

# Intercompany Loans and Profit Shifting – Evidence from Company-Level Data

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**Abstract:** This paper is concerned with tax-planning strategies of multinational corporations. A theoretical analysis discusses the choice of the capital structure in a setting where intercompany loans can be used not only to minimize cost of capital but also to shift income to low-tax countries. Empirical evidence is provided using micro-level panel data of virtually all German multinationals made available by the Bundesbank. This comprehensive dataset allows us to exploit differences in taxing conditions of almost eighty countries during a period of nine years. The findings provide conclusive evidence about the role of intercompany loans for profit shifting to low-tax countries. The results indicate that the sensitivity of intercompany loans to tax-rate differences is at the same order of magnitude as the tax sensitivity of debt finance reported in existing studies. However, the implied tax-revenue effects are rather small, suggesting that costs related to intercompany loans are much higher than is often assumed by tax-policy makers.

**Keywords:** Corporate Taxation; Multinational Corporations; Tax Planning; Tax Haven; Intercompany Loans; FDI; Micro-Level Data

**JEL Classification:** H25; F23

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# 1 Introduction

Much of the discussion about international tax competition is centered around the impact of taxes on location and investment decisions (see de Mooij and Ederveen, 2003, for a survey). However, it is often neglected that there are many more dimensions along which the multinational corporation can structure its activities internationally, and that decisions related to production and trade are only part of the story. From a taxation perspective, the fact that those corporations hold affiliates in different countries opens up many opportunities for tax planning with the aim to minimize their overall tax burden. This might be quite important for the tax revenue from corporation taxes and, furthermore, may significantly alter the way taxes affect the economy.

As is well noted in the literature (*e.g.*, Hines and Rice, 1994, and Gresik, 2001), a multinational corporation has several important ways to engage in tax planning other than choosing location and level of investment. One important determinant of the tax burden is the transfer price for goods and services traded within the corporation (for a theoretical discussion see *e.g.*, Haufler and Schjelderup, 2000; for empirical evidence see *e.g.*, Swenson, 2001, and Clausing, 2003). Besides transfer pricing, multinationals have enhanced opportunities with respect to tax planning as they can use external as well as internal funds in order to adjust their capital structure. This allows multinationals not only to arbitrage more easily across different lending markets. It also opens up opportunities for tax planning by means of intercompany loans. Borrowing from affiliates located in low-tax countries and lending to affiliates at high-tax locations will allow the latter to deduct interest payments from profits and save taxes in the high-tax country (Mintz and Smart, 2004).

While several papers document some significant degree of profit shifting of multinationals (*e.g.*, Grubert and Mutti, 1991, or Hines and Rice, 1994), the empirical literature has failed to provide conclusive evidence that intercompany loans are, in fact, an important

device to shift income. At best, the empirical literature provides some evidence that the capital structure of multinationals is sensitive to differences in international taxation. *E.g.*, Jog and Tang (2001) investigate the capital structure of Canadian companies and, especially, take into account how these firms respond to tax-rate differences with regard to the US. However, the tax sensitivity of the debt-equity ratio is a standard issue in corporate taxation. In fact, the tax shelter from debt will support a tax-rate sensitivity of the leverage for multinationals' affiliates as well as for national corporations. For instance, Gordon and Lee (2001) find a strong tax sensitivity of the leverage of US corporations.

Only some recent papers consider intercompany loans. Desai, Foley, and Hines (2004a) analyze the capital structure of US multinationals and report a significant tax sensitivity of both external and internal debt. Buettner *et al.* (2006) confirm their findings for German multinationals. As the main result of Desai *et al.* is that internal debt serves as a substitute to external debt, it is, however, not clear to what extent the tax sensitivity of intercompany loans reflects profit shifting as compared to the standard tax shelter from debt. In fact, as noted by Mintz and Smart (2004), profit shifting by means of intercompany loans should not be responsive to the local tax rate but to the *tax-rate differences* observed within the multinational group.

This paper, therefore, studies how those tax-rate differences affect the capital structure of multinationals and, in particular, the use of intercompany loans. For this purpose we use a large micro-level panel database of virtually all German multinationals made available for research by the German Bundesbank. This comprehensive dataset allows us to exploit tax-rate differences in 79 countries, among those many low-tax, or tax-haven countries. For each affiliate within the multinational the appropriate tax-rate difference is calculated relative to the lowest tax rate observed among all affiliates. The empirical results strongly support a significant impact of the tax-rate differential on intercompany loans, implying that intercompany loans are used to shift profits from high- to low-tax countries. The results indicate that the sensitivity of intercompany loans to tax-rate differences is slightly

larger than the tax sensitivity of debt finance as reported in existing studies. However, the implied tax revenue effects are not dramatic. This finding is indicative for substantial additional cost of borrowing or agency costs. As a consequence, restrictions on the internal finances of multinationals might be much more distorting than is conventionally assumed by tax policy makers.

The paper is organized as follows. In Section 2 we model a corporation which is active at different locations, including low-tax countries or tax havens. The corporation is assumed to maximize profits by allocating internal funds optimally with respect to differences in international taxation. From the optimality conditions we obtain testable empirical implications, which are discussed in Section 3. Section 4 gives a short description of the dataset used and discusses the investigation approach. Section 5 provides descriptive statistics. The basic results are presented in Section 6. Some further evidence showing how the results change with the share of ownership is presented in Section 7. Section 8 provides our conclusions.

