Foreign (In)Direct Investment and Corporate Taxation

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Abstract: This paper investigates the role of corporate taxation with respect to a multinational's investment decision in which the multinational can pursue either a direct or an indirect investment strategy. The latter strategy involves an intermediate corporate entity and opens up enhanced opportunities for international tax planning. The existence of preferential tax treatment for intermediate entities presumably changes the role of corporate taxation in destination countries, because it supports multinationals in avoiding taxes. The empirical findings of this study are consistent with theoretical predictions and suggest that tax effects differ, depending on the investment regime. The endogeneity of the regime choice – direct versus indirect – is taken into account by a switching regression approach.

Key Words: foreign direct investment, corporate taxation, switching regression, affiliate-level data

JEL Classification: H25, F23

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1 Introduction

Economists agree that corporate taxation influences both the location choice and the investment decision of multinational firms (see Gresik, 2001; De Mooij and Ederveen, 2003). However, as companies become ever more international, another aspect is that multinational enterprises also find it increasingly easier to shift profits from high- to low-tax jurisdictions (see Hines, 1999; Devereux and Maffini, 2007). Differences in national tax systems and the complexity of the international tax law open up additional opportunities to avoid taxes. This implies that multinationals may establish sophisticated firm structures to exploit tax-avoidance opportunities.

In this paper we analyze how taxes affect the affiliate-level investment decision of German multinationals, taking into account that a significant share of outbound investments are indirect rather than direct. While we consider direct investments as simple bilateral structures, where a parent company is directly investing in a foreign affiliate; indirect strategies involve at least three corporate entities, where the parent is investing via an intermediate or conduit entity in another foreign enterprise (see Weichenrieder and Mintz, 2008). Indirect investment structures possibly support multinationals in reducing corporate tax liabilities on a worldwide basis, because profits can be shifted from high- to low-tax (or even zero-tax) conduit locations. Moreover, tax-efficient indirect financing structures allow payments to be channeled from affiliates to parent companies, possibly without any tax deduction. As a consequence, the role of corporate taxation in destination countries may change.

Mintz (2004) demonstrates in a theoretical model that the analysis of investment decisions made by multinationals should explicitly differ between direct and indirect investments. In

contrast to the existing empirical literature, this paper follows this structural distinction and empirically confirms that tax effects differ: while direct investments are negatively affected by foreign statutory tax rates, indirect investments are positively related to statutory tax rates in host countries. If we follow theoretical predictions and control for the tax-related cost of capital, we find adverse effects on affiliate-level investment for both structures. The potential endogeneity of the structural choice (direct versus indirect) is taken into account by a switching regression approach. The empirical investigation is based on the Microdatabase Direct Investment (MiDi), a comprehensive dataset of all German outbound investment positions provided by the Deutsche Bundesbank (the German Central Bank; see Lipponer, 2007). The current version is available from 1996 to 2005 and contains data on companies' balance sheets as well as some further information, e.g. whether the investment is held directly or indirectly.

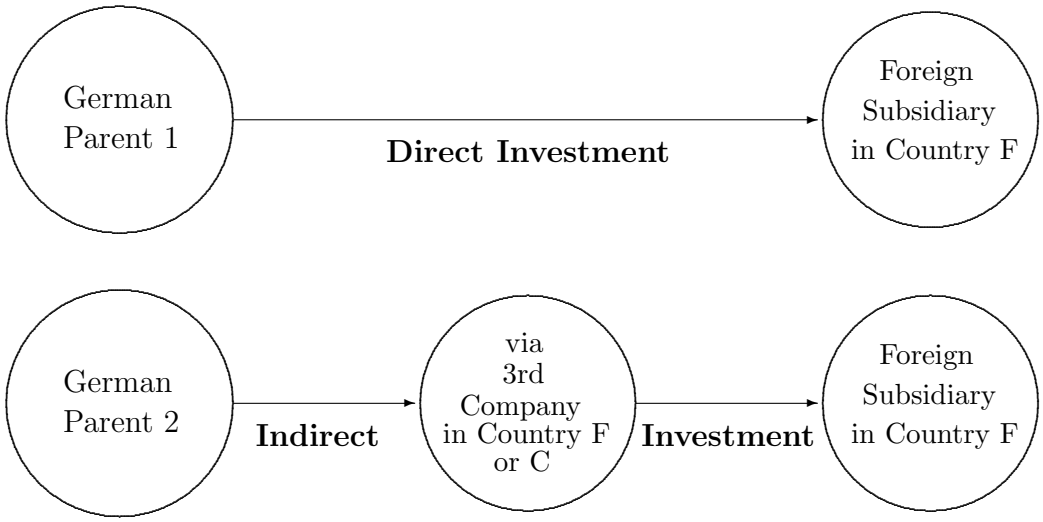
The novel empirical findings of this paper carry an important policy implication: the existence of conduit entities and low-tax conduit countries will lead to less aggressive international tax competition over statutory tax rates. Conversely, if tax discrimination in terms of preferential tax treatment for the conduit entities is reduced, tax competition is intensified (see Keen, 2001; Bucovetsky and Haufler, 2007).

The paper is organized as follows. Section 2 provides a general overview of direct and indirect investment structures, including some descriptive statistics. In Section 3, we set up a model that distinguishes between direct and indirect investments. Section 4 proposes an empirical estimation approach. Subsequently, Section 5 provides information about the data. Section 6 presents the empirical results. Section 7 examines the sensitivity of the results. Section 8 concludes.

2 Direct versus Indirect Investments

While the majority of foreign investments are direct, a considerable proportion of multinational outbound activities are indirect (see below). Figure 1 shows a stylized model which points out that German multinationals can, in principle, follow both investment regimes. Either the multinational decides to invest directly in the destination country F or it chooses an indirect structure and establishes a conduit entity, possibly in a third country C.[1] The choice of this organizational structure is presumably not random; it may depend on destination-country characteristics, firm preferences or strategies, as well as on the company-specific potential.

Figure 1: Direct versus Indirect Investment



[1] We mostly refer to 'conduit' entities. This emphasizes that these entities connect German parent firms to foreign subsidiaries in destination countries. Alternatively, we may refer to intermediate or holding companies.

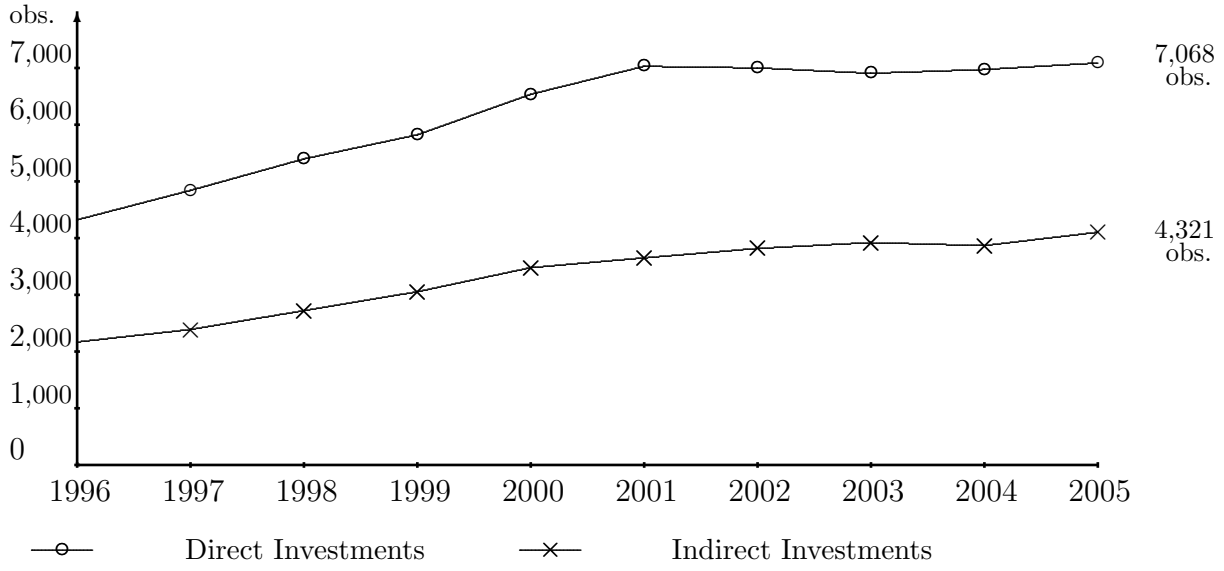
Figure 2 presents the annual number of German outbound investments from 1996 to 2005. There has been a significant increase in the number of investment objects in both regimes. Moreover, focusing on indirect observations, the left graph of Figure 3 shows the three most important conduit locations for German multinationals. The Netherlands attract more than a fourth of German conduit entities. Together with Switzerland and Austria, these three countries host almost 60% of all German conduit entities. The right-hand side of Figure 3 displays the three most important destination countries for indirect structures. Here, observations are more evenly distributed across countries: about one-fifth of German indirect outbound investment goes to Italy, France, and Spain.[2]

