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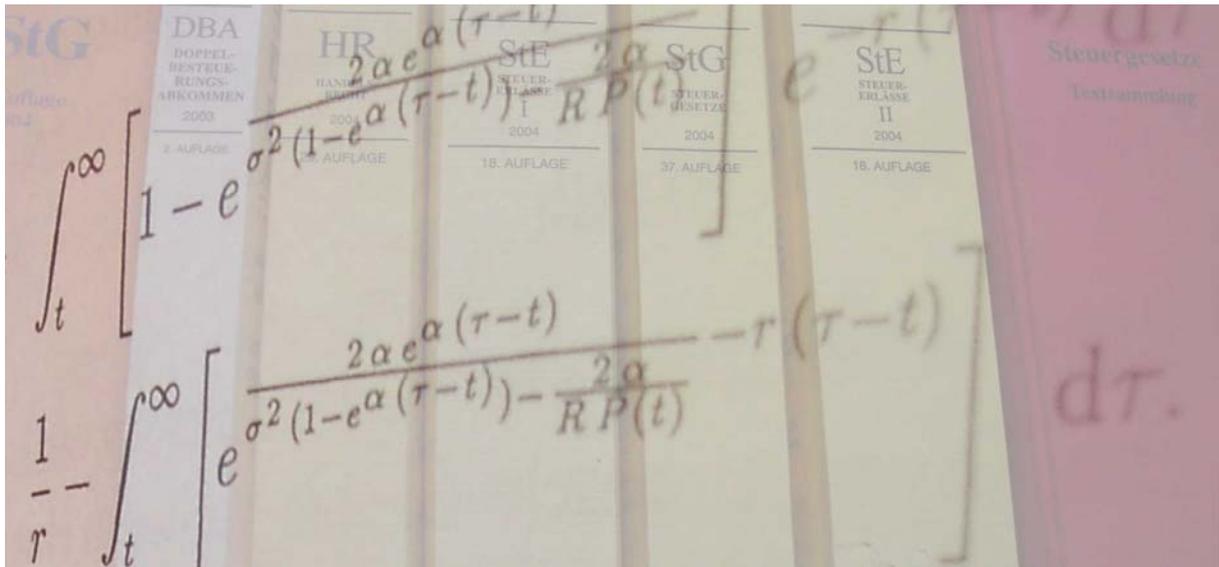
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# The Impact of Thin Capitalization Rules on Shareholder Financing

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## Abstract

From a tax planner's point of view, it is often attractive to choose debt over equity financing. As this has led to an increase of debt financing of corporations, many countries have introduced thin capitalization rules to secure their tax revenues. We analyze the influence of section 8a of the German Corporate Tax Code on corporate capital structure decisions. Furthermore, the impact of the new interest barrier is taken into consideration. The existence of the Miller equilibrium as well as definite financing effects depend significantly on the fraction of long-term debt, of substantial shareholders and when capital gains are realized.

**Keywords:** business taxation, capital structure, interest barrier, Miller equilibrium, shareholder financing, thin capitalization rules

**JEL Code:** H25, H21, G32

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# The Impact of Thin Capitalization Rules on Shareholder Financing

## 1 Introduction

Seen from a tax perspective it is often attractive for shareholders of corporations to provide capital as debt capital instead of equity capital. This has led to an extensive enlargement of debt financing of corporations<sup>1</sup>. To protect tax revenues, the legislators of many countries have reacted to this development by implementing increasingly so-called thin capitalization rules<sup>2</sup> or by strengthening existing rules<sup>3</sup>. Against this background the question is how such regulations affect the capital structure decisions of stockholders of corporations<sup>4</sup>.

During the last decades a multitude of authors have contributed to the field of capital structure decisions in companies<sup>5</sup>. In line with neoinstitutional theory, a major role is played in particular by the tax based trade-off theory<sup>6</sup> and the non-tax oriented pecking-order-theory<sup>7</sup>. The theory of Modigliani and Miller (1958) represents the groundwork for many contributions based on neoclassical theory. In this work, taxes have not yet been included. Many extensions to Modigliani and Miller (1958) take account of many different aspects. Modigliani and Miller (1963) extend their model themselves and integrate among other things a corporate tax. Miller (1977) completes the model anew and in addition implements an income tax on the shareholder level. In both attempts a classic corporate tax system is assumed.

Furthermore, in some approaches the income tax effects on the capital structure are modelled more precisely. For instance, capital gains taxes are highlighted by Farrar and Selwyn (1967), Brennan (1970), and Schneller (1980) and thereby the asymmetric taxation of dividends and capital gains. Brennan (1970) and Zechner (1990) assume a progressive tax scale and allowances for interest paid.

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<sup>1</sup> Cf. Holzaepfel and Köplin (2004), pp. 20 ff.

<sup>2</sup> E.g. in Italy and the Netherlands. For an overview of the different thin capitalization rules, cf. e.g. Kessler and Obser (2004); Gouthière (2005).

<sup>3</sup> E.g. in Germany, Denmark, Great Britain, Spain and France.

<sup>4</sup> We neglect problems of information asymmetry between managers and shareholders in the following. Hence, we abstract for reasons of simplicity from principle-agent conflicts.

<sup>5</sup> An overview of different capital structure models is given by Myers (2001) and Graham (2006).

<sup>6</sup> Cf. e.g. Myers (1984).

<sup>7</sup> Cf. Donaldson (1961).

Some papers take account of tax policy details in various countries. Laß (1999) models US-American tax law between 1977 and 1994 as well as German tax law between 1976 and 1998 in a Miller framework. Swoboda (1991) examines Germany and Austria's 1991 tax laws using the same model. In this context he considers Germany's corporate tax, income tax and also property tax, local business tax and church tax. Holland and Steiner (1996) expand Swoboda's approach and investigate the influence of Germany's solidarity surcharge on the capital structure. Fung and Theobald (1984) consider the 1984 tax laws of France, Germany, the United Kingdom and the USA. Unlike Swoboda, they restrict themselves to corporate and income taxes.

Beyond detailed models of different taxes there are many other extensions to the Modigliani and Miller (1958) model. Hodder and Senbet (1990), Graham (2003), and Desai, Foley, and Hines (2004) consider international tax aspects, DeAngelo and Masulis (1980a), DeAngelo and Masulis (1980b), and Graham (2000) take account of non-debt-tax shields, e.g. Kraus and Litzenberger (1973), Haugen and Senbet (1978), Kim (1978) model bankruptcy costs, and Jensen and Meckling (1976) and Leland (1998) integrate agency costs<sup>8</sup>. Capital structure models under uncertainty are examined by Kim (1982), Zechner (1990) and Swoboda (1991). Miller and Scholes (1978) and Litzenberger and van Horne (1978) consider dividend policy. Schneller (1980) and Graham (2003) offer a model that takes account of different systems to prevent double taxation of dividends. Furthermore, a dynamic model is presented by Fischer, Heinkel, and Zechner (1989).

Although the literature provides detailed investigations of tax rules, thin capitalization rules have to date only been analyzed by Buettner, Overesch, Schreiber, and Wamser (2006) and Overesch and Wamser (2006). The authors analyze financing decisions in a multinational firm under consideration of a restrictive tax rule for stockholders' debt financing, which is comparable to the German thin capitalization rules. In their papers, the main elements of a thin capitalization tax rule are considered without modelling details of the regulation for a specific country<sup>9</sup>. A more sophisticated and specified analysis of the influence of thin capitalization rules on entrepreneurial capital structure decisions has not been conducted until now.

To fill this void, we integrate the German thin capitalization rules of section 8a of the

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<sup>8</sup> For an overview cf. Harris and Raviv (1991).

<sup>9</sup> Yet neither a specific debt capital/equity capital ratio, safe haven, nor a differentiation between profit-dependent and profit-independent loans are carried out.

Corporate Tax Code into a capital structure decision model in the following analysis. We analyze its influence on corporate financing decisions. Section 8a of the Corporate Tax Code can be regarded as an example of tax rules that constrain the stockholder's debt financing, as they exist in many countries. This rule is representative of policies that are characterized by a given permitted debt-equity capital ratio. Because many countries have implemented tax rules which are similar to section 8a of the Corporate Tax Code in this respect<sup>10</sup>, the following analysis is of general relevance. Our results remain important even after the abolition of section 8a to estimate the consequences of many countries' thin capitalization rules on capital structure decisions, for instance those taken by multinationals.

We refer to the capital structure model by Miller (1977). Miller investigates the market for debt capital and shows that this market always leads to an equilibrium in which for every company the capital structure is irrelevant to the value of the firm. The same after-tax return arises irrespective of the form of financing<sup>11</sup>, because the advantage being that debt capital incur interest payments that are deductible from the corporate tax base and the advantage of the equity capital due to a relative lower income tax burden are balanced<sup>12</sup>.

