Bilateral Internal Debt Financing, Tax Planning, and the Effectiveness of Anti-Avoidance Rules*

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Abstract: This paper analyzes how tax-rate differentials affect internal debt financing of multinational companies. Our investigation relies on bilateral tax-rate differentials within multinational firms that are one crucial determinant of internal debt usage. The empirical results suggest that higher bilateral tax-rate differentials between borrowing and lending entities are associated with higher shares of internal debt. Compared with previous studies, we find significantly more pronounced tax effects on internal debt financing. As the results imply that multinational firms use internal debt financing to avoid taxes in high-tax countries, we also investigate whether anti-avoidance rules are effectively imposed. While our results suggest that the German CFC rule does not significantly affect internal debt shares of foreign subsidiaries, we find evidence that thin-capitalization rules in host countries are quite effective.

Key Words: Corporate Taxation, Bilateral Tax-Rate Differentials, Internal Debt, Firm-Level Data

JEL Classification: G30, G32, H24, H25

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1 Introduction

Firms may use debt as a tax shield because interest payments for debt are typically deductible from taxable profits while equity costs are not. In the case of multinational enterprises, the financial decision entails additional strategies of international tax planning. Against the background of different corporate tax rates in different countries, cross-border borrowing and lending strategies may support multinationals in minimizing their total tax burden. Several empirical studies investigating the financial decisions of multinational firms confirm that taxes are a crucial determinant of the capital structure. In particular, these studies suggest that higher taxes are associated with higher debt-to-capital ratios of multinational firms’ subsidiaries (see e.g. Desai, Foley and Hines, 2004; Huizinga, Laeven and Nicodème, 2008).

Although multinationals may not only borrow from external sources but also borrow internally from affiliates, only some studies have particularly analyzed the tax avoidance by means of internal debt financing. Exceptions are the studies of Desai, Foley and Hines (2004) as well as Altshuler and Grubert (2003), where a positive impact of the tax rate of the borrowing affiliate on internal debt is found using data from US multinationals. For German multinationals, Mintz and Weichenrieder (2009) as well as Buettner et al. (2009) confirm the positive tax response of foreign affiliates with respect to internal debt financing.

However, all these studies neglect the fact that in case of internal debt not only the tax rate at the borrowing location matters but also the tax rate of the lending part. While interest payments reduce taxable income of the borrowing affiliate, interest is subject to tax at the level of the lending entity. Mills and Newberry (2004) analyze the impact of the lending entity’s tax rate. They find a significant negative effect of the parent companies’ tax rate on the internal-debt-to-total-assets ratio of affiliates located in the US. In another study, Ramb and Weichenrieder (2005) analyze the impact of the parent-company tax rate on the internal debt share of German inbound FDI. However, they find no robust
impact of the lenders’ tax rates on internal borrowing. Overesch and Wamser (2009) consider internal debt of subsidiaries located in Germany that is borrowed from the foreign parent companies. They find a negative impact of the home-country tax rate of the parent company on bilateral internal debt financing of the subsidiary.

This paper adds to the existing literature by focusing on the impact of bilateral tax-rate differentials between borrowing and lending entities on tax planning by means of internal borrowing. For the empirical analysis we use a unique micro-level dataset of German multinationals that allows us to identify both the borrowing as well as the lending entity of internal debt.\textsuperscript{1} Therefore, we can construct bilateral tax-rate differentials that crucially determine the incentives for internal debt usage. Our empirical results suggest that a higher bilateral tax-rate differential between the borrowing and lending entity has the expected positive impact on internal debt financing.

Our analysis relates to two previous studies that analyze the effect of tax-rate differentials on debt financing. However, both studies make assumptions on the relevant tax rate of the lending part as no precise information on the bilateral tax-rate differentials is available. Huizinga, Laeven and Nicodème (2008) assume a weighted average tax rate of all locations (where affiliates of a multinational firm are observed) as the tax rate of the lending affiliate. Moreover, their analysis considers total borrowing rather than internal borrowing. Using the same data as this study, Buettner and Wamser (2009) investigate internal debt of affiliates of German multinationals that is provided by non-German affiliates of the same multinational. Their findings confirm the predictions of their underlying theoretical model, which suggests that all lending is carried out by the affiliate that is located in the country with the lowest tax rate among all locations in which a respective multinational is active. The tax-rate differential in this case, hence, refers to the differential between the local tax rate and the minimum tax rate observed in the company group.

\textsuperscript{1}Note that we exploit a specific subgroup of multinationals where this is possible. For more information on the definition of the relevant sample, see Section 3.
As the finding of a positive impact of the bilateral tax-rate differential on internal debt implies that firms use internal debt to shift profits, we analyze in a second step the effectiveness of states’ anti-avoidance rules that aim at reducing tax-planning opportunities. On the one hand, we estimate the impact of thin-capitalization (TC) rules limiting the amount of interest deductions at the level of the borrowing affiliates. On the other hand, we investigate the effects of the German-controlled foreign company (CFC) rule that eliminates the advantage of low-tax countries as a location for lending affiliates.