While this paper argues that differences in international taxation can explain why indirect structures exist, the classical case of an indirect entity may be associated with non-tax reasons. Indeed, headquarters or holding companies may provide services which it is useful to bundle centrally for legal or efficiency reasons. With regard to taxation, Weichenrieder and Mintz (2008) identify three potential roles of conduit entities. First, a conduit entity can be used for so-called treaty shopping, because some countries do offer preferential treatment with respect to withholding taxes.[3] Second, conduit entities in low-tax countries provide high-tax affiliates with internal debt. Borrowing from affiliates located in low-tax conduit countries and lending to affiliates in high-tax host countries will allow the latter

[2]Note that Figure 3 only considers three-country structures, i.e. structures where the destination country is different from the conduit country. If observations were included that allow host and conduit country to be identical, the United States would have been an important host as well as conduit country, because many US affiliates are held via US holding companies.

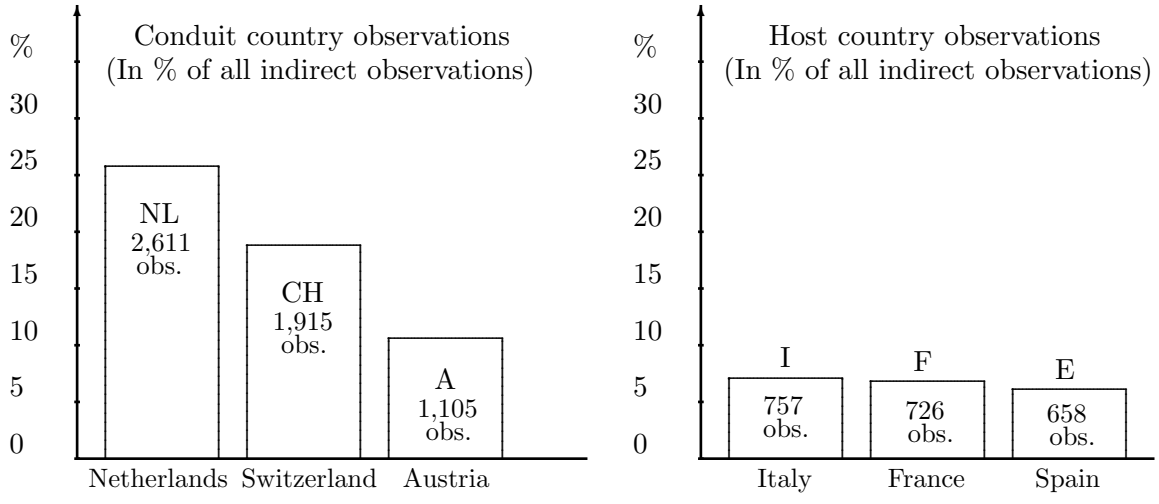
[3]Note that the conduit entity is not necessarily located in a third country. Some countries may provide special tax treatment for some firms, depending, for instance, on the legal form. The special treatment of holdings in the Netherlands, financial holdings in Luxembourg, or headquarters of foreign multinationals in Belgium (*co-ordination centers*) are well-known examples (see Council of the European Union, 1999). Even a holding in the same country is then possibly tax motivated. Profit and loss consolidation, which is often allowed on a national basis only, can also explain tax motivated conduit entities where no third country is involved (see Weichenrieder and Mintz, 2008).

Figure 2: Number of (In)Direct German Outbound Investments



Annual number of (in)direct outbound investments (1996 – 2005). The figure reflects the number of affiliates in host countries. Direct is defined as direct participation interest in non-holding companies. Indirect as participation interest held by holding and non-holding companies. All minority holdings, partnerships, and observations from the financial service sector are excluded. Source: Deutsche Bundesbank, MiDi.

Figure 3: Conduit & Host Countries (Indirect Investments)



Indirect three-country structures are the only structures considered, i.e. conduit countries are always different from host countries. The left panel shows the three most important conduit countries for German indirect outbound investments (1996 – 2005). The Netherlands, Switzerland, and Austria account for 56.76% of all observations. The right side depicts the three most important destination countries for indirect investments (1996 – 2005). Italy, France, and Spain account for 21.58% of all observations. Minority holdings, partnerships, and financial services are excluded. Source: Deutsche Bundesbank, MiDi.

to deduct interest payments from profits and save taxes. Under certain conditions, for example if the parent is also located in a high-tax country, this structure even allows for two interest deductions for one investment.[4] Finally, the low-tax conduit can reinvest income and defer any payments to the parent. This last point is especially relevant for outbound investments from countries using a tax credit system. However, income deferral of passive income may collide with controlled foreign company (CFC) rules, depending on the type of income (for further information about the US Subpart F legislation, see Hines, 1999; for the German rule, see Weichenrieder, 1996). Desai, Foley, and Hines (2003) confirm that tax deferral is an important strategy for US multinationals, because of the US tax system.[5] They show that indirectly owned affiliates are more sensitive to foreign tax-rate differences, because chains of ownership can mitigate the effects of the US foreign tax credit system by expanding opportunities to defer US tax liabilities. Incentives under ownership chains are then comparable to incentives under exemption systems, because multinationals can avoid repatriation taxes. Note, though, that implications of using ownership chains are basically very different, depending on the tax system of the parent country.

[4]This is called a double-dip structure and corresponds to the analysis in Section 3.2. Some important tax attributes encourage this double-dip situation in the case of indirect investments (see Mintz, 2004). First, parent country and host country do not limit interest deduction; second, the parent country exempts conduit income; third, the conduit country allows for special tax treatment of intermediate companies or is a low-tax country; fourth, the conduit country (the host country) imposes little or no withholding tax on income paid to the parent (conduit).

[5]In the US, companies are taxed on their worldwide income, irrespective of where it was earned. Afterwards, to avoid double taxation, a company receives a credit for the taxes it paid to a foreign government up to the amount it would have paid had it remained in the US (tax credit system). In contrast, the method used by Germany and other countries is called a territorial or exemption system. Here, only profits earned in the home country are taxed.

3 Theoretical Analysis

Consider a simple partial equilibrium model of a German multinational enterprise. The multinational is active in Germany G and also in a foreign country F. Production is determined by a concave production function with standard properties, where $f_G(K_G)$ denotes production in Germany, and $f_F(K_F)$ denotes production in the foreign country.[6] The model follows the analysis of Mintz (2004) and distinguishes two regimes, where Regime I (II) is the direct (indirect) investment regime.

