also been responsible for the departure of firms to fiscally more attractive countries. What were the total costs for the state of the TCR implementation? In other words, has the implementation of the TCR been beneficial overall for the Netherlands?

Regarding the new propositions, how will firms react? How rigorous will they change their financing policy? It is expected that the newly proposed legislation will further deteriorate the Dutch climate of establishment. What consequences do we expect for the Dutch Treasury? What are the international tax consequences? These are all questions that illustrate the complexity of the fiscal treatment of debt and justify the present political attention and concern.

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## Appendices

### *Appendix A, Article 10d Wet VPB 1969*

- 1 Indien bij een belastingplichtige in jaar sprake is van teveel aan vreemd vermogen, komt bij het bepalen van winst van dat jaar niet in aftrek een gedeelte van rente terzake van geldleningen – kosten van geldleningen daaronder begrepen – dat evenredig is aan de verhouding tussen het teveel aan vreemd vermogen en het gemiddeld vreemd vermogen.
- 2 Indien de belastingplichtige niet met andere lichamen in groep is verbonden in zin van artikel 24b van boek 2 van Burgerlijk Wetboek , blijft het eerste lid buiten toepassing.
- 3 Het bedrag aan rente dat op grond van eerste lid niet in aftrek komt, bedraagt ten hoogste het bedrag aan rente terzake van geldleningen direct of indirect verschuldigd aan met belastingplichtige verbonden lichamen, verminderd met bedrag aan rente terzake van geldleningen verstrekt aan zodanige lichamen.
- 4 Van een teveel aan vreemd vermogen als bedoeld in eerste lid is sprake voorzover het gemiddeld vreemd vermogen van belastingplichtige meer bedraagt dan driemaal het gemiddeld eigen vermogen en dit meerdere € 500 000 te boven gaat. Voor de toepassing van eerste lid in verbinding met eerste volzin wordt onder vreemd vermogen slechts verstaan het saldo van verschuldigde geldleningen en de uitstaande geldleningen en worden de fiscaal toelaatbare reserves niet als eigen vermogen beschouwd.
- 5 Indien de belastingplichtige daarvoor bij de aangifte kiest, wordt het teveel aan vreemd vermogen in afwijking van vierde lid bepaald als het bedrag waarmee het gemiddeld vreemd vermogen van belastingplichtige uitgaat boven het gemiddeld eigen vermogen vermenigvuldigd met factor welke overeenkomt met vermogensverhouding bij de groep. Voor de toepassing van eerste lid in verbinding met eerste volzin worden het vreemd vermogen en het eigen vermogen bepaald aan de hand van jaarrekening, opgemaakt volgens de bepalingen van titel 9, boek 2, van Burgerlijk Wetboek , dan wel volgens soortgelijke buitenlandse wettelijke regelingen. Ingeval tot het vermogen van belastingplichtige behoren dan wel daarvan deel uitmaken vermogensbestanddelen van samenwerkingsverband respectievelijk van dochtermaatschappij in zin van [art. 15](#), worden voor de toepassing van tweede volzin het vreemd vermogen en eigen vermogen bepaald aan de hand van geconsolideerde balans waarop de vermogensbestanddelen van dat samenwerkingsverband of die dochtermaatschappij afzonderlijk zijn verantwoord.
- 6 De factor, bedoeld in vijfde lid, is gelijk aan het gemiddeld vreemd vermogen gedeeld door het gemiddeld eigen vermogen, volgens de geconsolideerde jaarrekening van groep, bedoeld in artikel 24b van boek 2 van Burgerlijk Wetboek , dan wel een soortgelijke buitenlandse wettelijke regeling, waarvan de belastingplichtige deel uitmaakt. Indien de belastingplichtige deel uitmaakt van meer dan één groep wordt de groep met grootste balanstotaal als maatstaf genomen.
- 7 Voor de toepassing van dit artikel wordt onder geldlening verstaan een vordering of schuld die voortvloeit uit een overeenkomst van geldlening of daarmee vergelijkbare overeenkomst en waarbij bij een schuld zonder toepassing van dit artikel rente in aanmerking zou worden genomen bij het bepalen van winst.
- 8 De in dit artikel bedoelde gemiddelden worden bepaald naar de stand bij het begin en het einde van jaar, waarbij het gemiddeld eigen vermogen ten minste op € 1 wordt gesteld.
- 9 De vermindering van belasting ingevolge voorschriften ter voorkoming van dubbele belasting wordt berekend zonder toepassing van tweede, het derde en het vijfde lid.
- 10 Bij de berekening van vermindering van belasting ingevolge voorschriften ter voorkoming van dubbele belasting wordt het gezamenlijke bedrag aan rente dat op grond van eerste lid bij die berekening niet in aftrek komt, niet tot een hoger bedrag in aanmerking genomen dan het bedrag aan rente dat op grond van dat lid bij het bepalen van belastbare winst niet in