Until now, only a few studies have been investigating the effectiveness of anti-avoidance rules. Weichenrieder and Windischbauer (2008) as well as Overesch and Wamser (2010) exploit reforms of the German TC rules. Both studies find an impact of these reforms on internal debt financing of foreign affiliates. Moreover, the results of Wamser (2009) suggest that subsidiaries that were affected by a tightening of the German rule in 2001 avoided the restriction imposed on internal debt interest deductibility by using more external debt, where associated interest payments were still deductible. Buettner et al. (2008) use German outbound FDI data and find a negative impact of the existence as well as of the tightness of TC rules on debt financing. Furthermore, the paper by Altshuler and Grubert (2006) illustrates that the US CFC rule is quite ineffective, while a recent study by Ruf and Weichenrieder (2009) finds that the German CFC rule is generally very effective in restricting tax planning of German multinationals.

Our analysis reveals a significant negative effect of host countries’ thin-capitalization rules on internal debt usage. However, we do not find any significant impact of the German CFC rule on internal debt financing behavior of subsidiaries.

The paper is organized as follows. Section 2 discusses the tax incentives on internal debt finance as well as how anti-avoidance rules try to eliminate these tax incentives. The empirical investigation approach and the data are presented in Section 3. Section 4 presents the empirical results and Section 5 concludes.
2 Theoretical Background

2.1 Determinants of Internal Debt Financing

The firm-value relevance of the capital structure choice and the impact of taxation on financing and investment decisions have been subject to extensive discussion in the corporate finance literature. Although the rationale of Modigliani and Miller (1958), who suggest the irrelevance of the capital structure in perfect capital markets, has been generally accepted, the presence of financial innovation and the cost of corporate financial decision making seem to conflict with the perfect capital market assumption, and therefore, with the irrelevance theorem (Ross, 1977; Myers, 2001). Several theoretical models consider a firm that optimizes its capital structure by taking into account a trade-off between the costs and benefits of debt finance. The literature suggests that costs may be related to financial distress (see Kraus and Litzenberger, 1973), or may arise from agency conflicts between equity and debt claimants (see Jensen and Meckling, 1976; Myers, 1977) or managers and shareholders (Jensen, 1986). The major benefit of debt financing is that interest expenses are deductible from corporate profits, while dividend payments to equity holders are not. Thus, debt can act as a tax shield because taxable profits are reduced (Modigliani and Miller, 1963). The value of this tax shield obviously depends on the corporate tax rate of the borrowing entity: the higher the tax rate, the higher the value of the debt tax shield.

While the extensive literature on the determinants of capital structure choices considers stand-alone firms, only a few papers analyze the capital structure determinants for subsidiaries of (international) business groups. One strand of this literature considers external borrowing of a group of firms and analyzes the allocation of external debt among the different affiliates of the group (see Stein, 2003, for an overview). The parent company, rather than a subsidiary, should borrow external debt if borrowing by a subsidiary is more costly or somehow constrained, for example, due to to a low level of creditor rights (La Porta et al., 1997; Desai, Foley and Hines, 2004). Moreover, since a coinsurance effect
arises from concentrated borrowing, interest rates might be smaller if a parent or a holding
borrows (Akbel and Schnitzer, 2009, and cites therein). Moreover, a lender anticipates
a higher risk of financial distress if borrowing is allocated to a subsidiary with limited
liability (Bianco and Nicodano, 2006). However, borrowing by a subsidiary might help
to overcome agency problems between subsidiary managers and the CEO of a business
group (Aghion and Bolton, 1992; Akbel and Schnitzer, 2009). A subsidiary manager may
benefit from running the subsidiary and enjoy what is called “empire-building”. This con-
flict is similar to the free cash flow theory introduced by Jensen (1986). The obligation
to pay interest disciplines subsidiary managers and prevents from empire building strate-
gies. Moreover, recent papers show that debt allocated to the subsidiary is a means to
shift country risk to creditors (Desai, Foley and Hines, 2008; Kesternich and Schnitzer,
2008). Finally, subsidiary borrowing denominated in a foreign currency reduces exchange
rate exposures associated with turnover denominated in the respective currency (Kedia
and Mozumdar, 2003). However, this currency hedge can also be implemented if external
borrowing of the parent company is denominated in the foreign currency.

In sum, this literature explains whether or not external borrowing is allocated to a sub-
sidiary. Thus, these findings may explain the amount of internal financial sources but it
does not explain the mode of internal financing: internal debt or equity. However, we
argue that some explanations for the choice between external finance and equity can be
attributed to the decision on the mode of internal finance. While the problems arising
from financial distress and agency conflicts between equity and debt claimants seem to
be of less importance in the case of internal financing, the mode of internal financing can
help to solve agency conflicts between subsidiary managers and the parent company CEO
can solve particular monitoring problems of long-term investment projects is difficult for
the CEO. Fixed annual interest payments in the case of internal debt financing constitute
such a payback rule and reduce cash available for empire-building investment projects. In
the case of equity financing, however, the subsidiary managers can influence the amount
and timing of distribution using well-known strategies of earnings management.\footnote{Cf. Healy and Wahlen (1999) for an overview on earnings management.}

Gopalan, Nanda and Seru (2007) show for Indian business groups that internal debt is used to subsidize low-performance subsidiaries and to prevent them from bankruptcy. Moreover, Graham and Harvey (2001) provide survey evidence on the determinants of financial decision. Their results suggest that financial flexibility is the most important argument to choose a mode of finance. If this also holds in the case of internal financial decisions, it seems to be very likely that external debt of the parent company or another affiliated company is associated with internal debt financing of a subsidiary. If internal debt financing is used, interest payments, currency uncertainty, maturity, and the risk of financial distress arising from external debt can be passed through.