3.1 Direct Structure (Regime I)

Profits are determined by output, $f_G(K_G)$ and $f_F(K_F)$. Both countries, Germany and the foreign country, tax profits at rates of τ_G and τ_F, respectively. We assume an interest rate i, which is identical for all types of borrowing and in both countries. We further assume that foreign-source income is tax exempt.[7] Overall profits of the multinational (home and foreign profits) are given by

$$\begin{aligned} \pi &= (1-\tau_G)(f_G(K_G) - iB_G) + iE_F \\ &+ (1-\tau_F)(f_F(K_F) - iB_F) - iE_F. \end{aligned} \tag{1}$$

The first line captures the profits of the German parent company. B_G refers to external debt finance. Accordingly, interest expenses iB_G are deductible from the tax base. Note

[6] Capital is the only variable input factor. The production function exhibits a positive but decreasing marginal product of capital: $f'(\cdot) > 0$ and $f''(\cdot) < 0$.

[7] Germany basically exempts foreign earnings from domestic taxation.

that we abstract from opportunity costs for own capital iE_G. We may, however, define profits inclusive of iE_G. The second line refers to the profits of the foreign affiliate. The affiliate in F can borrow from third-party lenders B_F or finance with parent equity E_F. The parent receives dividends iE_F without tax deduction. We keep E_F in the model – albeit it would cancel out in this first case – because it emphasizes one crucial difference compared to the indirect structure (see below). The firm maximizes profits subject to the following constraints:

$K_G + E_F = B_G,$

$K_F = E_F + B_F,$

$B_G \geq 0,\ B_F \geq 0.$

Note that the first constraint implies that the parent also raises funds to finance the foreign affiliate; actually more than necessary for its own investment K_G. We further impose non-negativity constraints on B_G and B_F. An additional assumption is that the host country tax rate is always lower than the home country tax rate ($\tau_G > \tau_F$). If we maximize the model with respect to K_G and K_F, taking into account all relevant restrictions, we obtain the following marginal conditions:

$$\begin{aligned} f'(K_G) &= i, \\ f'(K_F) &= i\frac{(1-\tau_G)}{(1-\tau_F)}. \end{aligned}$$

The first optimality condition points out that the decision of the parent company is not distorted by corporate taxation. Abstracting from i, we refer to the second expression as

the tax wedge[8] or the tax-related cost of capital of the foreign affiliate. If we assume that the German tax rate always exceeds the foreign tax rate, new investment is exclusively parent-debt financed.[9] The equity transfer to the affiliate, therefore, is refinanced with external debt. Assuming that the parent's profits are positive (the parent is not tax-exhaust), overall profits of the multinational enterprise are maximized. While the optimality condition for the German part of the multinational implies tax neutrality, the required rate of return for the foreign investment is below i, because of simple tax arbitrage.

For a variation in the foreign statutory tax rate, we obtain the comparative static effect which is unambiguously negative: a higher foreign tax rate τ_F implies higher cost of capital and less investment

$$\frac{dK_F}{d\tau_F} = \frac{i(1-\tau_G)}{(1-\tau_F)^2 f''(K_F)} < 0.$$

3.2 Indirect Structure (Regime II)

We rely on one structural difference when introducing the conduit structure: the parent company still transfers equity funds to a foreign affiliate, but now to a conduit entity. Subsequently, the conduit provides the foreign affiliate F with internal debt, for which interest expenses are tax deductible. The meaning of the above notation slightly changes: E_F now refers to internal debt if we consider the foreign affiliate; it refers to equity if we

[8]The term tax wedge simply reflects that the optimality condition is distorted, i.e. $f'(K_F) \neq i$. The tax wedge in the case of the foreign affiliate implies a reduction of the cost of capital.

[9]We obtain this extreme result – complete debt finance – because we do not introduce any costs associated with debt (and because $\tau_G > \tau_F$). While these costs are neglected in this model, the corporate finance literature refers to concepts where debt finance is associated with additional costs (for surveys, see Myers, 2001; Graham, 2003).

consider the parent firm. Any further activity of the conduit is not modeled, because we are only interested in investment activities of the affiliate in F. The multinational's profits are determined by

$$\begin{aligned} \pi &= (1-\tau_G)(f_G(K_G) - iB_G) + iE_F \\ &+ (1-\tau_F)(f_F(K_F) - iB_F - iE_F). \end{aligned} \tag{2}$$

We assume that transfers, including interest payments to the conduit, can be channeled from the affiliate to the parent without any tax deduction. The model then describes the so-called double-dip structure, because the multinational can deduct interest payments in the host country and in the home country.[10] We maximize the model subject to the above constraints and obtain two expressions for the cost of capital:

$$\begin{aligned} f'(K_G) &= i, \\ f'(K_F) &= i\frac{(1-\tau_G-\tau_F)}{(1-\tau_F)}. \end{aligned}$$

The foreign affiliate's capital costs are further reduced, because of the additional interest deduction. A variation in the foreign tax rate yields the following positive expression

$$\frac{dK_F}{d\tau_F} = \frac{-i\tau_G}{(1-\tau_F)^2 f''(K_F)} > 0.$$

The prediction of a positive tax effect is the result of the double-dip interest deduction, because a higher foreign tax rate implies that interest deductions are even more valuable.

[10]Intuitively, the German parent takes up more capital than necessary to finance its own investment. Interest expenses in Germany are deductible for corporate tax purposes. The foreign affiliate is internal debt financed, and associated interest expenses are again deductible. Hence we have two interest deductions for the same investment.

3.3 Indirect Structure (Extended)

We extend the indirect model with respect to one critical assumption. While Equation (2) implies that interest payments received by the conduit are tax exempt, we introduce a tax τ_C on interest payments to the conduit. Profits can then be written as

$$\begin{aligned} \pi &= (1-\tau_G)(f_G(K_G) - iB_G) + iE_F \\ &+ (1-\tau_F)(f_F(K_F) - iB_F - iE_F) - \tau_C iE_F. \end{aligned} \tag{3}$$

τ_C may denote withholding taxes as well as the conduit country tax rate. The marginal decision of the foreign affiliate is then determined by

$$f'(K_F) = i\frac{(1-\tau_G-(\tau_F-\tau_C))}{(1-\tau_F)}.$$

There is no longer any tax advantage compared to the direct structure if τ_F equals τ_C. If $\tau_C < \tau_F$, the tax wedge ranges somewhere between the direct and the indirect solution.

To sum up, theory suggests two different regimes with two (three) different measures for the tax-related cost of capital. Hence, tax wedges T for respective regimes follow:

$$T_1 = \frac{(1-\tau_G)}{(1-\tau_F)}, \tag{4}$$

$$T_2 = \frac{(1-\tau_G-\tau_F)}{(1-\tau_F)}, \tag{5}$$

$$T_2^* = \frac{(1-\tau_G-\tau_F+\tau_C)}{(1-\tau_F)}. \tag{6}$$

T_1 applies to the direct structure (Regime I); T_2 is the relevant tax measure for the indirect structure (Regime II); and T_2^* relates to the extended indirect structure where τ_C is also considered.

4 Investigation Approach

The purpose of the empirical investigation is to estimate how taxes affect affiliate-level investment. The theoretical analysis suggests two different regimes, depending on whether investments are direct or indirect. One way to approach this problem is to consider direct and indirect investments as two separate samples, simply split observations, and estimate two distinct equations. However, firms do not randomly choose one or the other regime, and a simple split does not fully account for this endogeneity.[11]

To address the endogeneity problem we follow the literature and estimate an endogenous switching regression model, where the switching rule is observed. (Lee, 1978) suggests a two-step procedure: first, estimate the binary variable R indicating whether the investment is directly or indirectly held. Subsequently, estimate affiliate investment in a second stage and condition on the regime choice.