In section 2 we analyze whether, under the 2007 German tax code and taking account of the thin capitalization rule in section 8a of the Corporate Tax Code, a Miller equilibrium may emerge<sup>13</sup>. If not, we determine the optimal capital structure and identify the most important value driving factors. Section 3 forecasts the effects of Germany's 2008 business tax reform and in turn, the influence of substituting the existing thin capitalization rule by an interest barrier. In this context we provide first qualitative considerations about how the new rule will affect investors' financing decisions. In section 4 we summarize and draw conclusions.

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<sup>10</sup> E.g. Italy, the Netherlands, Spain, Denmark and Belgium.

<sup>11</sup> Cf. Swoboda (1994), p. 51.

<sup>12</sup> Cf. Miller (1977), pp. 269 f.; Zechner (1989), p. 9.

<sup>13</sup> On the basis of Miller (1977), we call a single investor's indifference towards providing capital as a loan or as equity capital to a corporation a „Miller equilibrium“. In the following, this so-called equilibrium is not a general market equilibrium.

## 2 Miller equilibrium for shareholder debt financing

### 2.1 Assumptions

In the following we integrate thin capitalization for shareholder debt financing according section 8a of the Corporate Tax Code as amended by the Korb II tax reform act<sup>14</sup> into Miller's model to deduce conclusions about the effectiveness of this regulation for financing decisions in corporations.

Under section 8a of the Corporate Tax Code interest on debt capital that a corporation receives from a shareholder with a shareholding of more than 25%, under certain circumstances, has to be requalified as hidden distribution of profits. This regulation only holds if the shareholder's capital commitment is a long-term commitment and if the tax allowance of € 250,000 of interest on debt is exceeded.

Depending on the nature of the credit, namely if the interest payments are profit-related or not, further requirements must be met. A permissible ratio of debt capital to equity capital of currently 1.5:1 applies to non-profit-related credits. Therefore, interest is not considered to be a hidden distribution of profits until the long-term debt of an substantial investor exceeds 1.5 times his equity share<sup>15</sup>. Our model relies on the following set of assumptions:

We assume a perfect capital market under certainty and identical debit and credit interest rates. The borrower is a corporation subject to section 1 para 1 no. 1 of the Corporate Tax Code. The investors are assumed to be natural individuals with unlimited income tax liability under the terms of section 1 para 1 of the Income Tax Code who hold their investment and accordingly the provided capital in private means. On corporate level corporate tax, solidarity surcharge and local business tax are considered<sup>16</sup>. On shareholder level income tax and solidarity surcharge are taken into account<sup>17</sup>.

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<sup>14</sup> Cf. section 8a of the Corporate Tax Code as amended by the Korb II tax reform act dated Dec. 22, 2006, BGBl. I 2003, pp. 2841 f.

<sup>15</sup> Cf. section 8a para 1 no. 2 of the Corporate Tax Code.

<sup>16</sup> There are also local business taxes for example in France, Spain, Luxembourg and Italy. For this reason the analysis of the German local business tax is only exemplary for those local business taxes that are similar to the German tax.

<sup>17</sup> In this respect we extend Miller's model and consider not only corporate and income tax but also other decision-relevant taxes. See also Swoboda (1991), p. 851. Church tax is disregarded. For a contrary point of view see Swoboda (1991), p. 854. For reasons of simplification and as it does not imply any extra tax burden on shareholder level withholding tax on capital is neglected.

Loans whose interest payments are profit-related and non-profit-related are both integrated into the model. The interest payment for non-profit-related loans amounts to  $i DC$ . In this context  $i$  describes the market rate of return that can be earned on the capital market and  $DC$  denotes the amount of debt capital provided by an investor. The interest payment for profit-related loans amounts to  $\varphi (\Pi - i DC)$ . In this context we exclusively consider a case where the interest payment is calculated as a fixed fraction  $\varphi$  of gross profit  $\Pi$  after deduction of non-profit-related interest payments. Consequently, the full amount of interest  $I$  is  $I = i DC + \varphi (\Pi - i DC)$ .

All investors who have to decide to provide either equity or debt capital are assumed also to be shareholders of the underlying corporation at the same time. Thus, corporate loans are exclusively raised from the shareholders. Loans from third parties are excluded from the analysis. The investors participate substantially with a fraction of  $\delta$  and non-substantially with a fraction of  $(1 - \delta)$  in the corporation<sup>18</sup>. It is true that  $\delta \in (0, 1]$ <sup>19</sup>.

To integrate effects of the local business tax into the model further assumptions are necessary. Corporate income as defined in the Corporate Tax Code is the basis for determining the local business tax base<sup>20</sup>. Since the local business tax itself is an operating expense, it is deductible from its own tax base. Furthermore, amongst the various tax base adjustments listed in section 8 of the Local Business Tax Code, only the addition of half of the interest payments for long-term debt<sup>21</sup> is considered in the model<sup>22</sup>. Reductions according to section 9 of the Local Business Tax Code are not considered at all. The fraction of the interest that is long-term debt<sup>23</sup> is denoted by  $\alpha$ ,  $\alpha \in (0, 1]$ <sup>24</sup>. This fraction applies to both profit-related and non-profit-related loans<sup>25</sup>. The interest payments that are requalified as hidden distribution of profits according to section 8a of the Corporate Tax Code are

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<sup>18</sup> According to section 8a para 1 in conjunction with para 3 of the Corporate Tax Code, a shareholder is substantially participating if they directly or indirectly hold more than 25% of the total capital stock at any point of time during the financial year.

<sup>19</sup> If  $\delta = 0$ , section 8a of the Corporate Tax Code does not apply.

<sup>20</sup> Cf. section 7 sentence 1 of the Local Business Tax Code.

<sup>21</sup> Cf. section 8 no. 1 of the Local Business Tax Code.

<sup>22</sup> Splitting debt into long- and short-term debt indirectly introduces time as a dimension into the model. Although we develop a static model that per definition does not account for the dimension of time, the differentiation between long- and short-term debt is necessary to distinguish between different types of interest for local business tax and thin capitalization purposes. Nevertheless, the model remains static.

<sup>23</sup> Section 8 no. 1 of the Local Business Tax Code.

<sup>24</sup> If  $\alpha = 0$ , section 8a of the Corporate Tax Code is not applicable.

<sup>25</sup> This is an extension to existing models. Only exclusively long-term loans have been considered to date. Cf. Swoboda (1991), p. 856; Laß (1999), p. 120.

deductible neither from the corporate tax base nor from the local business tax base<sup>26</sup>.

Under the corporate tax law dividends are not expenses and hence do not reduce the taxable income of the corporation<sup>27</sup>, whereas interest payments on debt are generally deductible from tax as they are operating expenses<sup>28</sup>. According to section 8a para 1 sentence 1 of the Corporate Tax Code this rule applies only to interest paid on long-term debt. We assume that a fraction  $\alpha$  of debt is long-term debt. This fraction corresponds to the fraction of long-term debt defined in section 8 no. 1 of the Local Business Tax Code<sup>29</sup>. We assume that the tax allowance<sup>30</sup> of € 250,000 of interest is exceeded. In the following the permissible debt-to-equity-ratio of 1.5:1 will be denoted with  $\mu$  and is also assumed to be exceeded as well. Consequently, not the total amount of interest that has been paid to an substantial shareholder is deductible, but rather 1.5 times the shareholder's share in corporate equity, thus  $i\mu\delta EC$ . In the following the deductible amount of interest is denoted as safe haven  $S$ .

Hence,

$$S = \begin{cases} i\mu\delta EC, & \text{if } DC > 0; \\ 0, & \text{otherwise.} \end{cases}$$

Equity capital  $EC$  provided by the shareholder denotes the equity capital that has already been provided prior to the point of time when the financing decision is made. The investor's individual amount of equity is exogenously given. Further, it is assumed that all investors offer the same mix of equity and loans to the corporation and consequently all substantial shareholders have an identical safe haven. It is therefore possible to determine the overall safe haven for all shareholders jointly. It is not necessary to fall back on the single shareholder.

Under income tax law earned interest is fully taxable<sup>31</sup>. The capital income from shareholders' invested equity capital consists of distributed dividends of the corporation and realized capital gains. The distributed profits  $D$  are subject to the half-income system and thus only 50% of this type of capital income is taxable<sup>32</sup>. In the following the taxable

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<sup>26</sup> Cf. section 7 of the Local Business Tax Code.