Finally, taxation is expected to be a very important determinant of the decision on the mode of internal finance. Thus, it does not come as a surprise that the only paper that has previously focussed on the choice between equity or internal debt by Chowdry and Coval (1998) exclusively addresses tax incentives. The tax incentives to use internal debt as the internal mode of finance are discussed in the next subsection.

### 2.2 Tax Incentives

Financing a subsidiary by internal lending rather than by equity has significant tax consequences. While interest payments for debt are deductible from taxable profits at the level of the borrowing affiliate, the return on equity is part of the taxable income. Furthermore, internal interest payments increase taxable profits of the lending affiliate, while internal dividends are tax exempt in most countries. As a result, the type of internal financing affects the allocation of taxable profits within the multinational firm. The higher the tax rate of the borrowing affiliate and the lower the tax rate imposed on the interest income of the lending affiliate, the more beneficial is the use of internal debt. Consequently, the
tax-rate differential between the borrowing entity and the lending entity determines the
cost of the incentive using internal debt financing.

Although the statutory tax rates imposed by the countries of the lending and borrowing
entities significantly determine the tax benefits from internal debt, the marginal tax in-
centives are also affected by firm-specific characteristics. De Angelo and Masulis (1980),
for example, develop a theoretical explanation for the existence of a firm-specific optimal
debt-to-equity ratio by taking into account alternative opportunities to reduce the corpo-
rate tax burden apart from debt. In particular, the existence of current losses or of losses
carried forward impact the tax incentives on debt. Since losses carried forward can offset
current taxable profits, the benefits of additional interest deductions may be crowded out
as additional interest payments only result in new losses that can be carried forward into
consecutive periods. As a consequence, the tax benefit of additional interest deductions
associated with debt tends to decrease if the borrowing affiliate has current losses or carries
forward losses. In case of the lending entity, by contrast, interest income may offset current
losses or losses carried forward. Consequently, interest income at the level of the lending
affiliate is no longer taxed. Hence, while in the case of the borrowing affiliate the tax
benefits decrease in in the amount of losses carried forward, they increase in the amount
of losses carried forward in the case of the lending affiliate.

2.3 Anti-Avoidance Rules

The separate entity approach to determine taxable income and the international variation
in corporate tax rates create strong incentives for multinational firms to shift taxable profits
to low-tax affiliates. Therefore, tax legislations of various countries include specific anti-
avoidance rules in order to counteract tax-planning strategies. Of particular importance
for tax-planning by means of internal debt financing are thin-capitalization (TC) rules and
controlled foreign company (CFC) rules. Over the last decades, the number of countries
using a TC rule or CFC rule has significantly increased. In 1996, for example, only 9 (9)
of the 27 member states of the European Union had a TC rule (CFC rule). Until 2007, the number of EU countries, which implemented respective constraints, increased to 17 (13) countries.

Although both rules pursue a similar goal, they differ significantly in scope and application. TC rules are set up by the host countries of the borrowing subsidiaries and restrict the tax deductibility of interest payments. Thus, these rules directly restrict the earnings-stripping opportunities of foreign subsidiaries located in such countries. By contrast, CFC rules do not directly focus on the profit-shifting strategies of subsidiaries located in the jurisdiction implementing the rule. In fact, the CFC rules restrict tax-planning opportunities of sub-level controlled affiliates that are located abroad. This means that while CFC rules are part of the home-country tax legislation from the parent firm’s point of view, the tax law of the host countries defines whether interest deduction is denied as in the case of TC rules. More details concerning the TC and CFC rules are provided below.

**Thin-Capitalization Rules**

A TC rule restricts the deductibility of interest payments from the tax base. The deductibility of interest payments is denied for interest paid to related parties if debt exceeds a certain limit. The detailed conditions for the application differ from country to country. In our empirical investigation we consider the variation in one general but very important characteristic of a TC rule: the rules only apply if debt financing is above a certain ratio of debt to equity. Generally, interest deduction for internal debt is restricted or penalized for tax purposes if the debt borrowed by an affiliate exceeds a certain proportion of its equity capital. If the actual debt-to-equity ratio is below the ratio described by the rule, the debt is within a *safe haven* and interest deduction is not restricted by the host country.\(^3\)

\(^3\)Besides, in some countries other preconditions have to be fulfilled. In the US case, for example, deduction for interest payments to non-US affiliates or other tax exempt corporations must exceed 50% of adjusted taxable income (see Sec. 163 (j) IRC). Several countries add requirements related to the ownership share of the creditor.

\(^4\)While the tax penalty depends on the interest rate, it may be possible that firms could avoid the tax penalty by issuing only a small amount of related party debt and instead set a rather high rate of interest.
Thus, the safe haven debt-to-equity ratio defines the tightness of a TC rule.

A particular problem, however, arises from the definition of the type of debt which is considered to calculate the debt-to-equity threshold. In some countries the ratio refers to overall indebtedness, while in others it refers only to loans provided by the shareholder and, in order to prevent circumvention of TC rules, to all loans from related parties. In addition, bank loans that are backed by shareholder funds are often also considered by the TC rules. The different definitions of debt are relevant for computing the debt-to-equity ratio that determines the potential restriction of interest deductibility. It is important to note, though, that in all countries and during the time span considered in this study, interest deduction is only denied for related party debt.