[11]We can think of endogeneity in this context in many different ways. First, there are some firms switching from one regime to the other. The ultimate regression sample contains exactly 50 affiliates switching at least once over the whole time span. Second, firms' potentials to cushion shocks differ, depending on the regime. Hence, the regime is correlated with these shocks. Third, the variable of interest, affiliate-level investment, may also differ structurally with respect to all control variables. Fourth, regime choice and investment level may be simultaneously determined. Another intuitive way to think about endogeneity is to look at the decision to establish an indirect structure. The existence of preferential tax treatments, or generally differences in international taxation, presumably distort the decision to establish a conduit structure. Furthermore, if the heterogeneity in multinationals' potentials determines the regime, we have a problem of self selection, or selection into the regime. Note that any fixed-effects approach may account for time-invariant preferences (e.g., Vella, 1998). Yet the proclivity of multinationals to choose a specific regime can vary over time.

From a taxation perspective, conduit structures should generally be dominant, empirically. However, descriptive statistics show that the majority of investments are direct. The reason may be that indirect structures are also costly: while every foreign activity is associated with costs (e.g., Markusen, 1995), a conduit entity involves additional control and information problems, and hence, additional costs which reduce the probability to choose the indirect structure. We summarize the decision to establish a conduit entity (the first-stage decision) with the following equations

$$R_{ijkt} = \begin{cases} 1 & \text{if } IND_{ijkt} > 0, \\ 0 & \text{otherwise.} \end{cases}$$

$$IND_{ijkt} = h[c_{ijkt}(X_{ijkt}, \gamma_i)].$$

R_{ijkt} is a binary variable indicating whether the multinational j is investing in country k at time t in an affiliate i via a conduit entity or not. IND_{ijkt} is the corresponding unobserved propensity and c_{ijkt} represents the company-specific costs associated with the conduit firm. These costs are determined by affiliate and company-group variables and also by host-location factors such as the host country tax rate τ_{kt}. Hence, a vector X_{ijkt} of observable host-country characteristics as well as affiliate- and company-group-specific characteristics determine costs. Finally, γ_i captures unobserved preferences of affiliates, which may be important, for instance, because of affiliate-specific management strategies. First-step estimation equations are then specified as

$$R_{ijkt} = a_1 BST_{jt} + a_2 PRO_{jt} + a_4 X_{ijkt} + \xi_t + \gamma_i + u_{ijkt}. \tag{7}$$

The respective regime choice is identified by the company-group-specific variables BST_{jt} and PRO_{jt}, which may reflect the group-specific ability as regards establishing a conduit entity. BST_{jt} is the balance-sheet total of the multinational group; PRO_{jt} refers to the profitability of the multinational.[12] Moreover, all relevant second-stage explanatory variables are included. From first-stage regressions we obtain estimates for an additional selection term $\hat{\lambda}$. Including $\hat{\lambda}$ in the equations of interest allows us to consistently estimate

$$\begin{aligned} \text{Regime I:} \qquad Y_{1,ijkt} &= \alpha_1 + \alpha_2 T_{1,kt} + \alpha_3 X_{ijkt} + \hat{\lambda}_{1,ijkt} \\ &+ \psi_t + \varphi_i + \epsilon_{1,ijkt} \quad \text{iff } R_{ijkt} = 1, \end{aligned}$$

$$\begin{aligned} \text{Regime II:} \qquad Y_{2,ijkt} &= \beta_1 + \beta_2 T_{2,kt} + \beta_3 X_{ijkt} + \hat{\lambda}_{2,ijkt} \\ &+ \psi_t + \varphi_i + \epsilon_{2,ijkt} \quad \text{iff } R_{ijkt} = 0. \end{aligned}$$

Y denotes affiliate-level investment. X_{ijkt} is a vector of affiliate- and country-specific control variables; ψ_t are time, φ_i affiliate-specific effects. To control for selection, we include estimated selection terms, $\hat{\lambda}_1 = \frac{\phi(X\hat{a})}{\Phi(X\hat{a})}$ and $\hat{\lambda}_2 = \frac{\phi(X\hat{a})}{1-\Phi(X\hat{a})}$, as additional regressors (see Maddala, 1983).[13] Finally, T_1 and T_2 are the tax-related cost of capital for direct and indirect structures as defined in Equations (4) and (5), respectively.

The empirical implementation of this two-step approach in context of panel data and

[12]For further data and variable definitions see Section 5 and Appendix B. Note that empirical identification requires at least one variable that explains the regime choice. We may refer to this variable as an instrument. The nonlinearity of the probability model can already be sufficient to identify the regime. Yet this can cause collinearity among regressors since we condition on the regime choice in the second stage (Wooldridge, 2002). Note also that we do not aim to explain which countries are preferable conduit-entity locations. Rather, we are interested in the multinational's regime choice, i.e. the first-stage decision to establish a conduit structure at all, where the company can choose any potential conduit location.

[13]ϕ denotes the standard normal density function; Φ the distribution function. The ratio $(\frac{\phi(X\hat{a})}{\Phi(X\hat{a})})$ is also known as the inverse Mills ratio.

unobserved heterogeneity in both equations requires further considerations. We follow the procedure suggested by Wooldridge (1995) for panel data selection models.[14]

5 Data and Descriptive Statistics

The data for the empirical analysis are taken from the Microdatabase Direct Investment (MiDi) provided by the Deutsche Bundesbank. This is an affiliate-level database of German multinationals' foreign investments. The data provide information about the investment object's balance sheet, including further information on the type of investment and on the investor. A favorable aspect of MiDi is that the current version is available as affiliate-level panel data for the period 1996 to 2005. Moreover, data collection is enforced by German law, which sets reporting obligations for certain international transactions and positions.[15] As a crucial variable for this analysis, MiDi includes the information on whether the German multinational invests directly or indirectly via a conduit entity.

Below regressions analyze the determinants of affiliate-level investment. Investment is defined as the logarithmic difference in the balance-sheet item 'fixed assets'.[16] We can interpret this variable as a growth rate, but we mostly refer to 'investment' in the following. One explanatory variable is the tax wedge T as defined above. This variable is expected

[14] Appendix A contains further details concerning the Wooldridge (1995) estimator and, especially, the procedure for correcting standard errors.

[15] Außenwirtschaftsgesetz (Trade and Payments Act) in connection with Außenwirtschaftsverordnung (Foreign Trade and Payments Regulation). Each German multinational has to report its foreign assets including both direct and indirect FDI, conditional on some lower threshold level for mandatory reporting. Since 2002, investments have to be reported if the participation is 10% or more and the balance-sheet total of the foreign object is above 3 million euros. Though previous years showed lower thresholds, this level is uniformly applied for all years in the panel. For details see Lipponer (2007).

[16] The dependent variable is calculated as: ln(fixed assets$_t$) - ln(fixed assets$_{t-1}$).

to be negatively related to affiliate-level investment (see Section 3). In order to control for country characteristics, we employ various host country variables: *GDP* to capture market size, *labor cost* in manufacturing and the local *lending rate* to capture differences in factor prices.[17] Furthermore, we control for the *present value of depreciation allowances* defined by the countries' tax code. Besides, we condition on the affiliate-specific variables *sales* and *loss carry-forward*. We expect a positive sign for sales, because this is an indicator for the affiliate's size and cash flow. The dummy variable loss carry-forward indicates whether some loss carry-forward is reported. The existence of losses in the previous periods may capture characteristics of the current decision problem of the company such as the expected performance of an affiliate. This variable is expected to be negatively related to investment.