<sup>27</sup> Cf. section 8 para 3 of the Corporate Tax Code.

<sup>28</sup> In line with Miller, the case of limited interest deductibility, particularly due to losses, is not considered. Cf. Miller (1977), p. 262.

<sup>29</sup> Cf. BMF communique dated July 15, 2004 - IV A 2 -p. 2742a - 20/04, m.no. 37.

<sup>30</sup> Cf. section 8a para 1 of the Corporate Tax Code.

<sup>31</sup> Cf. section 20 para 1 no. 7 of the Income Tax Code.

<sup>32</sup> Cf. section 20 para 1 no. 1 in conjunction with section 3 no. 40 d) of the Income Tax Code. This

fraction of dividends will be denoted as  $\sigma$ .

In line with Miller capital gains  $CG$  correspond to the sum of retained earnings<sup>33</sup>. These capital gains are only subject to income tax if the conditions of section 23 or section 17 of the Income Tax Code are valid. We assume that capital gains are always taxable. The time lag of capital gains taxation compared to dividend taxation is considered via a discounting factor  $\tau \in (0, 1]$ <sup>34</sup>. We obtain

$$(1) \quad \tau = \frac{1}{(1 + i_s)^n}.$$

$i_s$  is the after-tax market rate of return that the shareholder is able to earn alternatively on the capital market and is given by  $i_s = (1 - s)i$  with  $s$  being the investor's personal income tax rate. The variable  $n$  describes the period in years after which the capital gains are realized<sup>35</sup>. Capital gains, as dividends, are subject to the half-income system<sup>36</sup>. Therefore, only a fraction  $\sigma$  of the capital gain is taxable. In total the present value of assessable and taxable capital gains  $CG$  is  $\tau\sigma CG$ <sup>37</sup>.

Personal allowances, income-related expenses, standardized deductions, special expenses and extraordinary charges are not considered when calculating taxable income. We assume there is no income from other sources apart from interest income, dividends, and capital gains. Both the income from providing a loan to the corporation and the income from provided equity are subject to the combined tax rate of personal income tax and solidarity surcharge  $s_{esolz}$ . Although the income tax scale is progressive, from the perspective of the shareholders the income tax rate is constant and thus can be regarded as exogenously given. The fraction of interest that is not tax deductible on corporate level is requalified as hidden profit distribution<sup>38</sup>. These payments are subject to the half-income system on shareholder level<sup>39</sup>.

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system will be abolished in 2009 and substituted by a final taxation of capital income at a flat rate of 25%. Then, a modified shareholder relief system will only be applicable to capital income from corporate shares held as business assets.

<sup>33</sup> Cf. Miller (1977), p. 268. We hence abstract from increases in value which are only caused by speculation developments.

<sup>34</sup> It is necessary to implement the discount factor  $\tau$  into our static model to highlight the difference in taxation of dividends and capital gains in present value terms.

<sup>35</sup> We assume that  $n$  is exogenously given and hence the investor is not able to decide on the holding period  $n$ .

<sup>36</sup> Cf. section 3 no. 40 c) and j) of the Income Tax Code.

<sup>37</sup> For reasons of simplicity Laß (1999) and Swoboda (1991) assume for their analyses that capital gains are tax-exempt. Moreover, Swoboda discusses the consequences of including the taxation of capital gains in the model. Cf. Swoboda (1991), p. 857; Laß (1999), p. 119.

<sup>38</sup> Cf. section 8a of the Corporate Tax Code.

<sup>39</sup> Cf. section 20 para 1 no. 1 sentence 2 of the Income Tax Code.

## 2.2 Model

Now we will formally describe all relevant fiscal rules. In a first step we have to determine the amount of interest that can be deducted when determining the corporate tax base. In total, interest payments amounting to  $I$  are paid to the investor:

$$(2) \quad I = i DC + \varphi[\Pi - i DC].$$

Of this, the amount  $I_{dNE}$ , which describes the interest paid to shareholders who are not substantially participating, is completely deductible:

$$(3) \quad I_{dNE} = I(1 - \delta) = (i DC + \varphi[\Pi - i DC])(1 - \delta).$$

The interest payments to substantial shareholders can be deducted from the corporate tax base up to an amount of  $I_{dE}$ . Interest payments on short-term loans are completely deductible  $I\delta(1 - \alpha)$ , whereas interest payments on long-term debt are only deductible in the amount of the safe haven  $S$ .

$$(4) \quad I_{dE} = I\delta(1 - \alpha) + S = (i DC + \varphi[\Pi - i DC])\delta(1 - \alpha) + i\mu\delta EC.$$

Overall the sum  $I_d$  of  $I_{dNE}$  and  $I_{dE}$  is tax deductible at corporate level:

$$(5) \quad I_d = I_{dNE} + I_{dE} = (i DC + \varphi[\Pi - i DC])(1 - \alpha\delta) + i\mu\delta EC.$$

The amount of non-deductible interest  $I_{nd}$  which is requalified as a hidden distribution of profits is

$$(6) \quad I_{nd} = I - I_d = (i DC + \varphi[\Pi - i DC])\alpha\delta - i\mu\delta EC.$$

In terms of local business tax interest payments  $I_d$  are tax deductible from gross profit  $\Pi$  as operating expenses. According to section 8 no. 1 of the Local Business Tax Code half of the interest on long-term debt is added. For non-substantial shareholders a fraction  $\alpha$  of the deductible interest  $I_{dNE}$  is assumed to be long-term debt, for substantial shareholders

long-term debt amounts to the safe haven  $S$ . The local business tax burden is

$$\begin{aligned}
(7) \quad S_g &= s_g \left[ \Pi - I_d + \frac{1}{2} \left( I_{dNE} \alpha + S \right) \right] \\
&= s_g \left[ \Pi - \left( i DC + \varphi [\Pi - i DC] \right) (1 - \alpha \delta) - i \mu \delta EC \right. \\
&\quad \left. + \frac{1}{2} \left[ \left( i DC + \varphi [\Pi - i DC] \right) (1 - \delta) \alpha + i \mu \delta EC \right] \right] \\
&= s_g \left[ \Pi - \left( i DC + \varphi [\Pi - i DC] \right) \left( 1 - \frac{\alpha}{2} (1 + \delta) \right) - \frac{1}{2} i \mu \delta EC \right].
\end{aligned}$$

The taxable income in terms of corporate tax results from the deduction of debt-capital interest  $I_d$  and the local business tax  $S_g$  from gross profit  $\Pi$

$$\begin{aligned}
(8) \quad S_{ksolz} &= s_{ksolz} \left( \Pi - I_d - S_g \right) \\
&= s_{ksolz} \left[ \Pi - \left( i DC + \varphi [\Pi - i DC] \right) (1 - \alpha \delta) - i \mu \delta EC \right. \\
&\quad \left. - s_g \left[ \Pi - \left( i DC + \varphi [\Pi - i DC] \right) \left( 1 - \frac{\alpha}{2} (1 + \delta) \right) - \frac{1}{2} i \mu \delta EC \right] \right].
\end{aligned}$$

The taxable interest  $I_{liable}$ , dividends  $D_{liable}$  and capital gains  $CG_{liable}$  are subject to the investor's income tax. Additionally, interest that is considered to be a hidden distribution of profits due to section 8a of the Corporate Tax Code is subject to income tax. The taxable fraction of the hidden distribution of profits is denoted with  $hiD_{liable}$ . Thus, the burden resulting from income tax and solidarity surcharge is

$$(9) \quad S_{esolz} = s_{esolz} \left( I_{liable} + D_{liable} + hiD_{liable} + CG_{liable} \right).$$

The interest payment which are subject to income tax are identical to the deductible interest payments  $I_d$  on the corporate level. As the interest is completely taxable,  $I_d$  is equal to  $I_{liable}$ .

$$(10) \quad I_{liable} = I_d = \left( i DC + \varphi [\Pi - i DC] \right) (1 - \alpha \delta) + i \mu \delta EC.$$

The dividends  $D$  are subject to the half-income system and therefore only the fraction  $\sigma$  is subject to income tax

$$(11) \quad D_{liable} = \sigma D.$$

Interest that is interpreted as hidden distribution of profits is treated like dividends and thus likewise subject to the half-income system. The hidden distribution of profits corresponds to non-deductible interest on corporate level  $I_{nd}$ . This amount denotes the interest payments to substantial shareholders that exceed the safe haven.

$$(12) \quad hiD_{liable} = \sigma hiD = \sigma I_{nd} = \sigma \left[ \left( i DC + \varphi[\Pi - i DC] \right) \alpha \delta - i \mu \delta EC \right].$$