Table A-1 in the Appendix depicts detailed information on the debt-to-equity ratios of the TC rules considered in the empirical part. The empirical implication of a TC rule that limits the tax advantage of internal debt is straightforward: If a TC rule cannot easily be circumvented and is effective in limiting the tax advantage from internal debt, firms should adjust their capital structure in order to avoid the tax penalty of denied interest deduction if such a rule is introduced or tightened. In other words, we expect that tighter rules are associated with lower internal-debt-to-capital ratios.

**Controlled Foreign Company Rules**

CFC rules are set up by the home countries in order to restrict certain tax-planning strategies using subsidiaries in low-tax countries. In particular, CFC rules aim at restricting profit shifting to legally independent low-tax subsidiaries, which are shielded from home-country taxation. At the level of the parent company, foreign income of legally independent

However, high interest rates would generally conflict with the arm’s length principle.

5For computing the debt-to-equity ratio the TC rules of the following countries refer to total debt: Australia, Bulgaria, Denmark, Hungary, Japan, Latvia, Lithuania, Mexico, Netherlands, Poland, Romania, Switzerland, UK, USA. In the following countries only internal debt is considered: Belgium, Canada, Croatia, Czech Republic, France, Germany, Italy, Luxembourg, Portugal, Slovakia, Slovenia, Spain, South Korea, Turkey.
subsidiaries is usually tax exempt or only taxed upon repatriation. However, if a CFC rule applies, income of a foreign subsidiary is immediately taxed in the home irrespective of whether or not income is distributed.

Generally, the application of CFC rules depends on two conditions: Firstly, the tax rate in the host country is below a certain threshold. Secondly, the income has to be classified by the CFC rule as *passive* income. CFC rules usually classify income as *active* or *passive*. Interest income from internal lending to affiliated parties is usually deemed as passive income. As a consequence, interest income classified as passive income is immediately taxed as income of the parent company if the host country tax rate is below an applicable threshold implying that benefits from an exemption or deferral system are eliminated.

Since our empirical analysis is based on data from German multinationals, the German CFC rule applies to our sample. Therefore, German multinationals can only gain from tax-rate differentials between borrowing and lending foreign subsidiaries if the tax rate of the lending affiliate is above the threshold of the German CFC rule. Until 2000, the German CFC rule applied if the tax rate of the lending affiliate was below 30% and since 2001 below 25%.

The following simple example aims at clarifying the consequences of a CFC rule. Let us consider the case of an Irish and French subsidiary of a German parent company. In 2003, the Irish tax rate was 12.5% and the French corporate tax rate amounted to 35.4%. Therefore, the tax-rate differential between Ireland and France of about 22.9% created a strong incentive to finance the French subsidiary by means of an internal loan borrowed from the Irish subsidiary. If the Irish subsidiary was refinanced by equity capital, the German CFC rule would classify the interest income of the Irish subsidiary as passive income. Moreover, since the Irish tax rate was below the threshold of the German CFC rule of 25%, the German rule applied and the interest income was immediately taxed at the level of the German parent company. Although taxes paid in the host country of the lending affiliate can offset German tax liabilities, as a result, the high German tax rate of
approximately 40.6% was effectively imposed on the interest income. This simple example highlights that the German CFC rule eliminates any tax benefit of internal loans if the lending subsidiary is located in a host country with a tax rate below 25% (until 2000 below 30%).

3 Investigation Approach and Data

3.1 Empirical Approach

For the empirical investigation, we use an affiliate-level dataset described in Section 3.2 in more detail. First of all, we investigate how taxes affect the share of internal debt that an indirectly held German subsidiary borrows from an intermediate entity.\(^6\) This bilateral internal debt ratio \((BIDR)\) of subsidiary \(i\) in year \(t\) is the dependent variable in the following equation:

\[
BIDR_{i,t} = \alpha_0 + \alpha_1 (T_{B,t} - T_{L,t}) + \alpha_2 C_{i,t} + \delta_k + \gamma_t + \epsilon_{i,k,t}. \tag{1}
\]

A set of standard explanatory variables \((C)\) is included as well as parent-specific \((\delta_k)\) and year-specific \((\gamma_t)\) effects. Of particular interest is the firm-specific bilateral tax-rate differential \((T_B - T_L)\) between the borrowing entity and the lending entity. As the incentive to use internal debt increases in the tax-rate differential, \(\alpha_1\) is predicted to be positive.

Tax legislation responds to tax-planning activities of multinational firms by introducing anti-avoidance rules. In a second step, we therefore investigate whether these anti-avoidance rules are effective in restricting internal debt financing. We introduce a binary variable indicating whether the German CFC rule potentially applies to interest income of

\(^6\)Note that we are only able to identify bilateral debt if we consider a specific group of indirectly-held subsidiaries that are reported in our data (see below).
the lending subsidiary. Moreover, a measure of the tightness of a TC rule which is implemented by the host country of the borrowing subsidiary is inserted. For both indicators, we expect negative effects on internal debt financing. Higher values of both measures indicate that it is more likely that tax benefits of internal debt financing are denied.