Table 1 summarizes all relevant regression variables and respective mean values. The estimation sample is restricted to majority holdings. Moreover, financial services, partnerships, and non-manufacturing observations are excluded (see Table 7 in the Appendix for a detailed classification). According to theory, we remove observations if the German tax rate is below the statutory tax rate of the destination country.[18] Tax wedges are defined according to Equations (4), (5), and (6). Since withholding taxes are often negotiated in double tax treaties, the withholding tax rate τ_C depends on the location of the conduit entity and potential treaties of host countries with conduit countries. To check the sensitivity of the analysis, we further define T^*_{2a}, T^*_{2b}, and T^*_{2c}, where we set τ_C at 10%, 20%, and 25%, respectively, for all observations (see also Section 7). The consideration for this is that we change the composition of the sample, because the maximization problem in Section 3.3 requires that τ_C is below the host country tax rate. If this condition is not fulfilled, the

[17] MiDi does not provide information on affiliate-specific labor costs, or interest payments, etc.

[18] The relevant German statutory tax rate is adjusted for the non-deductibility of interest expenses, because this is the relevant measure for the basic arbitrage condition.

Table 1: Variable Description

		Mean Values (Standard Errors) Regime I	Regime II
Tax Variables	Statutory Tax Rate	.308	.327
		(.073)	(.072)
	Tax Wedge (T_1 & T_2)	.839	.345
		(.095)	(.171)
	Tax Wedge (T_2^*)		.351
			(.173)
	Tax Wedge (T_{2a}^*)		.495
			(.159)
	Tax Wedge (T_{2b}^*)		.634$^{(b)}$
			(.144)
	Tax Wedge (T_{2c}^*)		.695$^{(c)}$
			(.135)
Country Level	Country GDP (in US$ bill.)	951	1,790
		(1,993)	(2,839)
	Labor Cost (in US$)	13.79	16.89
		(8.78)	(7.55)
	Lending Rate	.076	.066
		(.046)	(.034)
	Present Value of Depreciation	.806	.802
		(.052)	(.049)
Affiliate Level	Fixed Assets (in € mill.)	15.62	27.22
		(86.93)	(133.26)
	Sales (in € mill.)	55.50	91.42
		(255.17)	(434.64)
	Loss carry-forward (binary)	.304	.326
		(.460)	(.469)
	Observations	14,487	5,949

Affiliate-level data are taken from MiDi. Corporate taxation data are taken from the International Bureau of Fiscal Documentation (IBFD), and from tax surveys provided by Ernst&Young, PwC, and KPMG. The lending rates refer to credits to the private sector and are taken from the IMF International Financial Statistics Yearbook (2006) augmented with corresponding OECD figures. GDP in U.S. dollars, nominal, is taken from World Bank World Development Indicators (2006). Hourly labor costs in U.S. dollars for production workers in manufacturing are taken from the U.S. Bureau of Labor Statistics and Eurostat. T_1 and T_2 refer to Equations (4) and (5). T_2^* refers to (6), where τ_C corresponds to the relevant withholding tax rate for interest payments. Note that withholding tax data refers to the year 2005. τ_C is equal to 10% (T_{2a}^*), 20% (T_{2b}^*), and 25% (T_{2c}^*) for all observations. Different sample size: $^{(b)}$ 5,554 observations, $^{(c)}$ 5,030 observations.

observation is removed. Additionally, we change the variation of the nonlinear tax wedge.

Whereas tax wedges differ by construction, a comparison of other variables' mean values already indicate structural differences. As we would expect, the mean statutory tax rate is higher in Regime II. Market size, reflected by GDP, is on average twice as high in Regime II. Moreover, investments are much bigger in the case of the indirect structures – in terms of fixed assets and also in terms of sales. Finally, one may speculate whether the difference in average labor cost reflects the motivation for the foreign investments (vertical FDI versus horizontal FDI).

6 Regression Analysis

Table 2 reports regression results where we simply split the sample and estimate the respective regime. As expected, we find a negative impact of the statutory tax rate and of the tax wedge T_1 on direct investments. While we partially confirm theory by finding a positive, but not significant, tax rate effect on indirect investments, in Column (4) we confirm the negative effect of the tax wedge as defined in Equation (5). Additional control variables such as the affiliate-specific sales, or the dummy variable for the loss carry-forward are included in all specifications. Both affiliate-specific variables show the expected sign. The fixed effects approach removes all cross-section variation between affiliates and also nests country fixed effects. In this sense, it is not surprising that country-specific variables, for example GDP or labor cost, are statistically insignificant. We find, however, a significant positive effect of the local lending rate for some specifications. The positive coefficient may reflect the comparative advantage of multinationals compared to domestic firms, because

multinationals can rely on internal capital markets. Note that all regressions control for variations in German lending conditions by including a full set of time dummies. Thereby, we also capture general taxing conditions in Germany which are the same for all German parent firms.

Since we condition on affiliate-specific effects in this sample split, estimates are consistent if sample selection – the choice of the regime – depends on the constant affiliate-specific component (e.g., Vella, 1998). If this affiliate-specific effect does not fully capture selection, i.e. if the selection effect varies over time, our estimates are not consistent. Table 3 presents the results from switching regressions, where we additionally condition on the selection effect $\hat{\lambda}$.[19] Basically, the results confirm findings in Table 2. However, the positive tax rate effect for the indirect investments is now significant. The estimated coefficient for the tax wedge T_1 in Column (3) implies that a 1 percentage point higher tax wedge is associated with -.38% less new investment in fixed assets. The regression in Column (4) suggests that a 1 percentage point higher indirect tax wedge is associated with -.99% less investment. The results confirm the double-dip structure as modeled in Section 3.2, because T_2 is calculated accordingly. In a further step, we consider that host countries possibly impose withholding taxes. T_2^* now refers to Equation (6), where τ_C corresponds to the bilateral withholding tax for interest payments between the host country and the conduit country. The insignificant coefficient in Column (5) may indicate that multinationals can avoid withholding taxes, for example, by using sophisticated conduit chains, or by benefiting from favorable tax treatment.

[19]See Appendix B for the first-stage regression results and interpretation. Results are robust with respect to the inclusion of regime-identifying variables. However, all regressions in Table 3 use Specification (2) from Table 6 for identification.

Table 2: Regression Results (Sample Split)

	(1)	(2)	(3)	(4)	(5)
Statutory Tax Rate	-.533*	.828			
	(.285)	(.580)			
Tax Wedge (T_1)			-.448*		
			(.249)		
Tax Wedge (T_2)				-.949*	
				(.499)	
Tax Wedge (T_2^*)					-.152
					(.722)
log(Sales)	.030	.046	.030	.046	.046
	(.020)	(.050)	(.020)	(.050)	(.050)
Loss carry-forward	-.034**	-.060*	-.034**	-.059*	-.059*
	(.016)	(.035)	(.016)	(.035)	(.035)
log(GDP)	-.200	.031	-.218	.004	.056
	(.201)	(.118)	(.200)	(.120)	(.125)
log(Labor Cost)	.027	-.210	.035	-.188	-.231
	(.199)	(.197)	(.198)	(.200)	(.201)
log(Lending Rate)	.107***	.079	.108***	.083	.095
	(.042)	(.064)	(.042)	(.061)	(.061)
Present Value Depr.	-.140	.024	-.140	.007	.015
	(.229)	(.559)	(.233)	(.565)	(.546)
Regime	I	II	I	II	II
Firms	3,377	1,627	3,377	1,627	1,627
Observations	14,487	5,949	14,487	5,949	5,949
Host Countries	32	33	32	33	33

Dependent variable is investment, defined as the logarithmic difference in the balance-sheet position fixed assets (ln(fixed assets$_t$) - ln(fixed assets$_{t-1}$)). Time and affiliate-level fixed effects are included but not reported. Standard errors (in parentheses) are robust and clustered (year-country cell). (***) (**) (*) indicate significance at the (1%) (5%) (10%) level. T_1 is defined according to Equation (4). T_2 follows (5). T_2^* corresponds to Equation (6).

