Corporation Taxes and the Debt Policy of Multinational Firms – Evidence for German Multinationals

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Abstract: This paper analyzes the impact of corporate taxes on the capital structure of foreign subsidiaries of multinational firms. The empirical investigation employs a large micro-level panel dataset of German multinationals covering 31 countries over a 10-year period. A special feature of this dataset is that it allows us to distinguish between internal and external debt financing. Our results confirm a positive effect of local tax rates on both types of debt. Moreover, while adverse local credit market conditions are found to reduce external borrowing, internal debt is increasing, supporting the view that the two channels of debt finance are substitutes. Our findings suggest that internal credit markets give rise to significant advantages and enhance multinationals' opportunities to use debt as a tax shield.

1   Introduction

In the presence of international tax rate differentials, multinational firms will tend to allocate external debt to high taxed affiliates in order to increase the tax savings from interest deduction (interest tax shield). Additionally, as a particular feature of multinationals' tax planning, not only external debt but also internal debt is available. Internal debt can be employed to transfer external debt within the group as well as to shift profits away from high taxed affiliates to low taxed companies of the group, granting the group access to the lowest internationally available profit tax rates. Given that internal loans are not subject to substantial economic frictions, internal debt might be the more flexible and the more tax sensitive debt instrument.

Several empirical studies have analyzed the impact of taxes on the overall capital structure of affiliates of multinational firms. Recently, Huizinga, Laeven, and Nicodème (2008) who use data of European affiliates find a semi-elasticity of the total leverage of about 0.435, which means that a 10 percentage point increase in the statutory profit rate is associated with a 4.35 percent increase in total leverage. Though internal debt enhances the multinationals' financing and tax planning opportunities, the choice of external and internal debt has been rarely addressed in empirical studies. Altshuler and Grubert (2003) use cross-section data of US-controlled affiliates and find a slightly higher tax elasticity of external debt. While this study only considers a small set of non-tax determinants of capital structures, Desai, Foley, and Hines (2004) show that external and internal debt of US multinationals' affiliates are substitutes and that internal debt is particularly sensitive to host country tax rates when considering a larger set of factors influencing the financial decision.

However, the results of empirical studies that are based on data of US multinationals cannot be directly compared with the results of studies based on data of European multinationals, because the taxation of a multinational's foreign source income at the parent's level may affect the tax incentive to use debt financing. In the US, distributed profits of a foreign affiliate are burdened with corporate income tax of the parent company while the parent company can claim a tax credit for the foreign taxes (credit system). As a result, gains from debt financing of foreign affiliates tend to be eliminated by the corporate income tax of the parent company. In Germany, as in most European countries, on the other hand, distributed profits of foreign affiliates are exempted from corporate income taxation at the level of the parent company (exemption system).[1] Consequently, tax savings of the affiliates due to debt financing are not eliminated by the parent's corporate income tax. Therefore, the incentive to use debt is expected to be particularly high for affiliates of a parent company subject to the exemption system.

For German multinationals, Mintz and Weichenrieder (2009) have confirmed an impact of host country taxes on internal debt, but they do not find any statistically significant tax effect of host country taxes on external debt for foreign affiliates of German parents. This is somewhat puzzling, given that external debt creates a tax shield and given that German multinationals do not experience a tax incentive to shift profits to the high tax country Germany via internal debt. Moreover, the potential gains from internal lending by affiliates located in low tax countries may be restricted by the German CFC legislation, which is, as Ruf and Weichenrieder (2008) show, quite effective. Recently, Buettner, Overesch, Schreiber, and Wamser (2009) have analyzed the tax sensitivity of the capital structure of

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[1] Under a German double tax treaty distributed profits of foreign subsidiaries are tax exempt at the corporate parent's level. Since 2001, exemption is granted by German tax law, subject to five percent of the dividends being taxed.

German multinationals. They have found a significant positive impact of host country taxes on both internal and external debt financing. However, their analysis does not pay very much attention to the non-tax determinants of the financing decisions of foreign affiliates. Our paper reconsiders the impact of taxes and lending conditions on the tax sensitivity of different types of debt by using data of German multinationals. The empirical investigation is based on a panel dataset made available by the German central bank (Deutsche Bundesbank), which provides information about virtually all German outbound investments. One of the favorable aspects of the data is that it contains information not only on total debt but allows us to distinguish between internal and external debt. Thus, we are able to analyze whether internal and external debt respond differently to taxes. Moreover, compared to previous studies using German firm-level data, we significantly extend the set of control variables to additional determinants of capital structures.[2] A rich set of control variables improves the reliability of the estimated tax effects if variables omitted in previous studies should be correlated with taxes.