3.2 Data

For the empirical analysis, we use firm-level data taken from the MiDi (Microdatabase Directinvestment) provided by the Deutsche Bundesbank. This is a comprehensive annual micro database of investment positions of German enterprises held abroad, as well as of investment positions held in Germany by foreign companies. However, we employ only data on German outbound FDI, where subsidiaries are located in 36 host countries. Affiliates from the financial sector, holding companies, and subsidiaries which may have specific taxing conditions are excluded. MiDi includes information about the subsidiary’s balance sheet and limited further information on the type of investment and on the investor. An advantage of the data is the possibility of tracing company groups and their affiliates over time. The current version is available for the period from 1996 to 2007. The data collection is imposed by German law which requires reporting for certain international transactions and positions. This aspect of MiDi is worth emphasizing, as we are able to

7 Lipponer (2008) provides a detailed description of MiDi.

8 All EU and OECD member states are included, except Romania, because no lending rates were available for this country, and Iceland, because no subsidiaries of German multinationals are reported in our dataset. Additionally, we consider Croatia. Germany is not included as the country of the parent companies.

9 We exclude observations from mining, agriculture, non-profit and membership organizations, because special tax regimes may be available. Furthermore, we exclude observations whose German parent is not an incorporated and legally independent entity, as well as subsidiaries which are not legally independent.

10 Sec. 26 of Foreign Trade and Payments Act (Aussenwirtschaftsgesetz) in connection with Foreign Trade and Payments Regulation (Aussenwirtschaftsverordnung). Since 2002, FDI has to be reported if the participation is 10% or more and the balance-sheet total of the respective foreign investment in Germany exceeds 3 million Euros. For details see Lipponer (2008). Though previous years showed lower threshold levels, we apply this threshold level uniformly for all years in the panel.
observe virtually all German outbound investments.

A specific feature of the dataset is the fact that for some subsidiaries of German parent companies information on bilateral internal debt items is available. In particular, both the borrowing and lending affiliate can be unambiguously identified in some specific cases. For this purpose it is, however, essential to restrict the sample to wholly-owned, indirectly-controlled, and incorporated subsidiaries. Then, the data allows us to identify subsidiaries that are controlled by only one company. Moreover, we can identify internal debt that is provided by the direct holder of the subsidiary as a bilateral internal debt item. Figure 1 displays the basic structure according to aforementioned considerations.

Figure 1: Intermediate Entities and Internal Debt Finance

We focus on borrowing of the indirectly held subsidiary shown on the right-hand side of Figure 1. The lender of the respective debt item is an intermediate entity as depicted in Figure 1. In contrast to previous studies, we can precisely determine the bilateral tax-rate differential between the borrowing and lending affiliate \((T_B - T_L)\) that is a crucial determinant of internal debt. Another advantage of this approach is that we obtain additional cross-section and time variation in tax incentives as both the tax rate at the lending location as well as the tax rate at the borrowing location varies, whereas in case of outbound FDI data, the variation in the parent tax rate does not contribute to identification.
Table 1: Descriptive Statistics

<table>
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<th>Dependent Variable:</th>
<th>Mean</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bilateral Internal Debt-to-Capital Ratio (BIDR)</td>
<td>.090</td>
<td>.190</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Explanatory Variables:</th>
<th>Mean</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>$T_B - T_L$</td>
<td>-.008</td>
<td>.041</td>
</tr>
<tr>
<td>CFCR Application</td>
<td>.032</td>
<td>.175</td>
</tr>
<tr>
<td>TCR Tightness</td>
<td>.048</td>
<td>.116</td>
</tr>
<tr>
<td>LCF$_B$</td>
<td>.124</td>
<td>.329</td>
</tr>
<tr>
<td>LCF$_L$</td>
<td>.072</td>
<td>.259</td>
</tr>
<tr>
<td>Lending Rate</td>
<td>.063</td>
<td>.037</td>
</tr>
<tr>
<td>Sales</td>
<td>140,005</td>
<td>3,182,435</td>
</tr>
<tr>
<td>Tangibility</td>
<td>.251</td>
<td>.252</td>
</tr>
</tbody>
</table>

Statistics refer to 31,421 observations of indirectly held German subsidiaries. The subscript $B$ denotes variables of the borrowing affiliates while $L$ denotes information of the lending affiliate. Firm-level variables are taken from the MiDi database provided by the Deutsche Bundesbank. The Bilateral Internal Debt-to-Capital Ratio is defined as the debt borrowed internally from the affiliate that directly holds the shares in the borrowing affiliate. Sales refers to affiliate’s sales in €1,000. Tangibility is an affiliate’s ratio of fixed assets to total assets. LCF$_B$ is a binary variable which is one if the borrowing affiliate has a loss carryforward. LCF$_L$ is a binary variable which is one if the lending affiliate has a loss carryforward. $T_B$ is the statutory corporate tax rate of the borrowing affiliate. $T_L$ is the statutory corporate tax rate of the lending affiliate. TCR Tightness is the minimum share of equity stipulated by the TC rule of the borrowing affiliate’s host country. CFCR Application is a dummy variable which is one if the German CFC rule potentially applies to income earned by the lending affiliate. The tax data is collected from databases provided by the International Bureau of Fiscal Documentation (IBFD) and tax surveys provided by Ernst&Young, PwC, and KPMG. Lending Rate refers to private sector debt, which is taken from the IMF International Financial Statistics Yearbook (2007) and augmented by OECD figures.

We consider bilateral internal debt borrowed from the intermediate company relative to total capital of the borrowing affiliate as the dependent variable. The dependent as well as all independent variables are summarized in Table 1.