Table 3: Regression Results (Switching Regression)

	(1)	(2)	(3)	(4)	(5)
Statutory Tax Rate	-.450**	.900*			
	(.229)	(.530)			
Tax Wedge (T_1)			-.383*		
			(.210)		
Tax Wedge (T_2)				-.994**	
				(.484)	
Tax Wedge (T_2^*)					-.184
					(.816)
log(Sales)	.029	.044	.030	.044	.043
	(.019)	(.055)	(.019)	(.055)	(.055)
Loss carry-forward	-.035**	-.060	-.035**	-.059	-.059
	(.016)	(.038)	(.016)	(.038)	(.038)
log(GDP)	-.233*	.027	-.248*	-.001	.052
	(.133)	(.097)	(.135)	(.157)	(.146)
log(Labor Cost)	.043	-.254	.050	-.233	-.274*
	(.129)	(.163)	(.136)	(.167)	(.165)
log(Lending Rate)	.111***	.075	.112***	.080	.091
	(.029)	(.056)	(.030)	(.101)	(.097)
Present Value Depr.	-.109	.059	-.113	.042	.045
	(.187)	(.530)	(.195)	(1.21)	(1.11)
Regime	I	II	I	II	II
Firms	3,377	1,627	3,377	1,627	1,627
Observations	14,487	5,949	14,487	5,949	5,949
Host Countries	32	33	32	33	33

Dependent variable is investment, defined as the logarithmic difference in the balance-sheet position fixed assets (ln(fixed assets$_t$) - ln(fixed assets$_{t-1}$)). Time dummies and linearized affiliate-level fixed effects are included but not reported. All estimations take into account the endogeneity of the regime choice. Standard errors (in parentheses) are robust for any form of heteroscedasticity and autocorrelation, and account for the two-step estimation (see Wooldridge, 1995). (***) (**) (*) indicate significance at the (1%) (5%) (10%) level. All reported results refer to Specification (2) of the probit equation (see Appendix B, Table 6). T_1 is defined according to Equation (4). T_2 follows (5). T_2^* corresponds to (6).

Table 4 summarizes the estimated selection effects (specifications refer to Columns (1) and (2) of Table 3). A test on the joint significance of the 9 selection terms confirms a bias for both samples. Selection can basically depend on the general economic environment, for example cyclical fluctuations, and how multinationals are able to cope with it. Note, though, that we do not have any well-defined expectations about the sign of the selection variables. However, we estimate a significant positive effect for most years of the direct sample. This is, intuitively, what we would expect: a higher probability to invest directly implies less new investment (the selection term can be interpreted as the inverse probability to choose the direct regime). Yet the findings for the indirect sample are ambiguous.

Table 4: Sample Selection Bias

	Regime I		Regime II	
Selection 1997	.405*	(.249)	-1.17**	(.571)
Selection 1998	-.011	(.020)	-.030	(.055)
Selection 1999	-.001	(.019)	.005	(.042)
Selection 2000	.372*	(.209)	.410	(.550)
Selection 2001	-.085	(.130)	.227	(.165)
Selection 2002	.247*	(.133)	-.012	(.097)
Selection 2003	-.059*	(.032)	-.018	(.058)
Selection 2004	.145	(.096)	.236	(.194)
Selection 2005	.098	(.065)	.239**	(.117)
Wald-test (χ^2_9)	23.80		15.72	
p-value	.005		.073	
Observations	14,487		5,949	

Selection variables 1997 - 2005 ($\hat{\lambda}_t$) are obtained from first-stage estimates (see Appendix B, Table 6). Coefficients refer to Specifications (1) and (2) in Table 3. Standard errors (in parentheses) are robust for any form of heteroscedasticity and autocorrelation, and account for the two-step estimation (see Wooldridge, 1995). (***) (**) (*) indicate significance at the (1%) (5%) (10%) level.

7 Sensitivity Analysis

Eventually, we test the robustness of the regression analysis. Table 5 presents estimations for both regimes. Columns (1) and (4) refer to 27 European Union (EU) member countries. Columns (2) and (5) refer to the EU 15. The reason for this sample restriction is that we possibly cannot capture relevant withholding tax rates, because conduit chains are complex and income is channeled through different conduit countries. Moreover, there is preferential tax treatment for some firms in many countries, with preferential treatment depending, for instance, on the legal form of the affiliate (see, e.g., Council of the European Union, 1999). If we restrict countries on the European Union, however, we can test the robustness of the findings, because the EU parent-subsidiary directive, the EU interest and royalties directive, and existing double-tax treaties often rule out withholding taxes. All results from above regressions are confirmed in Table 5. In a next step, we only analyze affiliates from the manufacturing sector (Columns (3) and (6)). Findings are also robust with respect to this sample restriction. Finally, Columns (7), (8), and (9) employ tax wedges, where the tax rate τ_C equals 10%, 20%, and 25%, for all observations. This changes the variation of the nonlinear tax term, and imposes a further restriction on the sample. Accordingly, all observations are removed if the host tax rate is above 10%, 20%, or 25% (the maximization problem in Section 3.3 requires that the host country tax rate is higher than taxation in the conduit country). All findings confirm the negative tax wedge effect, but the last specification is no longer significant.

Table 5: Sensitivity Analysis (Switching Regression)

	(EU 27)	(EU 15)	(Manufact.)	(EU 27)	(EU 15)	(Manufact.)	($\tau_C = 10\%$)	($\tau_C = 20\%$)	($\tau_C = 25\%$)
Tax Wedge (T_1)	-.513**	-.332	-.356*						
	(.210)	(.316)	(.207)						
Tax Wedge (T_2)				-.806*	-1.08**	-.788*			
				(.449)	(.489)	(.455)			
Tax Wedge (T^*_{2a})							-1.22**		
							(.620)		
Tax Wedge (T^*_{2b})								-1.25*	
								(.720)	
Tax Wedge (T^*_{2c})									-.939
									(.969)
log(Sales)	.026	.081**	-.001	.050*	.051	.033	.044	.038	.032
	(.021)	(.038)	(.020)	(.062)	(.078)	(.067)	(.055)	(.061)	(.066)
Loss carry-forward	-.034**	-.029	-.040**	-.039	-.051	-.066	-.059	-.067*	-.078*
	(.017)	(.025)	(.017)	(.032)	(.038)	(.043)	(.038)	(.040)	(.044)
log(GDP)	-.096	.212	-.172	.079	.018	.026	-.007	.066	.092
	(.149)	(.234)	(.135)	(.096)	(.126)	(.144)	(.152)	(.118)	(.120)
log(Labor Cost)	-.076	-.932***	-.014	-.225	-.365	-.151	-.236	-.416*	-.424**
	(.137)	(.254)	(.140)	(.190)	(.260)	(.174)	(.167)	(.221)	(.203)
log(Lending Rate)	.090***	.086	.100**	.095	.045	.087	.081	.115*	.111*
	(.033)	(.057)	(.030)	(.079)	(.116)	(.088)	(.085)	(.061)	(.062)
Present Value Depr.	-.186	-.545	-.060	.343	.790	.146	.047	.463	.598
	(.195)	(.538)	(.185)	(.727)	(.901)	(.948)	(1.02)	(.859)	(1.00)
Sample	1	2	3	1	2	3	4	5	6
Regime	I	I	I	II	II	II	II	II	II
Firms	2,884	1,681	2,887	1,288	1,037	1,387	1,627	1,544	1,449
Observations	12,716	6,750	12,454	4,841	3,796	5,137	5,949	5,554	5,030

Dependent variable is investment, defined as the logarithmic difference in the balance-sheet position fixed assets (ln(fixed assets$_t$) - ln(fixed assets$_{t-1}$)). Time dummies and linearized affiliate-level fixed effects are included but not reported. All estimations take into account the endogeneity of the regime choice. Standard errors (in parentheses) are robust for any form of heteroscedasticity and autocorrelation, and account for the two-step estimation (see Wooldridge, 1995). (***) (**) (*) indicate significance at the (1%) (5%) (10%) level. All reported results refer to Specification (2) of the probit equation (see Appendix B, Table 6). T_1 is defined according to Equation (4). T_2 follows (5). T^*_{2a} corresponds to (6), where τ_C corresponds to 10% for all observations. T^*_{2b} assumes $\tau_C = 20\%$, T^*_{2c} assumes $\tau_C = 25\%$ for all observations.