## 2 Theoretical Considerations

Consider a multinational enterprise which produces at  $N$  locations. The profit function of this corporation is given by

$$\begin{aligned}
\pi &= \sum_{i=1}^N f(k_i) (1 - \tau_i) \\
&- \sum_{j=1}^N \sum_{i=1}^N [i_j \lambda_{ji} k_i] (1 - \tau_i) \\
&- \sum_{j=1}^N \sum_{i=1, i \neq j}^N [i_j \mu_{ji} k_i] (1 - \tau_i) \quad + \quad \sum_{j=1, i \neq j}^N \sum_{i=1}^N [i_j \mu_{ji} k_i] (1 - \tau_j) \\
&- r \sum_{i=1}^N \left( 1 - \sum_j \lambda_{ji} \right) k_i
\end{aligned}$$

$$- \sum_{i=1}^N c_i (\lambda_{1i}, \dots, \lambda_{ji}, \dots, \lambda_{Ni}, \mu_{1i}, \dots, \mu_{ji}, \dots, \mu_{Ni}) k_i, \quad \text{with } \mu_{ii} = 0.$$

We can distinguish five components of the profit function. The first line captures the contribution of output,  $f(k_i)$ , taking account of the fact that a part of the corresponding profit is taxed away. The country-specific statutory tax rate is denoted with  $\tau_i$ . The second row shows the interest costs which, similarly, enter profits only after tax deduction.  $i_j$  is the corresponding lending rate at location  $j$ . Note that this term captures also the interest costs related to intercompany loans, provided the corporation raises a credit at jurisdiction  $j$  and transfers the money to location  $i$  such that  $\lambda_{ji} > 0$ . The third line is also concerned with intercompany loans but reports the contribution of pure profit shifting where some financial capital is shifted from one location to the other, without increasing outside debt. The fourth line reports the costs of capital financed with equity. The fifth line, finally, captures the agency costs of debt which are assumed to increase with the various types of loans borrowed from the other affiliates in the corporation (*e.g.*, Jensen and Meckling, 1976, or Myers, 1977).<sup>2</sup> The agency-cost function is indexed with the host country to reflect the potential role of this country's credit-market regulations for the underlying conflict between debtors and creditors.

The optimality conditions are

$$\frac{\partial \pi}{\partial \lambda_{ji}} = -i_j (1 - \tau_i) k_i + r k_i - \frac{\partial c_i}{\partial \lambda_{ji}} k_i \stackrel{!}{=} 0 \quad (1)$$

$$\frac{\partial \pi}{\partial \mu_{ji}} = -i_j (1 - \tau_i) k_i + i_j (1 - \tau_j) k_i - \frac{\partial c_i}{\partial \mu_{ji}} k_i \stackrel{!}{=} 0 \quad (2)$$

In the general case, the leverage of affiliate  $i$  financed with a credit from country  $j$  is,

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<sup>2</sup>The agency-cost function is assumed to be convex. More specifically,  $c_{i,\lambda} \equiv \frac{\partial c_i}{\partial \lambda_{ji}} > 0$ ,  $c_{i,\mu} \equiv \frac{\partial c_i}{\partial \mu_{ji}} > 0$ ,  $c_{i,\lambda\lambda} \equiv \frac{\partial^2 c_i}{\partial \lambda_{ji}^2} > 0$ ,  $c_{i,\mu\mu} \equiv \frac{\partial^2 c_i}{\partial \mu_{ji}^2} > 0$ .

among other determinants, a function of the corresponding after-tax rate of interest

$$\lambda_{ji} = f( r - i_j(1 - \tau_i), \dots ).$$

The leverage financed with equity is depending on the tax-rate difference

$$\mu_{ji} = h( i_j(\tau_i - \tau_j), \dots ).$$

If one is willing to impose somewhat more structure on the analysis, one can generate more specific predictions.

A restrictive case is provided by Buettner *et al.* (2006) who consider the leverage of a single foreign affiliate held by a German parent. In this case, the fact that Germany is a high-tax country makes it rather unlikely to observe a positive tax-rate differential which gives an incentive to shift profits from foreign affiliates into Germany. Thus, if  $t_j > t_i$ , all intercompany loans from  $j$  to  $i$  reflect external credit in the lending affiliate. Therefore,  $\mu_{ji}$  is zero in this case and the leverage is determined by the corresponding after-tax cost of interest.

Mintz and Smart (2004) consider another case where  $r < i_j(1 - \tau_i)$ . Thus, all intercompany loans relate to profit shifting. In this case,  $\lambda_{ji}$  is zero and the leverage is determined by the tax rate difference with regard to the lowest-tax affiliate.

For our purposes let us consider a slightly more general case by assuming a simplified agency-cost function where we aggregate among different types of loans, *i.e.*, if we consider that all loans received from other affiliates are perfect substitutes in the agency-cost function

$$c_i = c_i \left( \lambda_{ii}, \sum_{j \neq i} \lambda_{ji}, \sum_{j \neq i} \mu_{ji} \right). \quad (3)$$

With this cost function the first-order conditions for all intercompany loans would have to

match the same marginal agency costs. If interest rates and tax rates differ, this implies that the leverage related to intercompany loans refinanced with external capital  $\sum_{j \neq i} \lambda_{ji}$ , is determined by the lowest lending rate

$$\lambda_{ji} > 0, \quad \text{where } j = \arg \min_k i_k, \quad \text{and zero otherwise.} \quad (4)$$

In contrast, the other kind of intercompany loan which is not refinanced externally  $\sum_{j \neq i} \mu_{ji}$ , is determined by the largest tax-rate difference evaluated at the lending rate

$$\mu_{ji} > 0, \quad \text{where } j = \arg \max_k i_k (\tau_i - \tau_k), \quad \text{and zero otherwise.} \quad (5)$$

### 3 Empirical Implications

The analysis below aims at testing some empirical implications of the above model. Basically, the analysis is concerned with the implications of the first-order conditions and considers the empirical determinants of the debt-asset ratio where we take account of intercompany loans. In the above setting, the debt-asset ratio  $L_i$  of an affiliate  $i$  consists of three components

$$L_i \equiv \lambda_{ii} + ICL_i, \quad \text{where } ICL_i \equiv \sum_{j \neq i} \lambda_{ji} + \mu_{ji}, \quad (6)$$

where the first component is the amount of debt directly raised from external creditors, the second and third components together make up the amount of intercompany loans ( $ICL_i$ ). The theory distinguishes intercompany loans re-financed with external credit which are used to arbitrage across capital markets ( $\lambda_{ji}$ ), from those re-financed with equity ( $\mu_{ji}$ ) which are used to shift profits. However, this distinction is generally not observable, empirically. Instead, balance-sheet data, like those used in the current study, provide some figures for  $L_i$  and  $ICL_i$ .