Our results confirm a positive effect of local tax rates on both external and internal debt. Particularly, our results suggest that internal debt is significantly more sensitive to taxes than external debt, supporting the view that internal debt is generally more flexible. Furthermore, we find significant effects of various non-tax variables. As to the impact of capital market variables, external debt is reduced if borrowing costs and capital market conditions turn unfavorable, whereas internal debt is increased. This supports the view that the two channels of debt finance are substitutes and multinational companies can circumvent unfavorable lending conditions by financing subsidiaries with internal debt.

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[2] In addition to the statutory tax rate we take into account up to nine control variables for the determinants of the capital structure, while the recent study by Buettner et al. (2009), for example, includes only three additional controls.

The rest of the paper is organized as follows. In Section 2, we briefly outline the potential tax and non-tax determinants of the capital structure choice. A description of the dataset and the investigation approach is provided in Section 3. The results of the empirical analysis are presented in Section 4. Section 5 concludes.

2   Theoretical Views on Taxation and Multinationals' Debt Policy

2.1   Taxation and Capital Structure Choice

Modigliani and Miller (1958) demonstrate that financing does not affect firm value if the capital market is perfect. Following this logic, once imperfections are taken into account, as for instance corporate taxes, the capital structure choice matters. This view basically applies to domestic as well as to multinational firms, but nevertheless, the multinational firm is different. Indeed, the international presence of these firms provides various cross-country arbitrage opportunities to overcome local credit market weaknesses and additional scope for tax planning by using internal debt. This implies, firstly, that the multinational firm has more options in terms of financing flexibility (see Bancel and Mittoo, 2004). Secondly, the motivation to use internal debt may, in some cases, differ from using external debt, and, consequently, both variables may vary in their response to variations in exogenous determinants.

One obvious benefit of using debt finance is that associated interest expenses are tax deductible from corporate profits, while equity payments are not. As a result, the value of a firm depends on its leverage, because the debt tax shield adds to firm value (see Myers, 2001; Auerbach, 2002; Graham, 2003). Given a multinational company's total capital, the firm responds to affiliates' host country tax rates by shaping the capital structure of the

group. To increase the debt tax shield, debt capital should be allocated to high taxed affiliates. This allocation conforms to the trade-off theory of the capital structure, which proposes that companies balance the (marginal) costs (*e.g.*, agency costs) and the (marginal) benefits of debt financing when deciding on the capital structure (Kraus and Litzenberger, 1973; Jensen and Meckling, 1976; Meyers, 1977). Moreover, taxes trigger liquidity effects. High corporate income taxes negatively impact on available internal funds. The lack of internal funds of a high taxed affiliate could be compensated by surplus internal funds of a low taxed affiliate, transferred to the high taxed affiliate via internal debt. A high taxed affiliate, suffering from insufficient internal funds, could also use external debt to finance its investments. These liquidity effects of taxes are in line with the pecking order theory of corporate finance (Myers and Majluf, 1984), which suggests that firms use internal funds first, followed by debt and equity. From a tax perspective, debt financing could thus be driven by the allocation effect as well as by the liquidity effect of host country taxes. However, in our empirical analysis, we do not attempt to sort out which of the two effects does better explain the results.

Under the German exemption system of the corporate income tax, we expect all types of foreign affiliates to respond to the host country's corporate income tax rate. As to external debt, the group's corporate income tax savings due to interest deductibility are increased by allocating external debt to high taxed affiliates. External debt borrowed under favorable market conditions may be transferred via internal debt to a subsidiary with a higher tax rate. Moreover, internal debt can be used to transfer profits from the borrowing affiliate to the lending affiliate located in a low tax country. Interest income from internal lending is subject to tax at the level of the lending entity. If an intercompany loan is financed with a bank loan, rather than with equity, there are offsetting costs of interest as well. At any rate,

variation in the host country tax rate of the borrowing entities affects the incentive to use internal debt irrespective of the tax rate imposed on the interest income at the lending entities.[3]

Internal debt is tax-efficient as long as the German CFC rules do not apply. This is the case (i) if internal debt is refinanced by external debt or (ii) if internal debt is refinanced by equity and the tax rate of the refinancing affiliate is above the CFC minimum threshold. Since multinationals are able to channel both external debt and equity capital to foreign affiliates via internal debt, we expect that internal debt responds to host corporate income tax rates. Finally, internal debt is possibly more tax sensitive than external debt, since it is the more flexible debt instrument.