Explanatory variables include the statutory tax rate ($T_B$) of the host country of the borrowing affiliate, and the statutory tax rate ($T_L$) of the country of the lending entity is considered. These two variables are used to construct a bilateral tax-rate differential ($T_B - T_L$).

We use two dummy variables that indicate the existence of loss carryforwards either at
the level of the lending or the borrowing subsidiary, respectively. The first binary variable $LCF_B$ indicates whether the borrowing entity has a loss carryforward. A subsidiary with a loss carryforward may not be able to retain profits and internal debt financing is a flexible means to provide new capital (Gopalan, Nanda and Seru, 2007). Hence, we would predict a positive effect of $LCF_B$ on internal debt. However, due to a smaller financial resources if a subsidiary is not profitable, agency problems between the CEO and subsidiary managers should be of less importance and the impact on internal debt would be negative. Second, we consider a binary variable $LCF_L$ that depicts whether the lending entity has a loss carryforward. We expect a negative effect because losses in previous periods limit the cash flow available for lending.

In the presence of losses carried forward, significantly less pronounced effects of the borrower’s and lender’s tax rates are expected. For this reason in additional specifications, we insert interaction terms between the statutory tax rates and variables indicating whether the borrowing or the lending affiliate has a loss carryforward. In accordance with findings of previous studies (see, e.g., MacKie-Mason, 1990), we expect a less pronounced impact of a rising host country statutory tax rate of the borrowing affiliate on internal debt usage if the borrowing affiliate has a loss carryforward.\footnote{The tax incentives of debt financing are less pronounced if an affiliate suffers losses or carries forward any losses, because the affiliate can offset current profits, thereby reducing the tax base. In some countries a loss carryback is available and additional interest deductions may result in some tax refunding. However, note that a loss carryback is mostly very limited. Owing to the lack of information on the current profitability before interest payments, we can only consider the impact of loss carryforwards on internal debt financing.} Moreover, a loss carryforward at the level of the lending affiliate should result in a significantly less pronounced impact of a rising tax rate of the lender’s host country.

In order to analyze the effectiveness of TC rules we employ the variable $TCR$ Tightness as an indicator of tightness of the host country’s TC rule. However, constructing a meaningful indicator of the differences in the tightness of TC rules is difficult since the details of the rules differ between countries. Nevertheless, we can exploit a common feature of
the TC rules since application of all considered TC rules depends on a fixed debt-to-equity ratio. An actual debt-to-equity ratio below this fixed ratio of the rule ensures full deductibility of interest payments. Otherwise, interest deduction may be restricted. The variable *TCR Tightness* is a transformation of this debt-to-equity ratio into a minimum share of equity to total capital. A simple example can help to explain how the variable is constructed. Let us, for example, consider a country where the safe haven debt-to-equity ratio is 3:1. In this case, the value of the variable *TCR Tightness* amounts 0.25 because the minimal amount of capital financed with equity is 25%. If no restriction is imposed, the indicator has zero value, while in the hypothetical most restrictive case where no debt is allowed, the indicator has unit value. Thus, the variable *TCR Tightness* potentially varies between 0 and 1.

For the analysis of the effectiveness of the German CFC rule, we use the dummy variable *CFC Application* that identifies low-tax countries according to the German CFC rule. To be precise, the variable *CFCR Application* is one if the lending subsidiary is located in a country where the statutory tax rate lies below the threshold of 30% (25% since 2001). Otherwise, the variable *CFCR Application* equals zero. If the German CFC rule applies, the result is that interest income from internal lending is immediately attributed to the taxable income of the German parent company. Therefore, we expect a negative effect of *CFCR Application* since tax benefits of internal debt financing are eliminated owing to the high German tax level.

Financing decisions of a borrowing subsidiary may also be determined by its *Sales*, as this is an indicator for the size and cash flow of a subsidiary. In both cases, higher sales are associated with favorable lending conditions (e.g., Graham and Harvey, 2001). However, an easier access to bank loans may explain a negative effect on internal debt. Previous empirical studies show that external and internal debt financing of affiliates are substitutes (Desai, Foley and Hines, 2004; Buettner et al., 2009). In addition, higher sales may also imply that a firm is more able to retain earnings. In the latter cases, the impact on debt
would be negative, too.

As additional control variable, we take into account the variable *Tangibility*. This variable refers to the ratio of fixed assets to total assets. The impact of tangibility on internal debt is unclear. On the one hand, tangible assets reflect the amount of long-term investment projects for which monitoring problems of the CEO can be solved by internal interest payments. Hence the effect of tangibility is expected to positively affect the internal-debt-to-capital ratio of the subsidiary. On the other hand, a higher share of fixed assets may imply easier access to external debt, because firms can easily borrow against fixed assets.\(^{12}\) Moreover, depreciation allowances and investment tax credits associated with fixed assets may crowd out the value of interest deduction (De Angelo and Masulis, 1980).

Finally, we consider the *Lending Rate* for credit to the private sector at the location of the borrowing affiliate. While this variable may capture many aspects of the local credit market, a high lending rate is essentially associated with higher cost in terms of local external borrowing. In case of multinational firms, however, the negative effect of higher costs of external lending may be circumvented by internal capital markets, i.e. internal debt may substitute external borrowing. Consequently, a higher local lending rate should be associated with a higher share of internal debt.