*Appendix B, Article 10a lid 4 Wet VPB 1969*

Voor de toepassing van dit artikel en de artt. 10, 10d, 13, 13a, 13b, 13ba, 13c, 13d, 13e, 13j, 13k, 14, 14a, 17a, 20, 28 en 33 wordt als een met belastingplichtige verbonden lichaam aangemerkt:

- a. een lichaam waarin de belastingplichtige voor ten minste een derde gedeelte belang heeft;
- b. een lichaam dat voor ten minste een derde gedeelte belang heeft in belastingplichtige;
- c. een lichaam waarin een derde voor ten minste een derde gedeelte belang heeft, terwijl deze derde tevens voor ten minste een derde gedeelte belang heeft in belastingplichtige. Daarbij wordt een belang dat wordt gehouden door echtgenoot of minderjarig kind van natuurlijk persoon aan die persoon toegerekend. Met een echtgenoot wordt gelijkgesteld de ongehuwde meerderjarige die ingevolge artikel 1.2 van Wet inkomstenbelasting 2001 kan kwalificeren als partner. Onder een kind wordt mede verstaan een kind van echtgenoot alsmede een pleegkind.;
- d. een lichaam dat met belastingplichtige deel uitmaakt van fiscale eenheid als bedoeld in artt. 15 en 15a, tenzij het de toepassing betreft van art. 10d.

Onze Minister kan op verzoek van samenwerkende groep van niet-verbonden lichamen de inspecteur machtigen, onder door Onze Minister te stellen voorwaarden, deze groep aan te merken als verbonden lichamen. De inspecteur beslist op het verzoek bij voor bezwaar vatbare beschikking.



*Appendix C, Corporate Income Tax rates*

CIT Rates EU, OECD, Tax Havens and Other	2004	2005	2006
Netherlands Antilles	34,5%	34,5%	34,5%
Austria	34,0%	25,0%	25,0%
Australia	30,0%	30,0%	30,0%
Barbados	36,0%	30,0%	25,0%
Belgium	34,0%	34,0%	34,0%
Bulgaria	19,5%	15,0%	15,0%
Bahamas	0,0%	0,0%	0,0%
Canada	35,6%	35,6%	35,6%
Switzerland	24,1%	21,3%	21,3%
Cyprus	15,0%	10,0%	10,0%
Czech Republic	28,0%	26,0%	24,0%
Germany	38,3%	38,3%	38,3%
Denmark	30,0%	28,0%	28,0%
Spain	35,0%	35,0%	35,0%
Finland	29,0%	26,0%	26,0%
France	35,4%	34,9%	34,4%
Great Britain	30,0%	30,0%	30,0%
Gibraltar	0,0%	0,0%	0,0%
Greece	35,0%	32,0%	29,0%
Croatia	20,0%	20,0%	20,0%
Hungary	17,7%	17,7%	17,7%
Ireland	12,5%	12,5%	12,5%
India	36,8%	36,8%	35,9%
Italy	37,3%	37,3%	37,3%
Japan	37,3%	37,3%	37,3%
South Korea	27,0%	25,0%	25,0%
Cayman Islands	0,0%	0,0%	0,0%
Liechtenstein	17,0%	20,0%	20,0%
Luxembourg	30,4%	30,4%	29,6%
Latvia	15,0%	15,0%	15,0%
Malta	35,0%	35,0%	35,0%
Malaysia	28,0%	28,0%	28,0%
Mexico	33,0%	30,0%	29,0%
New Zealand	33,0%	33,0%	33,0%
Netherlands	34,5%	31,5%	29,6%
Norway	28,0%	28,0%	28,0%
Poland	19,0%	19,0%	19,0%
Portugal	27,5%	27,5%	27,5%
Romania	25,0%	16,0%	16,0%
Sweden	28,0%	28,0%	28,0%
Singapore	20,0%	20,0%	19,0%
Slovakia	19,0%	19,0%	19,0%
Slovenia	25,0%	25,0%	25,0%
Turkey	30,0%	30,0%	33,0%
Taiwan	25,0%	25,0%	25,0%
Ukraine	25,0%	25,0%	25,0%
USA	39,3%	39,3%	39,3%
British Virgin Islands	15,0%	0,0%	0,0%
South Africa	30,0%	30,0%	30,0%