Tax benefits of deductible interest payments may be less relevant if significant non-debt tax shields are available (see DeAngelo and Masulis, 1980). Typical examples of non-debt tax shields are depreciation allowances associated with tangible assets. The impact of non-debt tax shields is confirmed by Graham and Tucker (2006), who find evidence that other tax planning strategies of US multinationals substitute for interest deductions. The marginal tax incentive is a function of the host country statutory tax rate and the subsidiary's tax status. Therefore, a firm's loss carry-forward is another example of a non-debt tax shield reducing the general incentive to use debt. This is confirmed by MacKie-Mason (1990), who investigates tax effects on the incremental choice between debt and equity issues.

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[3] The proposition of a more pronounced tax effect under the exemption system does also hold if interest income is subject to a high tax rate as, for example, in Germany. The variation in the host country tax rate affects the incentive to use internal debt financing also if internal credit is associated with high total taxes due to the taxation of interest income.

2.2 Non-Tax Determinants of the Capital Structure

A large empirical literature has found significant effects of various factors on capital structures. Taking into account previous evidence, we consider several non-tax determinants that are likely to affect the capital structure choice. To begin with, literature finds that financing decisions are affected by firm-specific characteristics. Higher sales are positively correlated with the size of a company, and thus, are associated with favorable lending conditions regarding external borrowing (*e.g.*, Graham and Harvey, 2001; Rajan and Zingales, 1995). At the same time, a negative effect of sales on internal debt may result due to a substitution towards external debt. Moreover, the amount of collateral reduces the cost of external lending. Harris and Raviv (1990) find a positive correlation between companies' liquidation value (proxied by the fraction of tangible assets) and the optimal debt level. An increase in the liquidation value makes liquidation less costly for debt holders, who can resort to liquidation in order to attain a more effective management control. Losses may negatively impact external debt if incurring losses are associated with a low expected profitability. If losses mean, however, that the profit reserves of an affiliate go down, a loss carry-forward may be positively related to debt ratios. This view is supported by Gopalan, Nanda, and Seru (2007), who find evidence that financially weaker affiliates are supported by means of internal loans.

In an international context, any investigation of financial choices requires considering country-specific factors. Desai, Foley, and Hines (2008) argue that an important determinant of multinationals' financing decisions is the extent to which a firm is exposed to political risk. They demonstrate that political risk, including for example the risk of expropriation of assets, increases earnings volatility. As a result, foreign subsidiaries in risky environments are expected to show higher external debt to equity ratios compared to

subsidiaries in less risky countries because foreign investors try to shift risks to local lenders via external debt (see also Kesternich and Schnitzer, 2010). The capital structure choice might also be affected by the dynamic environment of the subsidiary such as host country economic growth. The effects depend on how subsidiaries finance new investments: if firms can finance investments by retained earnings, the effect of growth on total debt may be negative; if new investments are financed with debt, the effect might be positive.

One particularly relevant country variable is the local lending rate for credit to the private sector, because it captures many aspects of the local credit market. Since a high local lending rate may be associated with higher cost, it should exert a negative impact on external borrowing of the foreign affiliate. In terms of internal debt, on the other hand, we expect either no effect, because the variable is not relevant for internal borrowing, or a positive effect, because high external costs may cause substitution towards internal debt. While local lending rates may already capture differences in the countries' capital markets, there are further capital market characteristics that can have an impact on the borrowing of foreign affiliates. Some particular markets possibly provide more financial resources to the private sector. Thus, the deeper the local credit market, the easier the access to external debt. But the availability of local credit may, once again, asymmetrically affect external and internal borrowing: by substituting internal for external debt, the multinational firm can avoid the constraints associated with an underdeveloped local credit market (see Desai, Foley, and Hines, 2004). Country-specific creditor rights (La Porta, Lopez-de-Silanes, Shleifer, and Vishny, 1997) give rise to similar issues. Weak creditor rights probably result in higher borrowing costs for external debt (*e.g.*, Purda 2008) and the multinational could react by switching from external debt to internal debt. On the other hand, with collateral

and bankruptcy laws protecting the rights of creditors, a country may encourage external debt financing and, at the same time, induce a substitution away from internal debt.