Abstracting from possible differences in the lending rate, the optimality conditions for  $\lambda_{ij}$  and  $\mu_{ij}$  suggest that the share of capital of an affiliate financed with intercompany loans should not only be affected by the local tax rate but also by a positive tax-rate differential with regard to other locations where the multinational holds affiliates. As we have seen above, the empirical implications of the theory critically depend on the agency-cost function. Assuming that agency costs follow (3) such that intercompany loans from different locations are close substitutes, the share of capital of an affiliate  $i$  held by corporation  $k$  financed with intercompany loans  $ICL_{i,k}$  should be a function of the local tax rate  $\tau_i$  and the maximal tax-rate difference  $(\tau_i - \tau_k^{min})$  with regard to all other affiliates in the corporation.  $\tau_k^{min}$  is the lowest local tax rate among all affiliates as defined by equation (5). In other words, the theory suggests not only to take account of the local tax rate. Instead, we should take account of the tax-rate difference to the lowest-tax affiliate among all affiliates of a multinational as this determines the potential tax savings from profit shifting.

While the magnitude of effects depends on the agency costs, the theoretical discussion suggests that both tax indicators should exert non-negative or even positive effects on the share of debt financed with intercompany loans. In particular, the tax-rate differential should exert a positive effect. The existence of a significant impact of the local tax rate, however, hinges also on the conditions at the lending market. For instance, if the local lending market is favorable, the advantage of using external debt might directly be exploited without the use of intercompany loans.

## 4 Data and Investigation Approach

A basic problem in the empirical analysis of the tax effects on corporate decisions is to formulate an approach which shows sufficient variation in the incentives generated by the tax system. In the current study we utilize a micro-level panel dataset of German

multinationals which offers substantial variation in three dimensions:

1. A first dimension relates to the international perspective as the dataset reports the financial structure of each of the foreign affiliates of a multinational which operates in various countries. While the database considers the multinational's activities globally, the empirical analysis is based on a sample of 79 countries for which reliable information with regard to corporate income taxation is available to this study on an annual basis.
2. Another dimension which offers variation in the tax conditions is the time dimension. The panel data covers each multinational's activities on an annual basis in the period from 1996 until 2004.
3. The third dimension is related to the heterogeneity of the multinational corporations which differ in the lowest-tax corporation.

In order to test the empirical implications as outlined in the previous section, we employ a micro-level dataset for German multinationals (MiDi) provided by the Bundesbank. This contains a comprehensive annual database of foreign direct investment positions of German enterprises held abroad. The data provides information about each foreign affiliate's balance sheet and some further information about the ownership and about the German investor. In its current version, firm-level panel data for foreign affiliates are available for the period 1996 to 2004.<sup>3</sup> Each German multinational has to report its foreign assets, including both directly and indirectly held FDI, conditional on some lower threshold level for mandatory reporting.<sup>4</sup> Basically, the estimation sample comprises balance sheet information of virtually all German outbound investments from 1996 to 2004, regardless of the

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<sup>3</sup>Data collection is enforced by German law, which determines reporting mandates for international transactions as part of the Law on Foreign Trade and Payments and corresponding regulations.

<sup>4</sup>Since 2002 FDI has to be reported if the participation is 10% or more and the balance-sheet total of the foreign object is above 3 million euro. For details see Lipponer (2006). Though previous years showed lower threshold levels, we apply this threshold level uniformly for all years in the panel.

legal form, whether directly or indirectly held, or whether subsidiaries are wholly or only partly owned. While the dataset reports the capital share of intercompany loans received by foreign affiliates, comparable information is not available for the German parent. As a consequence, the focus of the study is on the capital structure of foreign affiliates.

With regard to the lending part of intercompany loans, the dataset distinguishes intercompany loans received from the parent as well as intercompany loans received from other foreign affiliates.<sup>5</sup> This allows us to restrict the focus of the empirical analysis even more closely to intercompany loans granted as well as received by foreign affiliates, since, as Germany is a high-tax country, there is little reason to expect German parents to issue intercompany loans to its foreign affiliates because of tax reasons.

Figure 1 provides a graphical illustration for a multinational corporation with two foreign affiliates, where the parent as well as one affiliate are located in high-tax countries but a third affiliate is located in a low-tax country.<sup>6</sup> In this setting, intercompany loans granted by the low-tax foreign affiliate might be used to shift profits into the low-tax country. While this might involve loans to the parent as well as to the high-tax foreign affiliate, the focus of the current paper is only on the relationship with the latter. As a consequence of this focus, the empirical analysis is concerned with multinational corporations with affiliates in more than one foreign country – binational corporations are excluded.