*Appendix D, SIC codes and sample distribution*

SIC code	Industry	Treatment Group	%	Control Group	%
0	Agriculture	0	0%	0	0%
1	Mining	6	3%	8	4%
2,3	Manufacturing	15	8%	29	14%
4	Utilities	1	1%	0	0%
5	Construction Industry	1	1%	10	5%
6	Wholesale & Retail	25	14%	40	20%
7	Transportation & Storage	10	6%	5	2%
8	Services	112	63%	108	53%
9	Public Administration	3	2%	2	1%
10	No Qualification	5	3%	2	1%
		<u>178</u>		<u>204</u>	

*Appendix E, Treated group split up in Holdings and Other firms*

Differential effects on thin capitalization

	ICL	Log internal debt	Log equity
b1: TG_Holding_04_06	-21.73***	-1.00	1.28**
Std. Error	4.28	0.79	0.65
b2: TG_Other_04_06	-24.21***	-0.32	2.00***
Std. Error	2.799993	0.52	0.43
b:3 TURNOVER	0.54***	0.58***	0.44***
Std. Error	0.19	0.04	0.03
R <sup>2</sup>	77%	56%	83%
Observations	382	382	382
Firms	1528	1528	1528
b1=b2	2.48	-0.68	-0.72
Std. Error	4.45	0.82	0.68
Firm fixed effects	yes	yes	yes
Year fixed effects	yes	yes	yes

**Annotations:** \*\*\*significant at 1% level, \*\*significant at 5% level

*Appendix F, Main regression results without firm fixed effects*

Differential effects on thin capitalization

	ICL	Log internal debt	Log equity
b1: TG_04_06	35.71***	0.16	-6.84***
Std. Error	2.15	0.30	0.34
b2: Log TURNOVER	-0.68***	0.27***	0.34***
Std. Error	0.15	0.02	0.02
R <sup>2</sup>	22%	15%	37%
Observations	1528	1528	1528
Firms	382	382	382
Firm fixed effects	no	no	no
Year fixed effects	yes	yes	yes

**Annotations:** \*\*\*significant at 1% level, \*\*significant at 5% level

*Appendix G, Main regression results without year fixed effects*

Differential effects on thin capitalization

	ICL	Log internal debt	Log equity
b1: TG_04_06	-24.04***	-0.30	1.98***
Std. Error	1.96	0.36	0.29
b2: Log TURNOVER	0.68***	0.61***	0.43***
Std. Error	0.19	0.04	0.03
R <sup>2</sup>	76%	54%	82%
Observations	1528	1528	1528
Firms	382	382	382
Firm fixed effects	yes	yes	yes
Year fixed effects	no	no	no

**Annotations:** \*\*\*significant at 1% level, \*\*significant at 5% level

*Appendix H, Main regression results including the 2003 effects*

Differential effects on thin capitalization

	ICL	Log internal debt	Log equity
b1: TG_03_06	-1.35	-0.95	1.11***
Std. Error	2.7	0.50	0.42
b2: Log TURNOVER	0.80***	0.56***	0.41***
Std. Error	0.16	0.03	0.025
R <sup>2</sup>	71%	56%	79%
Observations	1910	1910	1910
Firms	382	382	382
Firm fixed effects	yes	yes	yes
Year fixed effects	yes	yes	yes

**Annotations:** \*\*\*significant at 1% level, \*\*significant at 5% level