As a unique feature of multinationals, internal credit markets, i.e. internal cross-border lending, can be used to overcome local capital market imperfections or affiliate-specific difficulties with respect to external debt. Given that internal loans are not subject to substantial economic frictions, internal debt is the more flexible debt instrument. We expect that the two channels of debt finance are substitutes and that multinational companies circumvent unfavorable lending conditions in the host country of an affiliate by financing the respective affiliate with internal debt. Thus, if capital market conditions in the host country turn unfavorable, external borrowing should decrease while internal debt should increase.

3 Data and Empirical Specification

The empirical analysis uses the MiDi (Micro Database Direct Investment) database made available by the German central bank (Deutsche Bundesbank). This is a comprehensive micro-level dataset providing annual firm-level panel data of German controlled foreign affiliates for the period 1996 to 2005. We consider subsidiaries located in 31 countries for which sufficient tax information and control variables are available. A list of the considered host countries can be found in Table 2. The collection of the data is prescribed by German law, which determines reporting mandates for international transactions (Lipponer, 2007). This aspect of the data is worth emphasizing, because we are able to observe virtually all German outbound investments. We do, though, only consider majority owned and directly controlled subsidiaries to avoid any conflict of interest in terms of the

investors. Moreover, we restrict our sample to incorporated subsidiaries. Because of the special tax rules applicable to holdings and financial service providers, these firms are also excluded. The upper part of Table 1 provides descriptive statistics for our sample of foreign subsidiaries.

MiDi includes information about the investment object's financial accounting data and limited further information on the type of investment and on the investor. In our analysis we consider information about total debt and additional information about internal and external debt of foreign subsidiaries. While internal debt is provided by the German parent or by any other affiliated company, external debt consists of loans from third parties. We estimate equations of the following type to analyze the determinants of debt of an affiliate in country j held by a German multinational k in period t

$$Debt_{j,k,t} = \alpha + \beta x_{j,k,t} + \gamma_k + \theta_t + \varepsilon_{j,k,t}, \qquad (1)$$

where $Debt_{j,k,t}$ denotes the debt-to-capital ratio and either refers to *Internal Debt*, *External Debt*, or *Total Debt*.[4] θ_t is a time-specific and γ_k is a group-specific effect for all affiliates held by the parent company k. Note that the time effect also captures the impact of country-specific characteristics at the parent location like the German tax system as we consider only German multinationals. The company-specific effect encompasses, for example, the company-specific opportunity cost of capital.

The vector $x_{j,k,t}$ captures further characteristics of the subsidiary which affect the use of debt or the access to credit. First of all, we use *Sales* as an indicator of the size of the subsidiary. While we expect a positive impact on external debt, a negative impact on internal debt is

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[4] Capital is defined as the sum of nominal capital, capital reserves, profit reserves, and total debt.

expected if external debt is substituted by internal debt. The variable *Loss Carry-Forward* is a dummy variable which is equal to unity if a subsidiary carries forward any losses. Furthermore, we consider *Asset Tangibility* defined as fixed assets to total assets. As discussed in Section 2, the impact of a loss carry-forward and of asset tangibility on the use of debt is ambiguous. As agency cost of debt may vary across industries, we control for further heterogeneity by including dummies for 71 industries at the level of the subsidiary.

With regard to the taxing conditions, we employ the *Statutory Tax Rate* on corporate income modified by applicable restrictions on interest deductions. Since the statutory tax rate represents the tax savings from deducting one unit of interest, we expect a positive effect on all types of debt. Regarding internal debt, interest income is subject to tax at the level of the lending entity. However, we only focus on the tax effects associated with variation in host country tax rates of the borrowing subsidiaries because our data do not provide complete information about the lending entities. Nevertheless, we can consistently estimate a marginal effect of the host country tax rate if we assume that the variation in host country taxes and in tax rates imposed on interest income is uncorrelated.[5]

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[5] We control for the variation in German tax rates over time by means of time fixed effects because all parent companies of our sample are located in Germany. Moreover, we control, to some extent, for the unobservable heterogeneity in the financial decisions of the parent companies by means of fixed effects for each company. This also takes account of more complex company structures, such as the existence of conduit companies.