Capital gains  $CG$  result from the difference between the profit  $\Pi$  and the taxes at corporate level, namely the local business tax  $S_g$  and the corporate tax  $S_{ksolz}$ , as well as the dividends  $D$  and the interest  $I$ . Thereby the capital gains are subject to the half-income system. In present value terms we obtain<sup>40</sup>.

$$(13) \quad CG_{liable} = \tau \sigma \left( \Pi - S_g - S_{ksolz} - D - I \right) \\ = \tau \sigma \left[ \underbrace{\Pi - s_g \left[ \Pi - \left( i DC + \varphi[\Pi - i DC] \right) \left( 1 - \frac{\alpha}{2}(1 + \delta) \right) - \frac{1}{2} i \mu \delta EC \right]}_{S_g} \right. \\ \quad \left. - s_{ksolz} \left[ \Pi - \left( i DC + \varphi[\Pi - i DC] \right) (1 - \alpha \delta) - i \mu \delta EC \right. \right. \\ \quad \left. \left. - s_g \left[ \Pi - \left( i DC + \varphi[\Pi - i DC] \right) \left( 1 - \frac{\alpha}{2}(1 + \delta) \right) - \frac{1}{2} i \mu \delta EC \right] \right]}_{S_{ksolz}} \right. \\ \quad \left. - D - \underbrace{\left( i DC + \varphi[\Pi - i DC] \right)}_I \right].$$

Inserting eqns. (10), (11), (12), and (13) into eq. (9) leads to

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<sup>40</sup> Note that the discounted factor  $\tau$  is influenced by the after tax interest rate  $i_s$  and therefore by  $s_{esolz}^*$ . In a first step, we assume that  $\tau$  is exogenously given. Later, in a second step, we will analyze the interdependency of  $\tau$  and  $s_{esolz}^*$  by iteration.

$$\begin{aligned}
(14) \quad S_{esolz} = s_{esolz} & \left[ \underbrace{\left( i DC + \varphi [\Pi - i DC] \right) (1 - \alpha\delta) + i\mu\delta EC}_{I_{\text{liable}}} \right. \\
& \left. + \sigma \left[ D + \underbrace{\left( i DC + \varphi [\Pi - i DC] \right) \alpha\delta - i\mu\delta EC}_{D_{\text{liable}} + hiD_{\text{liable}}} \right] \right. \\
& + \sigma\tau \left[ \Pi - s_g \left[ \Pi - \left( i DC + \varphi [\Pi - i DC] \right) \left( 1 - \frac{\alpha}{2}(1 + \delta) \right) - \frac{1}{2}i\mu\delta EC \right] \right. \\
& - s_{ksolz} \left[ \Pi - \left( i DC + \varphi [\Pi - i DC] \right) (1 - \alpha\delta) - i\mu\delta EC \right. \\
& \left. \left. - s_g \left[ \Pi - \left( i DC + \varphi [\Pi - i DC] \right) \left( 1 - \frac{\alpha}{2}(1 + \delta) \right) - \frac{1}{2}i\mu\delta EC \right] \right] \right. \\
& \left. \left. - D - \left( i DC + \varphi [\Pi - i DC] \right) \right] \right] \underbrace{\hspace{10em}}_{CG_{\text{liable}}}.
\end{aligned}$$

In analogy to Miller, to identify the optimal capital structure based on the total after-tax income of all investors, we first have to determine the optimal dividend policy.

The total after-tax income of all investors  $\Pi_s$  is composed of the difference of the gross profit  $\Pi$ , local business tax  $S_g$ , corporation tax  $S_{ksolz}$  and income tax  $S_{esolz}$ ,

$$(15) \quad \Pi_s = \Pi - S_g - S_{ksolz} - S_{esolz}.$$

Considering equations (7), (8), and (14) net profit  $\Pi_s$  can be determined. To identify the optimal dividend policy, equation (15) has to be differentiated to  $D$ :

$$(16) \quad \frac{\partial \Pi_s}{\partial D} = s_{esolz} \sigma (\tau - 1) = 0.$$

For this reason, an investor is only indifferent towards dividend policy in three cases, namely if his marginal income tax rate  $s_{esolz} = 0$ , if  $\sigma = 0$  or if  $\tau = 1$ .

Condition  $\tau = 1$  implies that capital gains are always taxable and that taxation occurs when profits/gains are realized at the corporate level. Then, profits or capital gains can be taxed before they are realized at shareholder level when they occur on corporate level<sup>41</sup>. If  $\sigma = 0$ , this condition implies that neither dividends nor capital gains are taxed.

As in Germany these two conditions  $\sigma = 0$  and  $\tau = 1$  are not achieved the dividend policy is only irrelevant if  $s_{esolz} = 0$ . This is true if the taxable income of the relevant investor is

<sup>41</sup> Then, profits are taxed as they are in a partnership.

lower than the basic tax allowance<sup>42</sup>. Beyond the mentioned cases full retention is always the optimal dividend policy<sup>43</sup>.

To identify the optimal capital structure based on the optimal dividend policy, eq. (15) has to be differentiated with respect to  $D^* = 0$  to  $DC$  and it has to be zeroed out. Rearranging finally leads to the critical income tax rate  $s_{esolz}^*$ ,

$$(17) \quad s_{esolz}^* = \left( s_g \left[ I \left( 1 - \frac{\alpha}{2} (1 + \delta) \right) + \frac{S}{2} \right] + s_{ksolz} \left[ I(1 - \alpha\delta) + S - s_g \left[ I \left( 1 - \frac{\alpha}{2} (1 + \delta) \right) + \frac{S}{2} \right] \right] \right) \cdot \left( S + (1 - \alpha\delta) I + \sigma(\alpha\delta I - S) + \sigma\tau \left( s_g \left[ I \left( 1 - \frac{\alpha}{2} (1 + \delta) \right) + \frac{S}{2} \right] + s_{ksolz} \left[ I(1 - \alpha\delta) + S - s_g \left[ I \left( 1 - \frac{\alpha}{2} (1 + \delta) \right) + \frac{S}{2} \right] \right] - I \right) \right)^{-1}$$

with interest  $I = i DC + \varphi(\Pi - i DC)$  and safe haven  $S = i\mu\delta EC$ .

By means of equation (17) the optimal financing decision can be reached for every investor. All investors whose marginal tax rate  $s_{esolz}$  is equal to the critical income tax rate  $s_{esolz}^*$  are indifferent towards the allocation of debt and equity capital. They are referred to as marginal investors. Investors who have lower tax rates will offer a loan to the corporation, while investors with higher tax rates will offer equity capital<sup>44</sup>.

Due to the progressive income tax scale a general irrelevance of the financing policy can never be achieved for all taxpayers. Irrelevance can only be achieved for the taxpayers who have marginal tax rates that are identical to the critical income tax rate. Therefore, within this analysis it is only possible to investigate whether or not a Miller equilibrium can be reached for specific taxpayers.

<sup>42</sup> The basic allowance amounts to €7,664 for singles and €15,328 for married couples. Cf. section 32a of the Income Tax Code.

<sup>43</sup> As long as retained earnings are taxed at a lower effective rate than distributed earnings, full retention of profits always leads to the highest net profit. The same result is achieved by Miller although he does not outline it explicitly. Miller's results are explained by Swoboda (1991), p. 853 and Laß (1999), pp. 45-46, who find a different result for the German tax code. Both base their assumptions on a split corporate tax scale in connection with the full imputation system. From the authors' point of view the optimal dividend policy depends on the relation between the personal income tax rate and the corporate tax rate that is applied when profits are retained. If the personal tax rate is significantly lower than the prior burden of corporate tax, a distribution of profits is beneficial to reduce the tax burden from the corporate tax rate applied to retained profits to the lower personal income tax rate. Cf. Laß (1999), pp. 139-140.

<sup>44</sup> Cf. Swoboda (1991), p. 853.

## 2.3 Sensitivity Analysis

Quantitative analyses show that some parameters influence capital structure decisions more than others. In the following, besides tax rates, we highlight those parameters that have a significant impact on financing decisions. As e.g. changes in gross profits  $\Pi$  and in the profit-related payments on loans, determined by the fraction  $\varphi$  of  $(\Pi - i DC)$ , hardly influence the critical tax rate we present related results. Therefore, we focus on the most characteristic attributes of thin capitalization rules and the most important value drivers.

### 2.3.1 Interest on the long-term debts and discounted factor

To analyse how the different parameters of the model influence the investor's financing decisions, all variables are assumed to be constant, except the discount factor coefficient  $\tau$  and fraction  $\alpha$  of interest of the long-term debts.