As we focus on intercompany loans granted as well as received by foreign affiliates, we implicitly assume that the taxing conditions for these foreign affiliates are decisive for the company group. This might be questioned in a context where the parent company would have to pay taxes on worldwide profits, as in a regime of tax crediting. However, note that for German multinationals as well as for most other European multinationals

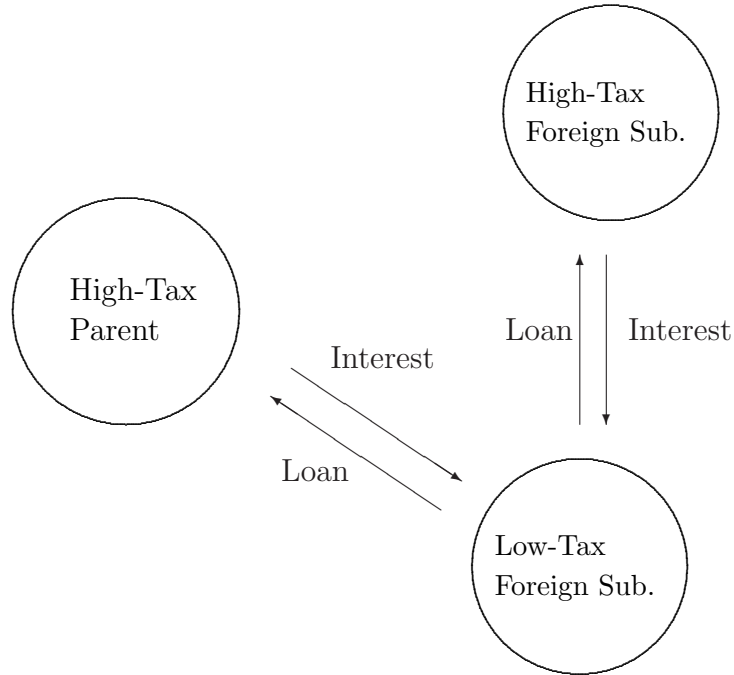
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<sup>5</sup>The corresponding position is “...liabilities to affiliated enterprises ... outside of Germany” (see Lipponer, 2006).

<sup>6</sup>The company structure can be, of course, much more complicated in the data. On average we observe about 5 foreign subsidiaries per multinational in our corresponding estimation sample.

the exemption principle applies. This could be different in the U.S. case, where foreign earnings are taxed subject to a foreign taxes credit. However, recent literature argues that the anti-abuse controlled foreign corporation (CFC) provisions is not effective (*e.g.*, Mutti and Grubert, 2006). Thus, tax planning of U.S. corporations might be similar.

Figure 1: Intercompany Loans in a Stylized Multinational Group



Since taxing conditions vary in more than one dimension, we can further exploit the micro-level structure of the data-set and explore the capital structure of multinationals using panel-data techniques. Following our discussion of the empirical implications, the analysis is based on regressions of the following type

$$ICL_{i,k,t} = a_1(\tau_{i,t} - \tau_{k,t}^{min}) + a_2\tau_{i,t} + a_3x_{i,k,t} + \varphi_t + \gamma_k + \varepsilon_{i,k,t}, \quad (7)$$

where  $(\tau_{i,t} - \tau_{k,t}^{min})$  is the specific tax-rate difference and  $\tau_{i,t}$  is the statutory tax rate applicable to affiliate  $i$ . The dependent variable,  $ICL$ , is defined by the amount of intercompany

loans received by a foreign affiliate from other foreign affiliates divided by total capital consisting of registered capital, capital reserves, profit reserves, as well as internal and external debt.

Note that the basic specification includes time effects,  $\varphi_t$ , possibly capturing differences in the treatment of foreign earnings in the home country (Germany) of the multinational and other aggregate shocks. The specification also takes account of a specific effect for each multinational,  $\gamma_k$ . This is important in the current context since corporation specific risk might shift the agency costs (Desai, Foley, and Hines, 2004a). We also employ some affiliate-specific control variables,  $x_{k,i,t}$ , which capture some heterogeneity in the agency costs across affiliates. Agency costs might also be related to country-specific conditions in the lending market such as bankruptcy laws, creditor rights, etc. This would suggest to further include country-specific effects. Finally, since agency costs may also vary with the branch of the affiliate, sector-specific effects could also be included.

## 5 Descriptive Statistics

Table 1 provides some information about the basic characteristics of the sample of multinationals. Three different samples are distinguished: the full sample comprises all foreign-direct-investment observations available. A reduced sample excludes all binational corporations and considers only affiliates where information about the local tax rate was available. Whereas we use information also from the second sample in order to compute the lowest tax rate within the group, the third is the ultimate estimation sample.

Table 1 reports the capital of all considered affiliates where a significant share is held by the reporting multinational. Comparing the aggregate stock of capital in the first and second sample we see that even if many countries are excluded in this second sample, still between 80 % and 90 % of all reported capital is covered in the reduced sample.

Table 1: Sample Characteristics

Sample	Obs.	Countries	Capital (in bn €)	Share
(1) all available obs.	173,473	162	4,133.33	1
(2) tax data available excl. binational corp.	133,159	74	3,555.56	0.86
(3) as in (2) excl. zero turnover	109,300	74	981.11	0.24

Capital consists of registered capital, capital reserves, profit reserves, as well as internal and external debt. The total capital figure is an unweighted annual average for the period from 1996 to 2004. Sample (1) comprises all observations available from Bundesbank Data (Outbound Investment), Sample (2) employs all affiliates where corporate tax rate information was available and excludes binational corporations, Sample (3) further excludes all observations with zero turnover.

This is different with the third sample, which is the basic sample for the regression analysis below. This sample further excludes affiliates with zero turnover. While this restriction implies a considerable decline in the number of observations, it implies that we focus on the capital structure of productive affiliates as in the above theoretical model. However, note that our estimation results are robust against the inclusion of affiliates with zero turnover.