8 Conclusions

This paper has investigated the affiliate-level investment decision of German multinationals. A theoretical model yields different corporate tax effects, depending on whether the multinational follows a direct or an indirect investment strategy. Accordingly, we estimate a switching regression model with observed switching for two structurally different regimes. This approach allows us to control for the endogeneity of the regime choice. The empirical results confirm theoretical predictions: corporate tax effects are negative for direct investments, but positive for indirect observations. The tax-related cost of capital is confirmed to be negatively related to investment in both regimes. In particular, according to Specifications (3) and (4) of Table 3, we find a semi-elasticity of -.38 for direct and -.99 for indirect investments.

The empirical analysis supports the hypothesis that income can be transferred to the German parent without any tax deduction. This may be reasonable, given that many conditions promoting the double-dip structure are fulfilled. First, Germany is a high-tax country.[20] Second, Germany exempts dividend income almost completely. Third, the major conduit countries (see Section 2) are well-known conduit locations, often with preferential tax regimes.[21] Fourth, real conduit structures can be more complicated. Indeed, indirect structures often involve not only one conduit entity, but complex multi-country ownership chains (Weichenrieder and Mintz, 2008). This may open up more opportunities to avoid taxes.

[20] If Germany is not the high-tax country, the observation is removed in Sections 6 and 7.

[21] Special tax regimes often apply to holding companies (e.g., in Belgium, the Netherlands, Switzerland, UK; see, e.g., Council of the European Union, 1999).

One remarkable aspect of the findings is the implication for tax competition: the existence of conduit structures and low-tax conduit countries reduces the downward pressure on statutory tax rates. One may speculate whether this explains why some countries can stick to relatively high statutory tax rates. However, tax competition is a phenomenon which is not confined to one specific aspect. In fact, since national governments can use tax preferences as a strategic policy variable (see Bucovetsky and Haufler, 2008), tax competition for conduit entities may well be intensified.

Appendix A: Selection Correction for Panel Data Models under Conditional Mean Independence Assumption

Wooldridge (1995) suggests a flexible two-stage regression method to correct for sample selection bias in panel data models. We apply a similar estimation strategy on the above switching regression model, which allows us to perform robust statistical inference. Appendix A summarizes the main points of the estimator, with an emphasis on standard error correction. For details and consistency proofs, please consult the Wooldridge (1995) paper. The estimator allows for arbitrary correlation between the unobserved effects (γ_i, φ_i) and observable explanatory variables.[22] Furthermore, the error distribution in the second-stage equation remains unspecified; the idiosyncratic errors can be arbitrarily serially dependent and can have any form of heterogeneity.

We proceed with a version of the above switching regression model, where we slightly

[22] A significant part of the variation in the dependent variable is explained by unobserved heterogeneity between firms. This unobserved effect is likely to be correlated with other control variables. Hence, consistent coefficients require a fixed effects approach.

change notations for simplicity and stick closer to Wooldridge (1995). We start the analysis by first estimating a probit model

$$P(R_{it} = 1|\mathbf{x}_i) = \Phi(\mathbf{x}_i\delta_t). \tag{8}$$

Equation (8) is estimated by standard probit techniques,[23] however for each time period t. Subsequently, we obtain estimates for the selection terms, $\hat{\lambda}_{1,i} = \phi(\mathbf{x}_i\hat{\delta}_t)/\Phi(\mathbf{x}_i\hat{\delta}_t)$ and $\hat{\lambda}_{2,i} = \phi(\mathbf{x}_i\hat{\delta}_t)/(1-\Phi(\mathbf{x}_i\hat{\delta}_t))$, which are then included as control variables in the second-stage regressions (Maddala, 1983).

$$\text{Regime I:} \qquad y_{1,it} = \theta_1\hat{\mathbf{w}}_{1,it} + u_{1,it} \quad \text{iff } R = 1. \tag{9}$$

$$\text{Regime II:} \qquad y_{2,it} = \theta_2\hat{\mathbf{w}}_{2,it} + u_{2,it} \quad \text{iff } R = 0. \tag{10}$$

Here, $\hat{\mathbf{w}}$ is defined as $\hat{\mathbf{w}}_{R,it} = (1, x_{R,it}, \overline{x}_i, 0, ..., 0, \hat{\lambda}_{R,it}, 0, ..., 0)$, for $R = 1, 2$.[24] Note that we additionally include the estimated probability terms $\hat{\lambda}_R(R = 1, 2)$ from first-stage regressions and also firm-specific means to control for unobserved heterogeneity.[25] Subsequently, we obtain the coefficient vector $\theta_R(R = 1, 2)$ from a pooled OLS regression:

$$\hat{\theta}_R \equiv (\sum_{i=1}^{N}\sum_{t=1}^{T}\hat{\mathbf{w}}'_{R,it}\hat{\mathbf{w}}_{R,it})^{-1}(\sum_{i=1}^{N}\sum_{t=1}^{T}\hat{\mathbf{w}}'_{R,it}\hat{y}_{R,it}), \quad R = 1, 2.$$

[23] $(\mathbf{x})$ is a vector of control variables, including all second-stage regressors and additional regime-identifying variables.

[24] The index R still denotes the Regime, but no longer refers to the binary variable.

[25] Following Wooldridge (1995), we linearize the unobserved effects according to the Chamberlain (1980, 1982) method, who suggests to include all leads and lags of explanatory variables in order to model the relationship between the unobserved effect and the exogenous variables. To save degrees of freedom, however, we apply the Mundlak (1978) approach that imposes time-constant coefficients and include mean values of explanatory variables $(\overline{x}_i)$.

Finally, we have to account for the two-stage estimation procedure. We obtain Avar$(\hat{\theta})$ by first defining OLS residuals, $\hat{e}_{R,it} \equiv y_{it} - \hat{\mathbf{w}}_{it}\hat{\theta}$ for $R_{it} = 1, 2; i = 1, ..., N; t = 1, ..., T$. To estimate Avar$(\hat{\theta})$, we further define $\hat{\mathbf{D}}$:

$$\hat{\mathbf{D}}_R \equiv N^{-1} \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{\mathbf{w}}'_{R,it} \hat{\theta}'_R \mathbf{G}_{R,it} \text{ for R} = 1, 2, \tag{11}$$

$$\text{where } \mathbf{G} \text{ is} \quad \hat{\mathbf{G}}_{R,it} = \begin{pmatrix} \mathbf{0} & \mathbf{0} & \dots & \mathbf{0} & \mathbf{0} & \dots & \mathbf{0} \\ \mathbf{0} & \mathbf{0} & \dots & \hat{\mathbf{Z}}_{R,it} & \mathbf{0} & \dots & \mathbf{0} \end{pmatrix}. \tag{12}$$