We assume

$$\begin{aligned} m &= 5\%; h = 389\% \\ s_k &= 25\%; s_{solz} = 5.5\%; s_e^{max} = 42\% \\ DC &= \text{€}100,000; EC = \text{€}1,000; \Pi = \text{€}10,000 \\ \sigma &= 0.5; \varphi = 0.01; \mu = 1.5; \delta = 0.1 \\ i &= 6\% \end{aligned}$$

Considering the average collection rate of  $h = 389\%$ <sup>45</sup> and taxable business value  $m$  we receive an effective local business tax rate  $s_g = 16.28\%$ .

The combined tax rate from the corporate tax and the solidarity surcharge is  $s_{ksolz} = 26.375\%$ <sup>46</sup>. For the combined top tax rate including the top marginal income tax rate and the solidarity surcharge we get  $s_{esolz}^{max} = 44.31\%$ . The investor receives total interest  $I$  of overall  $\text{€}6,040$ . Within the safe haven interest  $I_d = S = \text{€}9$  are tax deductible at corporate level.

Then, the critical income tax rate is

$$(18) \quad s_{esolz}^* = \frac{2,320 - 557\alpha}{6,045 - 302\alpha + \tau(-279\alpha - 1,860)}.$$

Table 1 shows the critical income tax rates for various values of  $\alpha$  and  $\tau$ <sup>47</sup>.

<sup>45</sup> Cf. Federal Statistical Office (2006).

<sup>46</sup> In the following, „corporate tax rate“ always refers to the combined tax rate composed of the corporate tax and the solidarity surcharge.

<sup>47</sup> The values in Table 1 neglect the influence of  $s_{esolz}^*$  on  $\tau$ . By iteration we can account for the interdependency of  $s_{esolz}^*$  and  $\tau$ . We can show that the critical tax rates are slightly higher. At a maximum we identify a deviation of 3 percentage points from the rates determined for an exogenously

Table 1: Critical income tax rates for various  $\alpha$  and  $\tau$  under section 8a of the Corporate Tax Code

		$\alpha$				
		0.01	0.25	0.5	0.75	1
$\tau$	0.01	38.43%	36.65%	34.75%	32.81%	30.81%
	0.25	41.51%	39.75%	37.85%	35.88%	33.84%
	0.5	45.29%	43.58%	41.71%	39.76%	37.72%
	0.75	49.83%	48.23%	46.46%	44.58%	42.59%
	1	55.39%	53.99%	52.42%	50.73%	48.91%

We find that the values for the critical income tax rate  $s_{esolz}^*$  vary between 30.81% and 55.39%.

Figure 1 illustrates the effects of the fraction of interest on long-term debts  $\alpha$  and the discounting factor for the taxation of capital gains  $\tau$  on  $s_{esolz}^*$ . The horizontal, chequered area indicates the top tax rate of 44.31% at which a Miller equilibrium can just about occur. If the critical tax rate is higher than 44.31%, an equilibrium is not possible for the underlying tax system. Then, investors will always prefer to provide a loan instead of equity to the corporation leading to the highest possible net profit  $\Pi_s$ .

If the combination of  $\tau$  and  $\alpha$  invokes a critical tax rate lower than 44.31%, it depends on the investor's individual income tax rate whether debt or equity financing is optimal. If the personal income tax rate is less than the critical tax rate, the investor will offer a loan. If it is larger, they will provide equity capital. If the marginal tax rate is exactly equal to the critical income tax rate, the investor is indifferent to either option. In this case we find a Miller equilibrium for this investor.

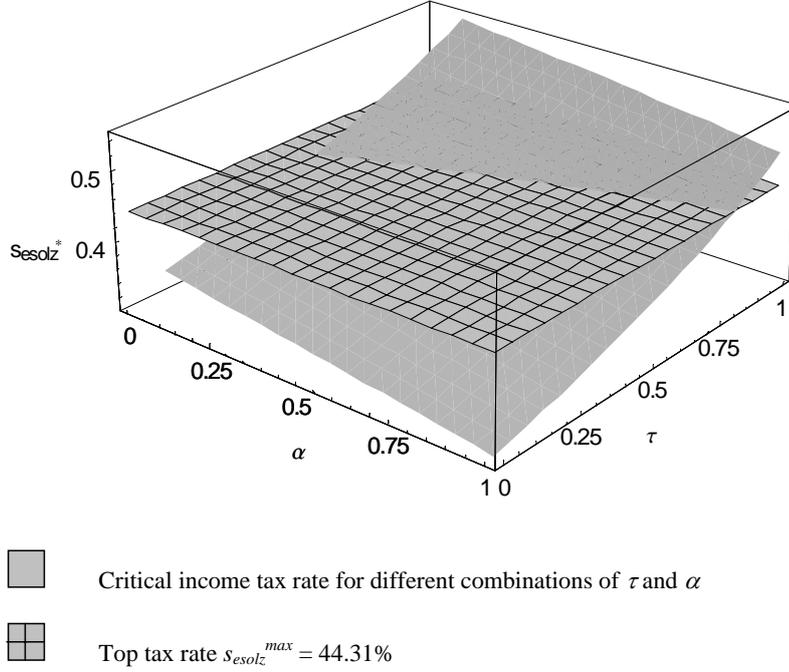
The specific values for the fraction of interest on long-term debts  $\alpha$  and the coefficient for discounting factor  $\tau$  will vary by corporations, so that plausible values can only be estimated. Assuming the investor is substantially participating in the corporation we assume the investor is interested in a long-term capital investment. Therefore the fraction of interest on long-term debts might generally be relatively high. For the same reason we expect the present value of capital gains tax to be relatively small, as we assume that the investors will realize their capital gain after a long time. Hence, if we assume that  $\alpha$  has a value close to unity and  $\tau$  is almost equal to zero, we see that the probability of the financing decision being irrelevant to at least some taxpayers is relatively high. Then, the critical tax rates take values that are usually applicable to many taxpayers.

Figure 1 clarifies that the critical income tax rate  $s_{esolz}^*$  is a decreasing function of  $\alpha$  for

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given  $\tau$ . Comparing the results with and without thin capitalization rules we get an identical deviation of 3 percentage points both in the case with and without considering section 8a of the Corporate Tax Code. We find the same deviation if we vary other model parameters. Against this background, it is acceptable to conduct the following investigation abstracting from this interdependency. Thereby, we do not have to fall back on numerical results but analytical and thus more general results can be obtained.

Figure 1: Critical income tax rates in accordance with section 8a of the Corporate Tax Code



the underlying thin capitalization rules. Hence the relative advantage of equity capital increases. This can be formally shown by the first derivative with respect to  $\alpha$  always being negative. If we derive equation 17 with respect to  $\alpha$  and insert according to our set of assumptions we get

$$(19) \quad \frac{\partial s_{esolz}^*}{\partial \alpha} = \frac{-2,666,425 + 1,683,300\tau}{(-6,045 + \alpha(302 + 279\tau) + 1,860\tau)^2} < 0.$$

This is because the local business tax base increases in step with increasing  $\alpha$ . Simultaneously the interest payments which due to thin capitalization are requalified as hidden distributions of profit also increase. Hence corporate tax also increases. In contrast, by requalifying the interest payments as hidden distributions of profit the shareholder's personal income tax under the half-income system decreases. This effect however is smaller than the increase of the corporate level taxes. Therefore, providing equity capital instead of loans is beneficial for a higher number of taxpayers.

Furthermore, Figure 1 shows that increasing taxation of the discounting coefficient  $\tau$  leads to a rise in the critical income tax rate. The derivative  $\frac{\partial s_{esolz}^*}{\partial \tau}$  is always positive<sup>48</sup>:

$$(20) \quad \frac{\partial s_{esolz}^*}{\partial \tau} = \frac{-(2,320 - 557\alpha)(-1,860 - 279\alpha)}{(6,045 - 302\alpha + (-1,860 - 279\alpha)\tau)^2} > 0$$

<sup>48</sup> We obtain this derivative by deriving equation 17 with respect to  $\tau$  and inserting the assumptions.

An increase in  $\tau$  causes a higher taxation of capital gains and consequently a higher taxation of equity capital. Hence the relative advantage of debt capital increases compared to equity capital.

### 2.3.2 Tax Rates

Differentiating equation (17) with respect to the corporate tax rate  $s_{ksolz}$ , we see that the tax advantage of debt capital (tax shield) at the corporate level increases with an increasing tax rate and so the relative advantage of debt capital increases<sup>49</sup>. Equity capital is more burdened by a higher tax rate, as dividends are not tax deductible on corporate level. Mathematically this result becomes obvious in that the derivative  $\frac{\partial s_{esolz}^*}{\partial s_{ksolz}}$  is always positive.