Table 1: Descriptive Statistics

	Mean	Std. Dev.	Min.	Max.
Firm Characteristics:				
External Debt to Capital	.336	.233	a	a
Internal Debt to Capital	.279	.247	a	a
Total Debt to Capital	.615	.245	a	a
Sales (€ 1,000)	54,925	363,074	a	a
Asset Tangibility	.250	.233	a	a
Loss Carry-Forward	.302	.459	a	a
Country Characteristics:				
Statutory Tax Rate	.331	.071	0	.532
Lending Rate	.068	.042	.018	.364
Depreciation Allowances	.804	.045	.657	1
Private Credit	1.17	.530	.100	3.11
Corruption Perception	3.28	1.79	0	7.34
Legal Protection	5.81	1.86	2	10
GDP Growth	.026	.016	-.069	.111

47,385 observations covering subsidiaries in 31 host countries from 1996 - 2005. Firm-level variables are taken from the MiDi-database. [a] Confidential data. The *Statutory Tax Rate* is the statutory tax rate on corporate income modified by applicable restrictions on interest deductions. The data are collected from the International Bureau of Fiscal Documentation (IBFD) and from tax surveys provided by Ernst&Young, PricewaterhouseCoopers (PwC), and KPMG. *Lending Rate* refers to private sector debt taken from the IMF International Financial Statistics Yearbook (2006) augmented with corresponding OECD figures. *Depreciation Allowances* is the present value of the depreciation calculated for investments in machinery. When calculating the present value we follow assumptions made in a study on effective tax rates by the European Commission (2001) and assume a discount rate of 7.1 percent. *Private Credit* is the ratio of credits provided by banks and financial institutions to private sector to GDP. *Corruption Perception* is published annually by Transparency International, which ranks countries in terms of perceived levels of corruption as determined by expert assessments and opinion surveys; the score ranges from 0 (country perceived as virtually corruption free) to 10 (country perceived as almost totally corrupt). *Legal Protection* is an index of the legal rights of borrowers and lenders index (0=less credit access to 10=more access) taken from the World Bank's World Development Indicators. *GDP Growth* is the annual growth in GDP taken from the World Bank's World Development Indicators.

Due to the lack of information about firm-specific interest expenses, we use the country-specific *Lending Rate* for private sector debt. A higher lending rate should be associated

with less external debt, while the internal-debt ratio should rise due to substitution. We also employ the variable *Depreciation Allowances* as an indicator of the non-debt tax shield that can be generated by the depreciation of fixed assets. Furthermore, we consider additional country characteristics that may have an impact on the local lending conditions. The variable *Private Credit* is the ratio of credits provided by banks and financial institutions to the private sector relative to GDP. Increasing the depth of the market for local credit should improve access to external debt and may reduce the need for internal funds. *Corruption Perception* is an index which rises with increasing corruption. Therefore, following the argument of Desai, Foley, and Hines (2008) concerning political risk, we expect a positive impact of this variable on external debt. *Legal Protection* is an index of the legal rights of borrowers and lenders. Since a higher index indicates a better legal protection, we expect a positive impact on external debt. Finally, the variable *GDP Growth* is used to control for the dynamics of the local market. As discussed in Section 2, the impact of this variable is ambiguous. The descriptive statistics are reported in Table 1.

Table 2 provides some detailed information about the distribution of the considered affiliates among host countries. One may note that subsidiaries in all countries report substantial shares of internal debt.