\(^{12}\) More collateral may make a liquidation less costly for shareholders as well as for debt holders, who can resort to liquidation in order to attain a more effective management control. Harris and Raviv (1990) find a positive correlation between companies’ liquidation values (proxied by the fraction of tangible assets) and the optimal debt levels.
4 Results

4.1 Impact of the Tax-Rate Differential

The estimations follow the approach presented in Section 3. Standard errors are clustered within country-year cells. We always consider firm-specific and year-specific effects as well as a basic set of additional explanatory variables. We start with an analysis of the impact of the bilateral tax-rate differential on internal debt borrowed from the holding company. The regression results are shown in Table 2. While specification (1) is based on Equation (1), industry and country dummies are subsequently inserted in specifications (2) - (3) and (4) - (5), respectively. All regression results confirm the expected positive effect of the bilateral tax-rate differential on the internal debt-to-capital ratio. This highlights the role of debt for multinationals’ tax planning.

The point estimator of specification (2) for the tax-rate differential suggests that a 10 percentage point higher tax-rate differential is associated with a 0.77 percentage point higher internal debt-to-capital ratio. If country dummies are inserted, the marginal effect is more pronounced and the corresponding effect is 1.65. Taking into account the mean of the internal debt-to-capital ratio the marginal effect corresponds to semi-elasticities of significant magnitudes. Evaluated at mean values, the tax semi-elasticity of specification (2) is 1.14, and based on specification (4) 1.83, respectively.

In addition, the results of specifications (3) and (5) in Table 2 depict a more pronounced tax effect if firm-specific tax incentives are controlled. Here the impact of loss carryforwards on the tax incentives is separately controlled by two interaction terms. In accordance with our expectations, the regression results confirm significant adverse effects of losses carried forward. While either a loss carryforward of the lending or the borrowing entity is associated with significantly less tax influence of the respective local tax rate on the debt-to-capital ratio, the basic effect of the tax-rate differential is very pronounced in the
## Table 2: Impact of Tax-Rate Differentials

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Dependent variable is the bilateral internal debt borrowed from the holding company to total capital. Estimations include time-specific and firm-specific effects. Robust standard errors, clustered within country-year cells, are in parentheses. *, **, *** denote significance at the 10%, 5%, and 1% level.

absence of any losses. Let us, for example, consider the results of specification (5). If the borrowing affiliate has a loss carryforward, an adverse tax effect of about -0.108 adds to the basic tax effect of 0.190. Thus, the marginal effect of a rising tax rate of the borrower’s host country on the internal debt ratio is only 0.082 if the borrowing affiliate has a loss carryforward, compared to 0.190 else. A similar adverse effect is estimated if the lending affiliate has a loss carryforward. Then, the marginal effect of an increase in the lender’s host country tax rate amounts only -0.114 (= -0.190 + 0.076), compared to -0.190 else.

It seems natural to compare our results with those of previous studies. The two studies that identify effects of tax-rate differentials find significantly smaller tax-elasticities. Huizinga, Laeven and Nicodème (2008) estimate a semi-elasticity of total debt with re-
spect to the differential between the tax rate of the borrowing affiliate’s host and the weighted average tax rate of the multinational group of only 0.19. Buettner and Wamser (2009) estimate a semi-elasticity of internal debt with respect to the differential between the tax rate of the borrowing affiliate’s host and the minimum tax rate available within the multinational group of about 0.69. Recently, Heckemeyer, Feld and Overesch (2009) provide a survey and meta-analysis of 20 studies concerning the impact of taxes on capital structures. Their meta-regression results based on 543 primary estimations suggest a typical tax semi-elasticity of internal debt of about 0.7. In sum, our results suggest that the tax elasticity of internal debt is significantly more pronounced in our setting. The comparison highlights the role of a careful construction of the bilateral tax-rate differential and of firm-specific characteristics that impact the tax status. Moreover, in comparison to results for the tax response of debt borrowed from externals sources, internal debt seems to be particularly flexible. Heckemeyer, Feld and Overesch (2009), for example, find a typical tax semi-elasticity of only 0.3 in case of external debt.

Finally, let us briefly discuss the effects of the non-tax determinants of debt financing. Our results confirm that higher sales are associated with less internal debt. This suggests that a rising size of a subsidiary improves access to debt from external sources. However, we find no significant effect of the local lending rate on internal debt financing. If tangibility serves as a proxy for the share of long-term investment projects, we expect a positive effect on internal debt because internal interest payments can help to monitor such a long-term investment strategy. In fact, the estimated coefficient is positive. The dummy variable indicating the existence of a loss carryforward at the level of the borrowing affiliate is positively related to the share of internal debt. This confirms our expectations since firms reporting losses in previous periods could not retain profits and, consequently, internal debt is a flexible means to provide new capital. The estimated effect is more pronounced if the interaction term between a loss carryforward and the tax rate is introduced. With regard to the impact of a loss carryforward at the level of the lending affiliate, our results reveal a negative effect. This confirms theoretical expectations since past losses restrict
the opportunity to lend to affiliated companies. Once again, the effect is more pronounced in columns (3) and (5) if an interaction term with the tax rate is inserted.

### 4.2 Effectiveness of Anti-Avoidance Rules

Our results provide striking evidence for significant tax elasticities of internal debt. Therefore, it does not come as a surprise that tax legislations try to counteract the tax planning activities by developing anti-avoidance rules. In the following, we test whether the two most prominent rules set up to restrict tax planning by means of internal debt financing – TC rules and CFC rules – are effective. The regression results are depicted in Table 3.