As has been discussed above, we employ affiliate- and group-specific indicators of the tax incentive for profit shifting. More specifically, we proceed in two steps. First, we determine for each multinational the lowest corporate income-tax rate observed among all of its foreign affiliates. (For ease of exposition we will refer to the corresponding affiliate as the lowest tax affiliate.) In a second step, we use this group-specific minimum tax rate as the benchmark for the group and compute the tax-rate differential of the local tax rate to this benchmark tax rate for each of the affiliates. As a consequence, high-tax affiliates will show large positive tax-rate differentials, whereas the tax-rate differential for the lowest-tax affiliate is zero.

Note, however, that the tax-rate differential with regard to the lowest-tax affiliate is not

determined on basis of the estimation sample but on basis of the more comprehensive sample (2) of Table 1. In other words, while we focus on the finances of the productive entities of multinational corporations, we take into account in a much more comprehensive way the incentives for profit shifting and include the incentives for using intercompany loans in order to shift profits to purely non-productive tax-haven affiliates.

Table 2 provides some information about which countries typically host the lowest-tax affiliates. The first column lists the number of all affiliates reported in each of the countries. The second column,  $\Delta\tau = 0$ , lists all observations where the respective country hosts the lowest-tax affiliate. While we see that most affiliates are reported in the U.S., in UK, and in France, the lowest-tax affiliate is quite often found in countries like Switzerland, Hungary, Poland, and Austria. Table 3 displays descriptive statistics for variables used in the empirical analysis. While the tax rate variable is measured at the level of the country, all other variables vary by affiliate.

A first impression of the relative importance of debt as a means of profit shifting as compared to the standard tax shelter from debt is given by the three different borrowing variables. While the total leverage is almost 60 %, intercompany loans make up only 24.2 %. This figure still includes intercompany loans from the German parent to foreign affiliates which, given Germany's high tax rate, is quite unlikely related to profit shifting. Intercompany loans received from other foreign affiliates amount only to an average capital share of 10.6 %. Given the limited information in the balance sheet of the affiliates, only two direct control variables are included initially. Since the effective tax reduction from using debt might be zero if a affiliate carries forward any losses for tax purposes (see MacKie-Mason, 1990), we include a variable indicating whether some loss carry-forward is reported. Some specifications will also include the turnover of the affiliate since a larger cash-flow might be associated with less credit-market constraints and, hence, might facilitate access to external credits.

Table 4 provides further descriptive evidence for the impact of taxes on intercompany loans.

Table 2: Geographical Distribution of Subsidiaries

Country	obs.	$\Delta\tau = 0$	$\tau$	Country	obs.	$\Delta\tau = 0$	$\tau$
Albania	6	0	.273	Korea (Republic of)	1,045	198	.301
Argentina	774	54	.346	Latvia	132	53	.229
Australia	2,384	190	.338	Lithuania	134	75	.232
Austria	7,356	1,326	.340	Luxembourg	1,910	349	.356
Bahamas	16	16	.000	Malaysia	878	197	.283
Bangladesh	42	0	.350	Malta	79	11	.350
Belgium	4,058	233	.388	Mexico	1,576	76	.343
Belize	0	0	.279	Netherlands	7,268	946	.348
Bermuda	187	187	.000	New Zealand	385	11	.330
Bolivia	23	1	.250	Norway	1,026	273	.280
Brazil	2,767	617	.321	Pakistan	123	7	.347
Bulgaria	250	66	.293	Panama	78	0	.353
Canada	2,176	75	.418	Papua New Guinea	0	0	.263
Cayman Islands	490	490	.000	Paraguay	33	12	.300
Chile	474	261	.157	Peru	160	11	.297
China	2,944	260	.330	Philippines	300	16	.328
Columbia	275	2	.350	Poland	4,482	1,828	.311
Costa Rica	55	4	.307	Portugal	1,688	355	.321
Croatia	353	81	.265	Romania	500	126	.308
Cyprus	323	72	.228	Russia	932	258	.301
Czech Republic	4,137	947	.333	Serbia&Montenegro	0	0	.193
Denmark	1,821	279	.318	Singapore	1,928	516	.250
Dominican Republic	51	10	.250	Slovak Republic	968	280	.319
Ecuador	99	10	.322	Slovenia	333	113	.250
El Salvador	36	7	.250	South Africa	1,177	34	.397
Estonia	127	116	.116	Spain	6,598	254	.395
Fiji	0	0	.336	Sri Lanka	49	11	.359
Finland	759	96	.286	Sweden	2,357	666	.280
France	11,473	880	.372	Switzerland	6,922	4,339	.246
Greece	831	63	.350	Taiwan	545	81	.250
Honduras	23	7	.284	Thailand	502	75	.300
Hong Kong	1,840	1,173	.163	Turkey	1,020	66	.367
Hungary	3,126	2,199	.178	Turks&Caicos Isl.	0	0	.000
Iceland	13	1	.267	UK	11,425	3,560	.308
India	951	45	.364	Ukraine	197	19	.290
Indonesia	429	67	.300	Uruguay	143	34	.311
Ireland	1,546	1,271	.106	USA	14,376	1,599	.412
Israel	160	7	.360	Venezuela	255	27	.340
Italy	6,887	254	.405	Vietnam	65	1	.294
Japan	2,317	15	.457	<i>Total</i>	<i>133,159</i>	<i>27,854</i>	<i>.288</i>

obs.: total number of observations (total number of investments, pooled);  $\Delta\tau = 0$ : observations with a tax-rate difference equal to zero, i.e these affiliates identified as low-tax affiliates;  $\tau$ : average statutory tax rate.