Table 2: Descriptive Statistics for German Outbound FDI

Host Country	Observations		Capital (€1,000)	Total Debt to Capital	External Debt to Capital	Internal Debt to Capital	Tax Rate
	Number	Percent	Mean	Mean	Mean	Mean	Mean
Australia	820	1.73	17,204	.625	.290	.336	.341
Austria	3,962	8.36	24,774	.608	.360	.248	.331
Belgium	1,957	4.13	44,345	.632	.344	.231	.382
Bulgaria	113	0.24	16,575	.624	.339	.285	.243
Croatia	142	0.30	75,448	.598	.261	.336	.234
Czech Rep.	2,563	5.41	29,143	.622	.318	.304	.316
Denmark	943	1.99	21,438	.645	.369	.276	.311
Estonia	23	0.05	6,656	.603	.236	.367	.023
Finland	335	0.71	22,798	.571	.294	.277	.283
France	5,487	11.58	29,021	.646	.368	.278	.369
Greece	472	1.00	22,840	.646	.331	.314	.347
Hungary	1,727	3.64	37,292	.571	.296	.275	.191
Ireland	389	0.82	29,500	.541	.269	.273	.108
Italy	3,934	8.30	31,035	.710	.405	.304	.418
Japan	901	1.90	58,566	.678	.431	.246	.456
Latvia	60	0.13	9,669	.618	.375	.243	.217
Lithuania	57	0.12	8,903	.684	.231	.452	.179
Mexico	563	1.19	63,857	.516	.229	.288	.346
Netherlands	2,46	5.19	30,822	.588	.318	.270	.345
New Zealand	110	0.23	9,934	.556	.245	.311	.330
Norway	397	0.84	15,101	.620	.338	.282	.280
Poland	2,986	6.30	22,142	.606	.299	.307	.278
Portugal	784	1.65	30,860	.576	.319	.258	.343
Slovakia	529	1.12	39,608	.582	.300	.283	.257
Slovenia	144	0.30	12,164	.561	.277	.284	.250
South Korea	387	0.82	42,992	.566	.335	.231	.302
Spain	3,233	6.82	35,771	.609	.354	.256	.350
Sweden	1,160	2.45	22,230	.618	.324	.294	.280
Switzerland	3,137	6.62	23,339	.559	.347	.212	.242
UK	3,910	8.25	29,327	.597	.324	.274	.306
USA	3,700	7.81	69,999	.601	.277	.324	.350
All Countries	47,385	100.00	33,196	.615	.336	.279	.331

Descriptive statistics for the estimation sample covering German outbound FDI in the period from 1996 until 2005. The data are taken from the MiDi database.

4   Results

The regression results are shown in Table 3. In order to obtain robust standard errors in the presence of possible random-group effects, we cluster at the level of the country-year cell. Basic results are reported in columns (1), (4), and (7). Columns (2), (5), and (8) show that the results are robust against inclusion of industry effects which capture differences in the financial conditions among 71 industries. In accordance with Desai, Foley, and Hines (2004) we consider parent-specific effects to control for the heterogeneity among firms.

We find significant and robust effects of the local tax rate on all types of debt financing. According to our estimates, a 10 percentage points increase in the statutory tax rate on corporate earnings is associated with an increase in the external debt ratio by 1.13 percentage points (see column 3) and a 1.67 percentage points increase in the internal-debt ratio (see column 6). Evaluated at sample means, this corresponds to a semi-elasticity of about 0.35 in case of external borrowing and 0.60 in case of internal borrowing, *i.e.* if the tax rate rises by one percentage point, external debt increases by 0.35 percent and internal debt by 0.6 percent.[6] In the US case, Desai, Foley and Hines (2004) find a semi-elasticity of external debt of 0.55 and of internal debt of 0.97. Consequently, our results do not confirm the expectation of a higher tax rate elasticity of debt finance in the German case, although an exemption system is applied. A plausible explanation for the comparatively stronger effects in the US case might be that the US credit system does not effectively prevent US multinationals' tax planning in terms of debt (cf. Hines and Rice, 1994; Altshuler and Grubert, 2003; Grubert, 2003; Altshuler and Grubert, 2006).

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[6] We transform the marginal tax effects into semi-elasticities of the debt ratio by dividing the marginal tax effect by the sample mean of the debt ratio.

In accordance with our expectation that internal debt responds more pronounced to taxes since it is not subject to substantial economic frictions, our results suggest a higher tax planning flexibility in terms of internal debt. An alternative explanation for the lower tax elasticity of external debt might be the fact that German multinationals had an incentive to allocate external debt to the German parent, as German profit tax rates were comparatively high during the investigation period. German CFC rules seem not to discourage firms from using internal debt. Internal debt might be provided by equity financed affiliates that are not subject to CFC rules, or internal debt might be refinanced by external debt, in which case the CFC rules do not apply. With respect to the latter case, Ruf (2008) demonstrates that a high corporate income tax rate increases the probability that a multinational establishes a finance company in the same country that carries significant amounts of debt.