In columns (1) - (3) of Table 3 we insert the variable $TCR\; Tightness$ which refers to the minimum equity share stipulated by the TC rules of the borrower’s host country. A higher value of $TCR\; Tightness$ reflects that a higher share of total capital has to be financed by equity so that full deductibility of interest is ensured. The regression results suggest that the obligation to finance a higher capital share by equity in order to ensure full interest deductibility is indeed associated with significantly less internal debt.

Specifications (4) - (6) of Table 3 consider the dummy variable $CFCR\; Application$ indicating if interest income of the lending affiliate may fall under the German CFC rule. This is likely to be the case if the tax rate of the lending affiliate’s host country is below 25% (until 2000 below 30%). We are however unable to identify any statistically significant effect of the German CFC rule on the internal debt ratio of indirectly held German affiliates. This still holds true if we also consider the impact of TC rules (columns (7) - (9)).

At first glance, our results seem to conflict with findings of previous studies. Ruf and Weichenrieder (2009), for example, find significant negative effects of the German CFC rule on passive investment that include internal lending of low taxed German subsidiaries. One may speculate why no significant effect of CFC rules can be identified in our setting.
Table 3: Effectiveness of Anti-Avoidance Rules

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Dependent variable is the bilateral internal debt borrowed from the direct owner to total capital. Estimations include time-specific and firm-specific effects. Robust standard errors, clustered within country-year cells, are in parentheses. *, **, *** denote significance at the 10%, 5%, and 1% level.
A possible explanation could be the fact that we focus on the effects of tax-rate differentials and the CFC rule on internal debt financing while conditioning on exogenous group structures of the multinational firms. The CFC rule however may impact on the group and lending structures of multinational firms, rather than on the level of internal lending. This assumption is also supported by Ruf and Weichenrieder (2009) who find an impact of the German CFC rule on the decision where to locate a conduit which has passive income. This explanation is further supported by the fact that only 3 percent of our observations may conflict with the German CFC rule because the intermediate company is even located in a low tax country. A second explanation may arise from a detail of the German CFC rule. In case of interest income from internal lending, the German CFC rule only applies if the internal lending is not re-financed by borrowing from external sources.

While our setting does not confirm any statistically significant effect of the CFC rule on internal debt financing, our results suggest that internal debt financing significantly decreases with a tighter TC rule. This finding confirms previous results (see Buettner et al., 2008; Overesch and Wamser, 2009). To obtain an impression of the empirical magnitude, consider the case where thin-capitalization is tightened from a debt-to-equity ratio of 3:1 to a ratio of 1.5:1. This tightening would be reflected by an increase of the variable TCR Tightness from 0.25 ($= \frac{1}{1+3}$) to 0.40 ($= \frac{1}{1+1.5}$). Taking into account the point estimate in specification (9) of about -0.063, as a consequence the internal debt share declines by approximately 0.945 percentage points. Evaluated at sample mean of the internal debt share, the effect corresponds to a reduction of 10.5 percent.

The striking effectiveness of TC rules becomes more clearly if the impact of the aforementioned tightening of a TC rule is compared to a tax rate cut that is associated with a debt reduction of equal magnitude. Considering sample means and the results of Columns (9), we compute a tax semi-elasticity of about 1.58. Thus, a host country of a borrowing affiliate must cut the statutory tax rate by approximately 6.6 percentage points in order to provoke a reduction in the internal debt share of the same magnitude as by the afore-
mentioned tightening of the TC rule. In sum, our estimation results suggest that TC rules are quite effective in restricting internal debt financing of multinational firms.

5 Conclusions

We have analyzed the tax incentives on internal debt financing of multinational companies. For the empirical investigation we have employed a unique firm-level data set that allows us to identify bilateral internal loans. Such bilateral loans are crucially determined by bilateral tax-rate differentials between borrowing and lending subsidiaries. Our empirical results suggest that a higher bilateral tax-rate differential between the borrowing and lending entity has the expected positive impact on internal debt financing. If we control for the impact of firm-specific characteristics that affect the response to taxes, the effect of the bilateral tax-rate differential is particularly pronounced.

Compared with previous studies, the results of our estimations point at considerably larger tax effects: comparing the tax-elasticity of our results with findings of other studies referring to total or external debt, our elasticities exceed other estimates by three to five times, depending on the specification. According to column (5) in Table 2, a 10 percentage point increase in the bilateral tax-rate differential is associated with a 21 percent higher internal-debt-to-capital ratio.

Tax legislations try to counteract the significant tax-planning activities by means of anti-avoidance rules. We therefore additionally test whether such rules are effective in restricting internal debt financing. We cannot find any statistically significant effect of the German CFC rule on internal borrowing of indirectly held subsidiaries. However, our results show that countries successfully restrict internal borrowing by imposing thin-capitalization rules.
### Appendix

Table A-1: Thin-Capitalization Debt-to-Equity Ratios

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Number of debt units in relation to equity capital that are accepted by the thin-capitalization rules for unrestricted interest deduction from taxable profits.

*a Rule does not apply to related party debt provided by a company located in a member state of the European Union.
References


Mintz, J. and A.J. Weichenrieder (2009), The indirect side of direct investment - multinational company finance and taxation, MIT Press, 128 -140.