Table 3: Descriptive Statistics

Variable	Mean	Std. Dev	Min	Max
Statutory tax rate	.334	.073	0	.532
Tax rate diff. within comp. group	.124	.106	0	.532
Total leverage	.588	.272	0	1
Intercompany loans				
– total	.242	.251	0	1
– excluding loans from German parent (ICL)	.106	.197	0	1
Loss carry-forward	.310	.463	0	1
Majority owned affiliate	.158	.365	0	1
Wholly owned affiliate	.721	.449	0	1
ln(Turnover)	9.79	1.40	<sup>a)</sup>	<sup>a)</sup>

Panel comprises 9 years, 109,300 observations. Tax rate differential is the difference between the statutory tax rate at the affiliate's location and the minimum tax rate available for a corporation group. <sup>a)</sup> confidential data

Table 4: Leverage and Intercompany Loans

Sample:	(1) basic sample	(2) 10%-percentile	(3) 5%-percentile	(4) $\Delta\tau = 0$
Total leverage	.588	.570	.547	.576
External debt	.346	.312	.313	.366
Intercompany loans				
– total	.242	.259	.234	.210
– excluding loans from German parent	.106	.138	.149	.077
<i>Observations</i>	<i>109,300</i>	<i>38,400</i>	<i>16,061</i>	<i>22,908</i>

10 % percentile (5%-percentile): all groups with an affiliate located in one of the low tax countries, where a low tax country is defined as a country with a statutory tax rates below the 5% (10%) percentile;  $\Delta\tau = 0$  refers to all those foreign affiliates with the lowest tax rate within the group.

It displays the share of capital financed with different types of debt for the basic sample as well as for various sub-samples. For ease of comparison, Column (1) repeats the mean values as reported above. Columns (2) and (3) report the share of intercompany loans observed among the affiliates of those multinational corporations which hold at least one affiliate in a low-tax country. Column (2) defines the low-tax country as a country with a tax rate below the 10 % percentile of the tax-rate distribution, Column (3) uses the even stricter definition based on the 5 % percentile of the tax rate distribution. If corporations use intercompany loans for profit shifting we should expect the mean to be higher for those multinational corporations. In fact, the capital share of intercompany loans (excluding those obtained from the German parent) is higher by about 40 %, indicating that the use of intercompany loans is much more prevalent among multinationals with affiliates in low-tax countries. Conversely, the affiliate experiencing the lowest tax rate within the group should display a much lower capital share of intercompany loans. As reported in Column (4), the mean capital share for those affiliates is lower by more than 25 %. This confirms the theoretical view as there should be little incentive to shift profits out of those countries.

## 6 Basic Results

Table 5 reports basic results. In order to control for group-specific risks all estimations employ fixed effects for the company group. Moreover, time dummies are included in order to capture differences in the taxation of the parent. Throughout the different specifications, the tax-rate differential shows a significant positive effect, whereas the host-country tax rate proves insignificant. This confirms the theoretical prediction in the sense that corporations use intercompany loans to shift profits. At the same time, the insignificance of the tax rate indicates that the intercompany loans between foreign affiliates do not play an important role in minimizing the cost of capital. Given the magnitude of this other type of intercompany loans (*cf.* Table 3), this function might well be carried using loans from the German parent.

Table 5: Basic Results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Tax rate diff. within comp. group	.069 ** (.017)		.069 ** (.019)	.067 ** (.019)	.068 ** (.019)	.068 ** (.018)	.068 ** (.018)	.065 ** (.018)	.065 ** (.018)
Statutory tax rate		.065 ** (.021)	-.001 (.027)	-.007 (.026)	.001 (.026)	-.006 (.025)	-.004 (.025)	-.034 (.027)	-.037 (.027)
Loss carry-forward				.031 ** (.003)	.030 ** (.003)	.033 ** (.003)	.033 ** (.003)	.033 ** (.002)	.032 ** (.002)
(ln)Turnover					-.004 ** (.001)		-.001 (.001)		-.005 ** (.001)
R-Sq	.001	.001	.001	.007	.008	.032	.032	.050	.050
Industry effects	no	no	no	no	no	yes	yes	yes	yes
Country effects	no	no	no	no	no	no	no	yes	yes

Dependent variable: Share of internal debt to other non-German affiliates. Robust standard errors in parentheses, a star denotes significance at 10 % level, two stars at 5 %. 109,300 observations, 4,215 firms. All estimates include a full set of company level and time fixed effects. We also allow for country-year cluster effects.

Qualitatively, there is not much difference between different specifications. Column (4) includes a control for a loss-carry forward as the incentive to shift profits is reduced in this case. The positive sign possibly reflects the substitutive relationship to external debt (Desai *et al.*, 2004a). This would also explain the negative sign for turnover which is taken into account in Column (5). The specifications in columns (6) to (9) additionally employ industry-level dummies following a classification of affiliates according to 71 industries. This might help to further control for differences in the financial risk related to an affiliate's activities. Columns (8) and (9), finally, use controls for the country in order to make sure that no country-specific characteristics are driving the results. While the results prove to be robust, some part of the variation is swallowed up by the country-specific dummies. Hence, we would consider Column (7) of Table 5 as the preferred specification.

Since in many cases the amount of intercompany loans received by an affiliate is zero, Table 6 reports results where those observations are excluded. However, the results show only minor differences.

Quantitatively, we see from the preferred specification (7) of Table 5 that a ten percentage point increase in the tax-rate difference to the group-specific "tax haven" leads to an approximately 0.68 percentage point higher internal debt ratio. Expressed as a semi-elasticity, a tax rate difference by ten percentage points triggers a response in the leverage by 6.4 percent. This figure is not much different from existing estimates of the tax sensitivity of debt. Corresponding calculations based on the estimates by Desai *et al.* (2004a) yield a semi-elasticity of 10.2 % (5.5 %) for the tax sensitivity of the affiliate leverage related to internal (external) debt. The findings of Buettner *et al.* (2006) suggest a corresponding semi-elasticity of 6.2% (5.1 %).