While the results confirm the expected positive impact of taxes on both external and internal debt, the two types of debt are asymmetrically affected by several indicators of the local lending conditions. We start with the discussion of the results for external debt in columns (1) - (3) of Table 3. The presence of a loss carry-forward exerts a negative impact, indicating that a loss carry-forward either directly reduces the gains from tax savings by debt finance, or, alternatively, that a low profitability hampers access to credit. The positive sign of sales is in accordance with the view that a larger size improves the access to external capital. A higher local lending rate is associated with less external debt, confirming the theoretical expectation. The impact of asset tangibility is insignificant. While the coefficient of the non-debt tax shield of depreciation allowances for fixed assets is negative, it is not statistically significant (see column 3). Moreover, there is no statistically significant effect of the share of private credit to GDP capturing local credit market depth.

With regard to corruption perception, we confirm the view taken by Kesternich and Schnitzer (2010) and Desai, Foley, and Hines (2008): more corruption is associated with a higher share of external debt. Note that foreign investors usually try to stay away from countries with high corruption (see, *e.g.*, Habib and Zurawicki, 2002). Our analysis, however, conditions on firms that already have chosen to invest in a certain country. The use of debt, hence, might be a way to deal with the corruption problem. The finding of a negative effect of legal protection seems counterintuitive. However, it should be noted that we control for the lending rate. Since beneficial impacts of legal protection on lending conditions are captured by the lending rate, the negative impact on external debt might simply point at the cost of compliance with the law. Finally, higher GDP growth leads to a smaller ratio of external debt financing. This might indicate that dynamic growth in the local market is associated with increasing opportunities to generate available funds through retained earnings.

A comparison of the results in columns (1) - (3) to columns (4) - (6) support the view that internal debt is a substitute for external debt. The sales variable is positively associated with external but inversely related to internal debt, and a loss carry-forward is negatively related to external debt but positively to internal debt. Both effects are in accordance with the support of financially weaker firms by means of internal loans (Gopalan, Nanda, and Seru, 2007). Similarly, the local lending rate exerts a negative impact on external debt but a positive effect on internal debt, suggesting that if external borrowing is expensive, the subsidiaries tend to rely on internal debt. A final case where opposite effects are found is GDP growth, which exerts positive effects on internal debt but negative effects on external debt. This latter result would imply that internal funds are used to finance investment opportunities particularly in dynamic local markets. Though affiliates operating in these

Table 3: Regression Results

Dependent variable	External Debt to Capital			Internal Debt to Capital			Total Debt to Capital		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Statutory Tax Rate	.159 **	.171 **	.113 **	.144 **	.125 **	.167 **	.303 **	.296 **	.280 **
	(.045)	(.045)	(.038)	(.029)	(.029)	(.030)	(.041)	(.041)	(.040)
Loss Carry-Forward	-.011 **	-.012 **	-.011 **	.065 **	.067 **	.067 **	.054 **	.055 **	.056 **
	(.003)	(.003)	(.002)	(.003)	(.004)	(.003)	(.004)	(.004)	(.003)
log(Sales)	.033 **	.030 **	.031 **	-.033 **	-.025 **	-.025 **	-.001	.005 **	.007 **
	(.002)	(.006)	(.002)	(.002)	(.002)	(.002)	(.002)	(.002)	(.002)
Tangibility	.004	-.009	-.009	-.133 **	-.063 **	-.064 **	-.129 **	-.072 **	-.073 **
	(.007)	(.008)	(.008)	(.009)	(.008)	(.008)	(.010)	(.010)	(.009)
log(Lending Rate)	-.026 **	-.027 **	-.040 **	.037 **	.041 **	.025 **	.011 **	.014 **	-.015 **
	(.006)	(.006)	(.009)	(.004)	(.004)	(.006)	(.005)	(.005)	(.007)
Depreciation Allowances			-.085			.022			-.063
			(.060)			(.036)			(.055)
Private Credit			-.011			-.014 **			-.025 **
			(.009)			(.005)			(.008)
Corruption Perception			.004 *			.002			.006 **
			(.002)			(.002)			(.002)
Legal Protection			-.003 **			.001			-.002
			(.001)			(.001)			(.002)
GDP Growth			-.642 **			.414 **			-.228
			(.177)			(.151)			(.162)
Industry effects	no	yes	yes	no	yes	yes	no	yes	yes
Company and time effects	yes	yes	yes	yes	yes	yes	yes	yes	yes
R^2 *(adj.)*	.4688	.4729	.4760	.4059	.4198	.4202	.4380	.4461	.4497