Because only part of the interest on debt capital is tax deductible for local business tax purposes, a change in local business tax rate  $s_g$  leads to a corresponding but less intensive effect.

### 2.3.3 Taxable fraction of dividends and capital gains

Focussing on a change in the taxable fraction of dividends and capital gains  $\sigma$  we obtain

$$(21) \quad \frac{\partial s_{esolz}^*}{\partial \sigma} = \frac{(\alpha - 4)(\alpha(336,718 - 310,784\tau) - 2.07 \cdot 10^6\tau - 5,017)}{(6,049 + \alpha(-604 + \sigma(604 - 557\tau)) - \sigma(9 + 3,720\tau))^2} \begin{matrix} \geq \\ < \end{matrix} 0.$$

The derivation is positive or negative depending on the fraction of interest on long-term debt  $\alpha$  and the discounting factor for capital gains  $\tau$ . There is no evidence of a uniform influence of these parameters on capital structure decisions.

For the following combination of both parameters we get a derivative that is equal to zero:

$$(22) \quad \tau = 1.08 - \frac{7.2}{6.7 + \alpha}.$$

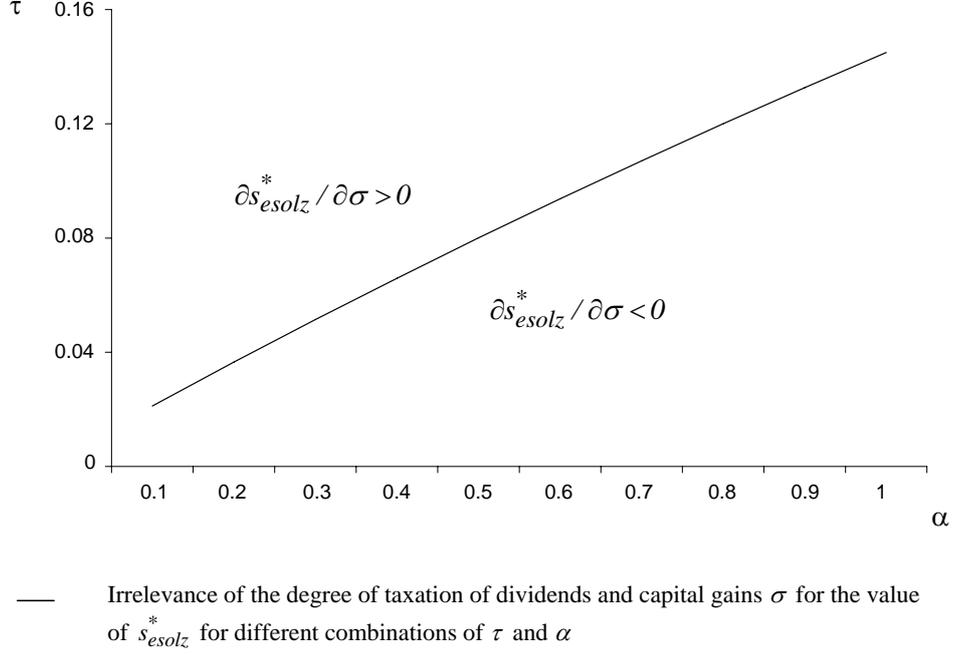
A change in  $\sigma$  has no impact on the financing decision. In Figure 2 we illustrate this interdependency between  $\alpha$  and  $\tau$  (equation (22)).

We see that the derivative  $\frac{\partial s_{esolz}^*}{\partial \sigma}$  is positive for most of the combinations of the discounting factor for capital gains  $\tau$  and the fraction of long-term debt  $\alpha$ . In these cases the relative advantage of debt capital increases with a nominal rise in taxation of gains from equity capital  $\sigma$ .

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<sup>49</sup> In the case of financing a German corporation by foreign shareholders Buettner, Overesch, Schreiber, and Wamser (2006) come to the same conclusion. Cf. Buettner, Overesch, Schreiber, and Wamser (2006), p. 11.

Figure 2: Irrelevance of the degree of taxation of dividends and capital gains  $\sigma$



Only in those cases where  $\tau$  is smaller than 0.16 can a negative derivative arise. Then equity capital becomes more favorable. The relative tax benefit of debt capital (tax shield) increases. This reaction is due to a rise in taxes on equity capital  $\sigma$  that favors debt capital. In contrast, income from equity capital benefits from being taxed at a lower real rate ( $\tau$ ). This second effect from  $\tau$  overcompensates the first effect from  $\sigma$ , so that altogether the relative advantage of equity capital increases.

### 2.3.4 Interest Rate

Analyzing an increase in the interest rate  $i$  we find the first derivative:

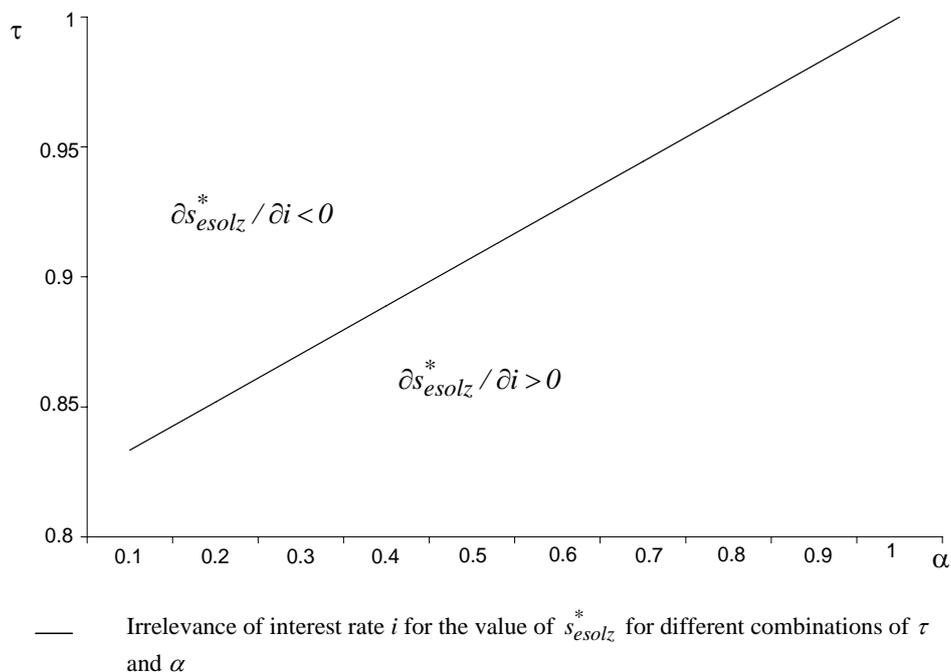
$$(23) \quad \frac{\partial s_{esolz}^*}{\partial i} = \frac{(1,978 + \alpha(449 - 3 \cdot 10^{-11}\tau) - 2,428\tau)}{\left(100 + i(99,075 - 30,487\tau) + \alpha[i(-4,950 - 4,569\tau) - 5\tau - 5] - 31\tau\right)^2} \begin{matrix} \geq \\ \leq \end{matrix} 0.$$

Depending on the discounting coefficient  $\tau$  and the fraction  $\alpha$  of interest on long-term debts the algebraic sign can be positive or negative. We find that  $i$  is irrelevant to all combinations from  $\alpha$  and  $\tau$  with:

$$(24) \quad \tau = \frac{1.51 \cdot 10^{35} + 3.43 \cdot 10^{34}\alpha}{1.85 \cdot 10^{35} + 2.22 \cdot 10^{21}\alpha}.$$

Figure 3 illustrates this relation<sup>50</sup>.

Figure 3: Irrelevance of interest rate  $i$



In contrast to our results for the degree of taxation of dividends and capital gains  $\sigma$ , we find for all combinations of  $\alpha$  and  $\tau$  above the straight line a negative functional relation of  $i$  and the critical tax rate, and a positive one for combinations below the straight line. This implies that equity capital becomes more attractive compared to debt capital the more heavily capital gains are taxed.

This result is not immediately intuitive. To explain this result we have to look at the underlying effects caused by an increase in  $i$ .

The amount of interest that is deductible at the corporate level increases with rising  $i$ . Hence the local business tax as well as the corporate tax decrease. In turn, the tax shield of debt capital increases in comparison to equity capital.

Two opposite effects arise at the shareholder level. On the one hand, the taxable interest income increases and depending on the fraction of interest for the substantial shareholders and on the fraction  $\alpha$  of interest on the long-term debts, the hidden distributions of profit increase. Consequently, the shareholder's income tax increases implying a reduction of the relative advantage of debt capital. On the other hand, an increase in the interest rate influences taxable capital gains. The capital gains decrease because the additional interest reduces the tax base<sup>51</sup>. Debt capital benefits from this effect.