In order to get an impression of the magnitude of the effect on the tax base, consider a case of an affiliate with a stock of capital of € 1 Mill. Suppose (pre-tax) profits are € 200,000. Using the mean leverage figure in the database we would expect the affiliate to receive an intercompany loan of about € 106,000. Furthermore, let us assume a lending

Table 6: Results for Non-Zero Leverage Observations

	(1)	(2)	(3)	(4)	(5)	(6)
Tax-rate diff. within comp. group	.043 *	.046 *	.056 **	.057 **	.055 **	.056 **
	(.025)	(.025)	(.024)	(.024)	(.023)	(.023)
Statutory tax rate	.013	.055	.009	.038	-.027	-.03
	(.036)	(.037)	(.034)	(.035)	(.040)	(.040)
Loss carry-forward	.044 **	.039 **	.046 **	.042 **	.044 **	.039 **
	(.003)	(.004)	(.003)	(.004)	(.003)	(.003)
(ln)Turnover		-.018 **		-.012 **		-.018 **
		(.001)		(.001)		(.001)
R-sq	.010	.020	.050	.054	.073	.082
Industry effects	no	no	yes	yes	yes	yes
Country effects	no	no	no	no	yes	yes

Dependent variable: share of internal debt to other, non-German affiliates. Robust standard errors in parentheses, a star denotes significance at 10 % level, two stars at 5 %. 66,781 observations, 3,146 firms. All estimates include a full set of company level and time fixed effects. We also allow for country-year cluster effects.

rate of 20%. Deduction of interest costs reduces the tax base by € 21,200, or 10.6%. Suppose now that the corporation opens up a tax-haven affiliate, where the corporation tax equals zero. Then, assuming the multinational's previous tax-rate difference is equal to the sample mean and the local statutory tax rate is equal to the mean value, the tax-rate difference increases by 21 percentage points (33.4%-12.4%). Our elasticity suggests that in this case, the intercompany loan would be increased by € 14,280 ( $0.068 \cdot 0.21 \cdot € 1,000,000$ ). Consequently, the high-tax country's tax base further declines by € 2,856 or 1.6%.

Suppose another example, where we observe a tax reform in the host-, or high-tax country. Let us assume that the tax rate declines by ten percentage points. Then, the intercompany loan would decrease by € 6,800 ( $0.068 \cdot 0.1 \cdot € 1,000,000$ ). In this case, the high-tax country tax base increases by € 1,360 or 0.8%.

## 7 Results for Different Shares of Ownership

The rather small effects might be taken to indicate that there are some important costs or restrictions which prevent them from using profit-shifting loans more aggressively. For instance, host countries might enact specific policies which restrict the use of intercompany-loans. However, it is difficult to quantify the role of those restrictions. In fact, it proved impossible to augment the current analysis based on almost 80 countries with an indicator of the existence of corresponding rules such as thin-capitalization- or earnings-strippings rules.

An alternative explanation, however, might be that firms are exposed to strongly increasing agency costs if they make more use of intercompany loans. While agency costs are basically unobservable, some of its potential determinants can be observed. Desai et. al (2004b) argue that shared ownership of foreign affiliates is associated with costs which may arise because of the coordination of different interests between more than one firm. Also Mintz

and Weichenrieder (2006) report a higher tax-rate sensitivity of intercompany loans for wholly owned subsidiaries. In order to test the hypothesis that the sensitivity with regard to the tax-rate differential will increase with the agency costs, at least indirectly, we include dummies and interaction terms for majority- and wholly-owned subsidiaries, respectively. If the agency costs related to intercompany loans exhibit a smaller gradient if the ownership share is higher, we would expect a higher tax-rate sensitivity when taking into account only majority holdings, and an even higher sensitivity for the wholly-owned subsidiaries.

In order to test for differences in the sensitivity of intercompany loans to profit-shifting opportunities captured by the tax-rate differential, we augment the above estimation approach (7) by interaction terms with dummies capturing the ownership share.<sup>7</sup>

Table 7 shows results for our basic sample. For ease of comparison, the first column repeats the basic result as displayed in Column (6) of Table 5. Column (2) reports results where we augment the basic approach with dummy variables for the ownership share. Both dummy variables are highly significant, pointing at an increased use of intercompany loans at majority and wholly-owned subsidiaries. Note that the definition for majority owned subsidiaries does not include wholly-owned subsidiaries. As a consequence, the results indicate that wholly-owned (partly-owned) subsidiaries show an about 5 (2) percentage point higher capital share financed with intercompany loans from other affiliates than subsidiaries without a majority participation.

Column (3) reports results where also the tax-rate differential is interacted with the two dummy variables for the ownership share. In fact, the results support significant differences in the tax-rate sensitivity. While the sensitivity with regard to the tax-rate differential shows a negative effect for minority participation, a positive effect is supported for majority owned subsidiaries. The tax rate sensitivity for wholly-owned subsidiaries, however, is

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<sup>7</sup>Dummies are preferred against a continuous interaction term for the ownership share since the distribution of the ownership share shows strong concentrations at the 51 % and 100 % thresholds. However, qualitatively, the results of corresponding estimates showed no major differences.