Company and time fixed effects included. Heteroskedasticity robust standard errors clustered at the level of country-year cells in parentheses. An asterisk denotes significance at the 10% level; two at the 5% level. 47,385 observations.

markets have enhanced possibilities to retain earnings, available internal funds might prove to be insufficient. A lack of internal funds could be compensated by transferring internal funds of other affiliates via internal debt. Given that our dataset covers several emerging markets where growth has been particularly strong, a possible alternative explanation is that in these markets, where external debt is not easily available, more internal debt is used to transfer external parent debt to the subsidiary.

While the results in columns (1) - (6) demonstrate that there are important asymmetries in capital structure choice for internal and external debt, let us finally consider the effects on total debt. Columns (7) - (9) show that the marginal tax effects on internal and external debt exactly add to the higher coefficient for total debt: total leverage increases by 2.8 percentage points (column 9) if the tax rate increases by 10 percentage points. Evaluated at the sample mean, we find a semi-elasticity of about 0.46, *i.e.* borrowing rises by 0.46 percent if the tax rate increases by one percentage point. Several findings for the non-tax variables confirm offsetting effects on external and internal debt. As a consequence, while the impact of certain conditions on external or internal debt and hence on the capital structure is substantial, total debt is often unaffected.

5   Conclusions

The empirical analysis of German multinationals confirms that local tax rates exert effects on the capital structure of foreign subsidiaries. This result refers not only to external debt; our findings indicate that a higher local tax rate is also associated with an increase in internal debt. We find evidence that internal debt of German affiliates responds more to local taxes than external debt. This result suggests a higher tax planning flexibility in terms

of internal debt. An alternative explanation might be the fact that German multinationals had an incentive to allocate their external borrowing to Germany because the German tax rates were comparatively high during the investigation period. With regard to internal debt, neither the comparatively high German corporate income tax rates nor the German CFC legislation have prevented German multinationals from substantially using internal debt. A possible explanation might be that multinationals do not use low taxed foreign affiliates in the context of equity based internal debt financing. Our analysis, however, does not shed sufficient light on the role of CFC legislation. Rather, it focuses on the capital structure choice of operating affiliates and does not include specific holding companies and financial service conduits.

A second result is that the various local credit-market conditions exert significant effects on financing decisions. However, the effects differ, depending on whether we analyze internal or external debt: while adverse credit-market conditions are found to reduce external borrowing, internal debt is increasing. This supports the view that the two channels of debt finance are substitutes. In fact, our result implies that internal borrowing is used by multinational firms to transfer internal funds as well as to avoid imperfections and constraints in external debt financing faced in the host country of the foreign subsidiary.

The tax sensitivity we have estimated in the case of German subsidiaries is slightly smaller than the magnitude that was found for the US case by Desai, Foley and Hines (2004). Since the US corporate income taxation is based on the credit system, while in the German case the exemption system applies, the results suggest that the international tax regime with regard to taxation of foreign source income has little impact on the tax sensitivity of multinationals' capital structures. From a tax policy perspective, this implies that a move

from territorial taxation (exemption system) to worldwide taxation (credit system) would not have much effect on tax planning incentives in terms of debt financing.

To sum up, we find robust evidence that internal and external debt financing of German foreign affiliates respond to foreign tax rates. Our study, therefore, suggests that due to internal credit markets, multinationals enjoy important advantages as compared to domestic firms. Certainly, since our dataset is restricted to multinational companies, a further investigation on how the debt policy of multinational firms differs from that of domestic counterparts and on how this distorts the competition between these firms is left for future research. Moreover, it remains a challenging task for further research to analyze the detailed mechanisms of multinationals' tax planning by means of financial decisions. This research could include, e.g., organizational structures to allocate debt or hybrid financial instruments.

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