Personal Taxes, Labour Regulation, and the Location Decisions of Multinationals

Shafik Hebous Goethe University Frankfurt and CESifo; hebous@wiwi.uni-frankfurt.de

Alfons J. Weichenrieder[1] Goethe University Frankfurt, Vienna University of Economics and Business, Oxford University Centre for Business Taxation, and CESifo; a.weichenrieder@em.uni-frankfurt.de

February 2013

Abstract

This paper examines the effects of international differences in labour market conditions on multinational firms' entry decisions. In particular, we focus on labour market regulations and top personal income taxes and explicitly distinguish between the modes of the new investment. We find that corporate taxes in a potential host country seem more detrimental for Greenfield than for Merger and Acquisitions (M&A). Our results for the effects of personal taxes point into the same direction, but depend on the estimation method and the chosen sample of countries.

Keywords foreign direct investment, personal taxation, labour regulation, corporate taxation, Greenfield, M&A, mixed logit model

JEL Classification H25, H73, F23

[1] Support from the European Tax Policy Forum (ETPF) is gratefully acknowledged. We thank Thomas Hemmelgarn, Michael Devereux, and participants of the ETPF/CEPS Workshop in Brussels, April 2012 for comments on an earlier version and Michael Lang for helpful suggestions. All remaining errors are ours. We also thank the Research Center of the Deutsche Bundesbank for its hospitality and support.

1. Introduction

A growing body of literature suggests that the probability of locating a new foreign direct investment (FDI) project in a particular country is negatively affected by the level of corporate taxation. Whereas early evidence reported a negative impact of corporate taxation based on aggregate FDI flows, recent contributions complement this finding by relying on firm-level data. Examples are Devereux and Griffith (1998), Buettner and Ruf (2007), and Egger and Merlo (2011). de Mooij and Everdeen (2003) Feld and Heckermayer (2011) provide surveys.

Clearly, the attractiveness of countries as potential hosts for new FDI depends on a vector of characteristics including not only taxation but also a range of country-specific policy variables. While from a tax perspective the effect of corporate taxation on the location decision has received most attention, an aspect that so far received less attention in the literature is with regard to characteristics of the local labour market. The profit maximisation problem of foreign direct investors might include aspects such as the level of personal taxation in host countries and prevailing regulations; e.g., the rigidity of the regulation of dismissals including the size of severance payments, the potential of unions to extract rents from highly profitable subsidiaries, and the access to a skilled labour force.

Why should personal taxes matter for FDI? Two particular arguments may be put forward. The first one is based on a managerial view of the multinational firm and argues that a number of managers, who potentially have some power on the selection of the location, will move to the host country where the new FDI affiliate will be established. Since, ceteris paribus, high personal taxes means lower disposable income, managers decide to locate the new investment

in a low personal tax environment. The second hypothesis is based on the classical argument of the relationship between income and efforts and has recently been emphasized by Egger and Radulescu (2011). High taxes decrease disposable income and hence lower also incentives of employees to supply efforts. Firms have to compensate employees for high taxes by providing higher wages to induce high efforts and productivity. Both arguments suggest that a higher personal tax rate discourages new FDI.

Yet, FDI are heterogeneous in many aspects. One benefit of using firm-level data is to allow for heterogeneous responses. One dimension of heterogeneity is the mode of investment; that is whether the new FDI project is in the form of a Greenfield project or acquiring or merging with an already exiting firm (M&A). Hebous, Ruf, and Weichenrieder (2011) indicate that the effects of taxes are more pronounced on Greenfield projects than on M&A. The suggested reason is that high corporate taxes lower expected cash flows, and thus taxes can be (partially) capitalised in the acquisition price. The findings support this hypothesis. Although this argument of capitalization has originally focused on corporate taxes, it can be extended by the same token to the case of personal taxes. If firms were to pay higher wages to support employees' efforts, then high wages will be reflected in the acquisition price. Also, the managerial model predicts that personal taxes can have differential effects on Greenfield investment and M&A. This argument is based on the observation that in the case of a Greenfield FDI, as compared to M&A, a significantly higher number of top managers move from the parent to the host country. This empirical regularity has been documented in Harzing (2002). Parent firms that prefer Greenfield as a mode of entry seem to rely more strongly on their own personnel and management skills to ensure effective integration of the new affiliate into the multinational group.