Table 7: Intercompany Loans and Ownership

	(1)	(2)	(3)	(4)	(5)
Tax-rate diff. within comp. group	.068 ** (.018)	.065 ** (.018)	-.099 ** (.022)	-.110 ** (.022)	-.105 ** (.022)
Tax-rate diff. × majority owned			.114 ** (.020)	.117 ** (.023)	.127 ** (.023)
Tax-rate diff. × wholly owned			.203 ** (.018)	.220 ** (.020)	.208 ** (.020)
Statutory tax rate	-.004 (.025)	.007 (.024)	.005 (.023)	.028 (.030)	.006 (.037)
Statutory tax rate × majority owned				.026 (.033)	.010 (.033)
Statutory tax rate × wholly owned				-.038 (.035)	-.052 (.033)
(ln)Turnover	-.001 (.001)	-.001 (.001)	-.001 (.001)	.001 (.001)	-.003 ** (.001)
(ln)Turnover × majority owned				-.005 ** (.002)	-.005 ** (.001)
(ln)Turnover × wholly owned				-.002 (.001)	-.002 (.001)
Majority owned (share > 51%)		.020 ** (.002)	.003 (.003)	.047 ** (.018)	.052 ** (.018)
Wholly owned (share = 100%)		.051 ** (.002)	.022 ** (.003)	.049 ** (.018)	.049 ** (.018)
Loss carry-forward	.033 ** (.003)	.034 ** (.003)	.031 ** (.003)	.031 ** (.003)	.031 ** (.002)
R-sq	.032	.040	.042	.042	.057
Industry effects	yes	yes	yes	yes	yes
Country effects	no	no	no	no	yes

Dependent variable: share of internal debt to other non-German affiliates. Robust standard errors in parentheses, a star denotes significance at 10 % level, two stars at 5 %. 109,300 observations, 4,215 firms. All estimates include a full set of company level and time fixed effects. We also allow for country-year cluster effects.

substantially higher. Adding up coefficients we find that the coefficient with regard to the tax rate differential is about 0.104 for wholly-owned subsidiaries. This indicates that a ten percentage point increase in the tax-rate difference to the group-specific “tax haven” leads to an approximately 1 percentage point higher internal debt ratio. Expressed as a semi-elasticity evaluated at a mean leverage figure of .120, a tax-rate change by ten percentage points triggers a response in the leverage by about 8.7 percent.

From the theoretical discussion we know, however, that the agency-cost function may affect not only the sensitivity with regard to the tax-rate differential but the sensitivity with regard to all other indicators of the relative cost of equity and intercompany loans. Therefore, columns (4) and (5) report results where the other explanatory variables are interacted with the ownership-share dummy variables as well. However, most of these interaction terms are insignificant and the results on the sensitivity with regard to the tax-rate differential prove to be robust.

In order to get an impression of how much the magnitude of the effect on the tax base is increased with wholly-owned subsidiaries, let us again consider a case of a subsidiary with a stock of capital of € 1 Mill. Using a mean leverage figure for wholly-owned corporations, we would expect such a subsidiary to receive an intercompany loan of about € 120,000. At a lending rate of 20%, deduction of interest costs reduces the tax base by € 24,000, or 12%. Suppose now that the tax rate faced by the subsidiary is decreased by 10 percentage points. Our elasticity suggests that in this case, the intercompany loan would be reduced by € 10,400 ( $0.104 \cdot 0.1 \cdot € 1,000,000$ ). Consequently, the tax base in the high-tax country would be increased by € 2,080 or 1.2 percent. Although this is a stronger effect than the one obtained for the basic estimates it still appears to be a rather small effect.

## 8 Conclusions

We have set up a model of a multinational corporation which uses intercompany loans for two purposes. The first is to minimize cost of capital by making use of external credit and engaging in arbitrage across affiliate locations. The second is to shift income to low-tax jurisdictions. The theoretical analysis shows that the first purpose suggests that the leverage will be affected by the after-tax lending rate. The second purpose, however, causes the leverage related to intercompany loans to depend on the tax-rate differences across the locations at which the multinational corporation carries out production. Only this type of response is indicative of profit shifting. Therefore, existing empirical evidence on the tax sensitivity of debt even if related to multinationals is not revealing the importance of profit-shifting activities.

Our empirical investigation studies whether in fact the tax-rate difference within a multinational group will help to predict the leverage of multinationals related to intercompany loans. The analysis makes use of a large micro-level panel dataset of virtually all German multinationals made available for research by the Bundesbank. This comprehensive dataset allows us to exploit differences in the taxing conditions in 79 countries, among those many tax-haven countries. For each affiliate within the multinational group we calculate the appropriate tax-rate difference relative to the lowest tax rate observed among all affiliates.

The empirical results strongly support a significant impact of the tax-rate differential on intercompany loans. The results indicate that the sensitivity of intercompany loans to tax-rate differences is slightly larger than the tax sensitivity of debt finance as reported in existing studies. Nevertheless, our results suggest that the implied magnitude of tax-revenue losses is rather modest.

This finding is indicative for substantial agency costs of intercompany loans. Our analysis for different ownership shares supports this hypothesis as it shows that the tax-sensitivity becomes stronger for wholly-owned affiliates. As a consequence, restrictions on the internal

finances of multinationals might be much more distorting than is conventionally assumed by tax policy makers.

## Datasources and Definitions

**Firm-level data** are taken from the micro-level dataset of the Bundesbank, see Lipponer (2006) for an overview. Our dependent variable, ICL, is determined by a balance-sheet position capturing liabilities to affiliated enterprises outside Germany divided by the total stock of capital. The latter is defined as consisting of registered capital, capital reserves, profit reserves, as well as internal and external debt.

**Corporate taxation** data are taken from the IBFD, and from tax surveys provided by the tax advisory companies Ernst&Young, PwC and KPMG. The statutory tax rate variable contains statutory profit tax rates modified by applicable restrictions on interest deductions. The data covers a group of 79 countries in a period of nine years from 1996 until 2004.

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