The matrix $\mathbf{Z_{it}}$ is $\mathbf{Z}_{it} = (0'0'...0'\ \hat{v}_{it}\mathbf{x}_i\ 0'...0')'$. $\hat{v}_{it}$ is the derivative of $\lambda(\cdot)$ evaluated at $\mathbf{x}_i\hat{\delta}_t$. For simplicity, we continue without the regime identifier R and estimate Avar$(\hat{\theta})$ for the respective regime. To obtain Avar$(\hat{\theta})$ as $\hat{\mathbf{A}}^{-1}\hat{\mathbf{B}}\hat{\mathbf{A}}^{-1}/N$, we further define

$$\hat{\mathbf{A}} \equiv N^{-1} \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{\mathbf{w}}'_{it} \hat{\mathbf{w}}_{it}, \tag{13}$$

$$\hat{\mathbf{B}} = N^{-1} \sum_{i=1}^{N} \hat{\mathbf{p}}_i \hat{\mathbf{p}}'_i, \tag{14}$$

$$\hat{\mathbf{p}}_i = \hat{\mathbf{q}}_i - \hat{\mathbf{D}}\hat{\mathbf{r}}_i, \ \ i = 1, ..., N, \tag{15}$$

$$\hat{\mathbf{q}}_i \equiv \sum_{t=1}^{T} \hat{\mathbf{w}}'_{it} \hat{e}_{it}, \ \ i = 1, ..., N, \tag{16}$$

$$\hat{\mathbf{D}} \equiv N^{-1} \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{\mathbf{w}}'_{it} \hat{\theta}' \nabla_{\delta} \hat{\mathbf{x}}_{it}(\hat{\delta})', \tag{17}$$

where $\nabla_\delta \hat{\mathbf{x}}_{it}(\hat{\delta})'$ is the gradient of $\hat{\mathbf{x}}_{\mathbf{it}}(\hat{\delta})'$, evaluated at $\hat{\delta}$; $\hat{\mathbf{r}}_{it}$ is defined for each t as minus the inverse of the average estimated Hessian times the estimated score of the probit log-likelihood function for observation i, where we use the standard results for the first- and second derivatives for the probit model (e.g., Maddala, 1983). Finally, we estimate $\text{Avar}(\hat{\theta})$ as $\hat{\mathbf{A}}^{-1}\hat{\mathbf{B}}\hat{\mathbf{A}}^{-1}/N$ and obtain valid standard errors.

Appendix B: First-Stage Regression Results, Data Sources, Definitions, Sample Restrictions

The first-stage regression is concerned with the estimation of a probit model, where group-specific variables identify the respective regime (see Equation (7)). The results for pooled probit regressions are reported in Table 6.[26] We find that a higher balance-sheet total (BST_{jt}) of the whole company group is associated with a higher probability of establishing an indirect structure. All regression results in Tables 3 to 5, however, are reported according to Specification (2), where profitability (PRO_{jt}) is included as a second identifying variable.[27] The findings indicate that a higher profitability of the company group is associated with a higher propensity to invest indirectly.[28] Both effects may indicate that multinational enterprises need a certain level of size and sophistication to invest in an indirect structure. We may speculate whether only big and profitable companies have the required expertise to perform international tax planning. While the second-stage regressions consider affiliate-level variation, where we also control for affiliate-specific heterogeneity, balance-sheet total and profitability vary at the group level. Therefore, we argue that both the balance-sheet total and the profitability on the multinational-group level are valid identifying variables. If we were considering variation between countries – we actually remove it by conditioning on affiliate-specific heterogeneity – we would also expect the local tax rate to be a crucial determinant of the regime choice. To sum up, the estimations suggest

[26]Note that the empirical model in Sections 6 and 7 follows Wooldridge (1995), who suggests to estimate probits for single years t to obtain $\hat{\lambda}$.

[27]Specification tests indicate that results are robust, irrespective of whether Specification (1) or (2) is used.

[28]Profitability is defined as total profits of the multinational (after taxes, prior to profit distribution, and offsetting of losses carried forward), relative to the balance-sheet total of the group.

that, after conditioning on affiliate-specific heterogeneity, group-specific variables are the only relevant factors affecting the choice of the regime.

Table 6: Regime Identification

	(1)		(2)	
log(Balance-Sheet Total)	-.111***	(.019)	-.113***	(.019)
Profitability			-.006***	(.002)
Statutory Tax Rate	-.007	(.363)	-.009	(.363)
log(Sales)	.000	(.011)	-.000	(.011)
Loss carry-forward	.008	(.017)	.008	(.017)
log(GDP)	-.075	(.113)	-.072	(.113)
log(Labor Cost)	-.030	(.134)	-.032	(.134)
log(Lending Rate)	.002	(.034)	.002	(.034)
Present Value of Depr.	.065	(.296)	.062	(.296)
LogL.	-9,179		-9,179	
Observations	20,436		20,436	

Dependent variable is the binary indicator for direct/indirect (1/0) investment. Probit estimation including time-specific effects and linearized unobserved affiliate-specific effects. Robust standard errors (in parentheses). (***) (**) (*) indicate significance at the (1%) (5%) (10%) level. *Balance-sheet Total* is the annual aggregate at group level. *Profitability* is the profitability of the multinational group, defined as total profits of the multinational (after taxes, prior to profit distribution, and offsetting of losses carried forward), relative to the balance-sheet total of the company group.

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Table 7: Data Sources, Definitions, and Sample Restrictions

Firm-level Data	*Source:* Microdatabase Direct Investment (MiDi). *Definition:* Investment is the logarithmic difference in the balance-sheet item fixed assets.
Corporate Tax Rates	*Source:* International Bureau of Fiscal Documentation (IBFD), Ernst&Young, PwC, and KPMG. *Definition:* Statutory Corporate Tax Rates.
Withholding Tax Rates	*Source:* Worldwide Corporate Tax Guide provided by Ernst&Young. Withholding tax rates refer to 2005. *Definition:* Withholding taxes on interest payments.
GDP	*Source:* World Bank World Development Indicators (2006). *Definition:* Gross domestic product in US$, nominal.
Labor Cost	*Source:* U.S. Bureau of Labor Statistics and Eurostat. *Definition:* Hourly compensation costs for production workers in manufacturing in US$.
Lending Rate	*Source:* IMF International Financial Statistics Yearbook (2006), augmented with corresponding OECD figures. *Definition:* Interest rate for credits to the private sector.
Present values of depreciation allowances	*Source:* Depreciation rules from above tax-data references *Definition:* Calculated for investments in machinery, discount rate 7.1 percent.
Sample Restrictions	According to the model, we drop all observations where the German statutory tax rate is below the foreign statutory tax rate, $\tau_G < \tau_F$. Tax rates account for the non-deductibility of interest expenses with respect to the German local business tax. Minority holdings and partnerships are excluded, as well as the following non-manufacturing sectors: education, health, veterinary and social care, financial services, holding companies, other services, recreational, cultural and sporting activities, retail and wholesale trade, real estate and renting, research and development, telecommunication and post, private households with employees activities of other membership organizations, nonprofit organizations serving households, general government, sewage and refuse disposal, compulsory social security, agriculture, hunting and forestry (see Lipponer, 2007). Note that restrictions do not apply on Figures 2 and 3.
Sensitivity Analysis	Table 5 refers to the following sample definitions: Sample 1 (2): only EU 27 (EU 15) member countries. Sample 3: only manufacturing industries. Sample 4: sets τ_C at 10% for all observations. The basic arbitrage condition then requires that host country tax rates are higher than 10%. Sample 5: sets τ_C at 20% for all observations. The basic arbitrage condition then requires that host country tax rates are higher than 20%. Sample 6: sets τ_C at 25% for all observations. The basic arbitrage condition then requires that host country tax rates are higher than 25%.

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