<sup>50</sup> To better illustrate the effect, the ordinate begins at 0.8 instead of zero.

<sup>51</sup> Note that the local business tax and the corporate tax also reduce the capital gains tax base. As

The total influence of an increase of the interest rate  $i$  on the critical income tax rate depends on which of the described effects is the dominant. This in turn depends on parameters  $\tau$  and  $\alpha$  as can be seen in equation (23).

Usually, the effects that lead to an increase of the relative advantage of debt capital are greater than the effect from the higher taxation of interest under the income tax. The opposite effects at the shareholder level are usually nearly equal, consequently the effect at the corporate level is dominant. Hence an increase in the interest rate  $i$  nearly always implies a rise in the critical income tax rate  $s_{esolz}^*$ .

Only for a very high taxation of capital gains do we find an increase of the relative advantage of equity capital or respectively a decrease in the relative advantage of debt capital. The reason for this reaction is that in these cases the increase of the advantage of debt capital, which is caused by decreasing capital gains, is neutralized by the higher nominal taxation itself.

We have to note that an increase in interest rate  $i$  has only a minimal influence on the value of the critical income tax rate. Thus an increase of  $i$  from 6% to 20% invokes adjustments in the critical income tax rate listed in Table 1 only in the fourth decimal place.

### 2.3.5 Permissible ratio of debt to equity capital and amount of equity capital

The influence of the permissible ratio of debt to equity capital  $\mu$  and of the amount of equity capital  $EC$  can be analyzed jointly since both variables only affect safe haven  $S = i\mu\delta EC$ . The multiple  $\mu EC$  denotes the maximum amount of debt capital that an substantial shareholder can provide to the corporation while tapping the full potential of the safe haven. The well-known dependencies between  $\alpha$  and  $\tau$  occur. We find that this ratio is irrelevant to capital structure decisions for:

$$(25) \quad \tau = 0.815 + 0.185\alpha.$$

We see that in the case of a small fraction of long-term debt  $\alpha$ , a relatively high portion of interest payments is tax-deductible as operating expenses. If  $\alpha$  increases, the non-deductible portion of long-term debt increases as well. As a result debt capital becomes more and more disadvantageous compared to equity capital. Income from equity realized in the form of capital gains is taxed with the factor  $\sigma\tau$ . Thus, this income is subject to a lower tax rate than interest because interest is taxed with the factor  $\sigma$  if it has to be requalified because of being identified as hidden profit distribution, or is even full taxed in all other cases.

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both taxes decrease, this causes – in an isolated view – an increase in capital gains. But the effect from deducting interest from the tax base is always stronger, so that we obtain an overall decrease in taxable capital gains.

If the permissible ratio of debt to equity capital  $\mu$  is increased e.g. from currently 1.5 to 10, debt capital may be ten times the equity capital contributed by one shareholder, a change in the critical income tax rate amounts to just a maximum of 0.15 percentage points.

### 2.3.6 Share of substantial investors

Assuming we analyze an increasing share of substantial shareholders  $\delta$ , we obtain:

$$(26) \quad \frac{\partial s_{esolz}^*}{\partial \delta} = \frac{71,687 - 87,976\tau + \alpha(6 \cdot 10^6\tau - 1 \cdot 10^6\alpha - 5 \cdot 10^6)}{(6,040 - (1,861 + 181\alpha)\tau + \delta(45 - \alpha(3,020 + 978\tau) + 15\tau))^2} \gtrless 0.$$

The share of an substantial investor is irrelevant to the critical income tax rate if and only if

$$(27) \quad \tau = 0.815 + 0.185\alpha$$

holds.

Just as in the case of taxation of dividends and capital gains with  $\sigma$ , a lower discounting coefficient applied to capital gains  $\tau$  leads to an increase in the relative attractiveness of equity capital.

This finding is based on the fact that at corporate level the relative proportion of tax-deductible operating expenses and hidden distributions of profit changes due to an increase of the share of substantial investors  $\delta$ , given a constant total sum of interest. The amount of hidden distributions of profit increases since a greater percentage of shareholders are affected by the thin capitalization rules of section 8a of the Corporate Tax Code. Hence, tax-deductible operating expenses decrease. Debt capital becomes relatively less attractive. Only if capital gains are taxed heavily and  $\tau$  is greater than 0.8, equity capital becomes so unattractive that the relative advantage of debt capital increases.

A variation in the share held by substantial shareholder  $\delta$  has great influence on the critical income tax rate compared to the variables mentioned before. If  $\delta$  is increased from 0.1 to 0.8, the critical income tax rates shown in Table 1 change by up to 19.4 percentage points.

We find an interesting result if  $\sigma = 1$  and  $\tau = 1$ , so dividends and capital gains are taxed completely. In these cases the critical income tax rate is 100% and debt financing is optimal for all taxpayers, irrespective of the value of the remaining parameters. This finding is based on the reason that equity and debt capital are taxed identically on shareholder level, namely in full and when gains are realized. On the corporate level debt capital is taxed more lightly than equity capital due to interest deductibility. Hence, debt always leads to higher net profit than equity.

### 3 Miller equilibrium with interest barrier and thin capitalizations rules

Under the German business tax reform, which passed through the Bundestag on May 25, 2007<sup>52</sup>, taxation of shareholder debt financing is likely to be changed completely. The present regulation of section 8a of the Corporate Tax Code will be annulled and replaced by a new interest barrier that is regulated in section 4h of the Income Tax Code and section 8a of the Corporate Tax Code. Since the new interest barrier is regulated in the Income Tax Code, it is applicable not only to corporations as debtors but also to all other forms of organization.

On principle interest payable is deductible up to an amount that corresponds to the interest earnings of the company<sup>53</sup>. The residual interest payable can be deducted from the tax base up to an amount of 30% of the residual profit<sup>54</sup>, plus depreciation and interest expenses and less interest income. Interest expenses that remain non-deductible according to this regulation have to be carried forward and, on the same conditions, increase interest expenses in subsequent financial years. In this regard, these non-deductible interest expenses are not classified as hidden distribution of profit. The tax allowance up to which the regulation is not applied is raised from € 250,000 to € 1,000,000<sup>55</sup>. Indeed, in this context it has to be pointed out that the interest barrier covers all interest expenses and does not only apply to interest payments on long-term debt. Moreover, the rule only applies if the enterprise is part of a group<sup>56</sup>. Notwithstanding, the rule does not apply if the equity ratio of the company at the end of the previous financial year was higher than or equal to the equity ratio of the corporate group even if the company is an affiliated company. The same is true for companies whose equity ratio falls 1% or less below the equity ratio of the group. Hence, the interest barrier sets a limit on the deduction of interest payments from taxable income if a company is better leveraged than its affiliate businesses<sup>57</sup>.

If the debtor is a corporation, section 8a para 2 and para 3 of the Corporate Tax Code contain two exceptions that stipulate the application of the thin capitalization rules, disregarding the premises of section 4h of the Income Tax Code. Accordingly, the interest barrier applies if the interest on debt capital paid to a shareholder whose share exceeds 25% amounts to more than 10% of the surplus of interest expenses over interest income. This regulation applies even if the company is part of a group or if its equity ratio exceeds the group's ratio or falls 1% or less below the equity ratio of the group<sup>58</sup>.

To investigate the influence of the new rule on financing decisions of investors, a mere

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<sup>52</sup> The Bundesrat adopted the German business tax reform on July 06, 2007.

<sup>53</sup> Cf. section 4h para 1 of the Income Tax Code.

<sup>54</sup> The residual profit is regulated in section 4h para 3 of the Income Tax Code.

<sup>55</sup> Cf. section 4h para 2a of the Income Tax Code.

<sup>56</sup> Cf. section 4h para 2b of the Income Tax Code.

<sup>57</sup> Cf. section 4h para 2c of the Income Tax Code.

<sup>58</sup> Cf. section 8a para 2 and para 3 of the Corporate Tax Code.

consideration of section 4h of the Income Tax Code in conjunction with section 8a of the Corporate Tax Code does not suffice. Instead, all the other intended new regulations of the German business tax reform need to be taken into account as well, provided they influence the financing decisions of the investors. Here, particularly the changes mentioned below need to be taken into account.

With regard to the local business tax, it has to be taken note of section 8 no. 1 of the Local Business Tax Code that prescribes that, henceforth, 25% of all payments on debt have to be added to the tax base if the sum of payments is greater than €100,000. Thus, the addition within local business tax does not continue to affect only interest payments on long-term debt but now applies to all payments on debt, irrespective of maturity. The local business tax measure factor will be reduced from 5% to 3.5%<sup>59</sup>.

The local business tax can no longer be deducted from corporate taxable income anymore<sup>60</sup>. Moreover, the corporate tax rate will be reduced to 15%<sup>61</sup>. Regarding the calculation of income tax it has to be taken into account that income generated from investments that are held in private means will be subject to a new withholding tax<sup>62</sup>. The withholding tax rate amounts to 25%. However, the taxpayer can apply for the assessment of income from capital if the assessment results in a lower tax liability than the final withholding tax paid on that income. Under certain conditions, earned interest in terms of section 20 para 1 no. 7 of the Income Tax Code is not subject to withholding tax<sup>63</sup>. In particular, that is the case if creditor and debtor are associated persons. A person is considered to be associated with another person if the former possesses an substantial share of more than 25%<sup>64</sup>. Capital gains generated from the liquidation of shares are counted as income from capital as well in compliance with section 20 para 2 no. 1 of the Income Tax Code. The year-long speculation period is abolished. Thus, capital gains are always subject to income tax.

In general, we can say that the introduction of the interest barrier means an intensification of taxation of shareholder debt financing.

Indeed, the legislators increased the tax allowance up to which the rule does not apply from €250,000 to €1,000,000. Notwithstanding, the material scope of application has become essentially broader. On this note, the interest barrier does not only affect interest expenses for long-term debt but all kind of interest payments. Moreover, the rule affects all forms of lending unlike the current law that solely affects financing that comes from substantial investors. For this reason e.g. the rule applies to financing of banks as well. In addition, the rule applies not only to corporations but also to companies of all legal forms. The potential avoidance of the legal consequences of shareholder debt financing by

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<sup>59</sup> Cf. section 11 para 2 of the Local Business Tax Code.

<sup>60</sup> Cf. section 4 para 5b of the Income Tax Code.

<sup>61</sup> Cf. section 23 para 1 of the Corporate Tax Code.

<sup>62</sup> Cf. section 32d of the Income Tax Code.

<sup>63</sup> Cf. section 32d para 2 of the Income Tax Code.

<sup>64</sup> Cf. section 1 para 2 no. 1 of the Foreign Transaction Tax Act.

bearing the comparison of the arm's-length principle is no longer possible. The Cabinet resolution of March 14, 2007 still stipulated an unrestricted offset of 30% of EBIT. Since such a regulation implies an equity ratio of 70% that is hardly achieved by any of the enterprises in practice, this stipulation is rather problematic<sup>65</sup>. The Bundestag resolution extenuated the problem. Henceforth, 30% of EBITDA can be offset without restrictions.

Regarding the legal consequences, the interest barrier can easily cause a considerable additional tax burden. Under the present thin capitalization rule of section 8a of the Corporate Tax Code, deleterious interest is requalified as hidden distribution of profit. Therefore, the tax treatment of this interest is equal to the treatment of dividends. Depending on the tax rates and the level of other parameters equity or debt capital can be more beneficial since the negative effect caused by the non-deductibility of interest on company level counteracts the positive effect caused by the lower taxation of dividends on shareholder level.

With regard to the new regulation interest is not classified as hidden distribution of profit. Under the same conditions, interest payments affected by the interest barrier can be deducted in subsequent years just as they can be deducted in the year of origin. Hence, the actual deductibility of interest payments is uncertain, particularly with regard to enterprises that are in a bad business situation or in a period of growth and expansion<sup>66</sup>. Interest expenses can be lost forever<sup>67</sup>. On shareholder level the interest payments are completely taxable, irrespective of the tax treatment on company level.

Assuming that an substantial shareholder has granted the loan, then the income from interest is subject to their personal income tax rate. The withholding tax rate of 25% does not apply. If the shareholder's marginal personal tax rate is greater than 25%, income from equity is taxed at a lower rate than income from interest due to the withholding tax<sup>68</sup>. Hence, in these cases equilibrium is possible since the lower taxation of income from equity on shareholder level counteracts against the lower taxation of income from interest on company level caused by the (partial) deductibility of interest payments. If the capital company incurs losses over a longer time period and if, thus, interest payments cannot be deducted in the same period, the attractiveness of equity financing compared to debt financing increases. In the extreme case, if interest on debt cannot be deducted at all, equity financing always generates the highest net profit.

If the personal income tax rate of the shareholder is lower than 25%, their tax burden will be identical, irrespective of the mode of financing. This is due to the fact that in this case the shareholder will always opt to assess the dividend yield. In that case the contracting of debt capital is always beneficial for the investor since at least part of the interest payments

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<sup>65</sup> Cf. Rödder and Stangl (2007), p. 483.

<sup>66</sup> Cf. Köhler (2007), p. 604.

<sup>67</sup> Cf. also Hallerbach (2007), p. 294.

<sup>68</sup> Cf. Kiesewetter and Lachmund (2004) who investigate and demonstrate the effects of a final withholding tax on the capital structure of enterprises with the help of investment appraisal and who design, based on the achieved results, a withholding tax that is independent of the financing form.

can be deducted from the tax base on corporate level. Only if exceptionally debt interest payments cannot be deducted from the tax base, will the investor be indifferent to either option.

## 4 Conclusions

In the present analysis the thin capitalization rule of the 2007 section 8a of the Corporate Tax Code has been examined as to its impact on financing decisions of shareholders of corporations. This rule can be regarded as a representative example of many countries' thin capitalization rule. Furthermore, initial qualitative considerations have been made about how the introduction of an interest barrier in Germany will impact on investors' financing decisions. Again, this new rule can be regarded as an example of many countries' possible tax reforms in the field of thin capitalization.

Whereas papers that do not consider section 8a of the Corporate Tax Code show that in default of adequate high income tax rates the capital structure is relevant<sup>69</sup>, this analysis makes clear that with the existence of thin capitalizations rules often no general statement can be made regarding the profitability of either financing option. The effect depends significantly on the values of the single parameters. However, we were able to show that some combinations of parameters exist which lead to a capital structure irrelevance for a single investor. The present analysis shows that a Miller equilibrium taking into account current tax rates and the current codified debt-equity ratio particularly is possible when the provided debt comprises a big fraction of long-term debt and when capital gains are realized after a relatively long period. However, with a progressive tax scale such equilibrium can only appear for the single taxpayer, equilibrium for all taxpayers is only possible with a proportional tax scale. Furthermore, the after tax profit of a firm can never be maximized through mixed financing. Dependent on the concrete values of the single parameters either an exclusively equity or debt financing results in the highest after tax profit or the method of financing is irrelevant to the after tax profit of the firm. For the calculated critical income tax rates the corporation is not only indifferent concerning financing by equity or debt but also concerning the choice between a profit-related or non-profit-related interest pattern. In particular variation of tax rates, of holdings of the substantial shareholders, of long-term debt as well as of the discounting coefficient for the taxation of capital gains have a substantial impact on the critical income tax rate and make a Miller equilibrium possible. Of these parameters, only the tax rates can be influenced by the legislator. The remaining parameters can be changed by the taxpayers themselves.

The present analysis of section 8a of the Corporate Tax Code has been made in representation of all thin capitalization rules that are characterized by a specific permissible ratio

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<sup>69</sup> Cf. the investigations of Fung and Theobald (1984); Swoboda (1991) and Laß (1999) for the laws of 1976 until 1996 as well as Kruschwitz (2004) for the governing law of 2004.

of equity and debt capital. As a corresponding regulation exists in several countries, the knowledge gained in our study can be relatively easily transferred to the capital structure decisions of these countries. Therefore, the analysis has a fundamental importance also after the abolition of section 8a of the Corporate Tax Code.

For the interest barrier, initially only statements about the tendency are made. It has been shown that if the investor has a personal marginal tax rate below 25% debt financing always leads to highest net profit. In case if the personal marginal tax rate is higher than 25%, then generally equilibrium is possible. In such cases the optimal financing decision must be made on the basis of the case at hand. In cases where that non-deductible interest cannot be deducted from the tax base in the following years by reasons of long-term losses leads to the financing method is irrelevant if we assume the investor's personal income tax rate to be below 25%. If a personal income tax rate of above 25% is assumed, providing capital as equity capital is advantageous. To gain more precise results for Germany a quantitative analysis including all items of the German 2008 Tax Reform Act is necessary. We relegate this issue to future research.

Our analysis highlights that for companies in countries with thin capitalization rules debt financing through shareholders can be optimized. However, under specific circumstances the capital structure can become irrelevant.

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