Against this background, this paper uses German firm-level data on new FDI in the pre-crisis period from 2005 to 2007 to incorporate both aspects in the analysis: personal taxation and the entry mode. Particularly, based on the above arguments, we test two predictions: 1) Personal taxes affect the location of a new FDI, and 2) personal taxes have a differential effect on the likelihood of choosing a location for a new project depending on the mode of FDI (Greenfield or M&A). Results provide mixed evidence depending on the estimation methodology and the chosen sample of countries. Conditional logit estimates, using the marginal top personal tax rate, strongly support the first prediction when the top personal tax rate is used. At the same time, the average personal tax rate shows no statistically significant effect. Even when we use the top statutory personal tax rate, the tax elasticities for Greenfield and M&A projects are rather similar and the conditional logit estimates provide no support for the second hypothesis. The paper also employs random coefficient (mixed) logit models. In many respects, the results are in line with those reported based on conditional logit estimates: personal top statutory tax rates help predict location decisions. Unlike in the logit model, they now have a much more pronounced effect on Greenfield projects than on M&As. At the same time, the personal average tax rate is still insignificant in our sample of OECD countries. This may support the view that the detrimental effect comes from more expensive remunerations and bonuses of the top managers rather than the higher average cost for staff. Corporate income taxes have a significantly negative effect in all our specifications. The results confirm previous research that high corporate taxes deter Greenfield in particular.

The paper is structured as follows. Section 2 will discuss in more depths the relevant literature on location choice, labour markets and entry modes. Section 3 will introduce the data, whereas section 4 presents the empirical methodology. Section 5 reports our results. The conclusions in Section 6 put forward some suggestions for future research.

2. Literature Review

2.1 Host Country Characteristics and FDI

The literature on the effects of country-specific variables on FDI is rather extensive so that providing a full survey is beyond the scope of this paper. To focus the overview we consider recent and most related contributions. Egger and Radulescu (2011) look at the progressivity of labour taxes and the top marginal income tax rates of countries in a cross section of countries. More precisely, their paper looks at the difference between the top-income tax rate in the parent country and the host country as well as at the difference in the progressivity measures of the income tax systems. The authors find that in a cross section of bilateral FDI flows a higher difference in the progressivity and in the top rates lead to significantly less FDI bilateral FDI flows between the two countries involved. The authors interpret this result as evidence that a high tax rate in the country of the parent leads to lower outflows. This in turn is interpreted as the difficulty of implementing performance based pay schemes for the management of parent countries when there is a high marginal tax rate on labour income. In a more recent study, Egger, Radulescu and Strecker (2012) specifically look at a set of headquarters and again find adverse personal tax effects. Unlike in the present paper, no distinction is made in these studies as to whether establishments have been created via Greenfield or M&A activities.

Some studies address the role of labour market regulations in attracting FDI. Haaland, Wooton and Faggio (2002) find that labour market flexibility significantly affects location choice using data on European transition countries and a sample of 537 subsidiaries of multinational enterprises. Javorcik and Spatareanu (2005) look at new European subsidiaries established by large European companies. The authors conclude (p. 396) that the increase in flexibility that reflects the difference between France (inflexible) to the UK (flexible) may

lead to an increase in investment volume between 12 and 26 percent, depending on the exact measure. Another related study is Görg (2005) who stresses that inflexible labour markets, by introducing an exit cost, put the foreign investor into a situation of uncertainty and partial irreversibility of investment. The higher the cost of exit or entry, the more it pays for the investor to defer investment waiting for more concrete profitability signals.

While there is initial evidence that, along with corporate taxes, labour taxes and labour regulation is retarding the set-up of foreign affiliates, so far there is no evidence on how different forms of investments may be affected to a different extent. Foreign direct investment may occur because of an ownership change of an existing firm or plant or as a result of a new Greenfield investment. From the perspective of the host economy, the two sorts of FDI may have quite different implications. Harms and Méon (2011), for example, find that it is only Greenfield FDI that exerts growth effects in developing countries.

Different forms of FDI may have a different impact on the host economy. At the same time, there is also reason to believe that high taxes may have a different effect on different forms of FDI. Swenson (2001) and Hebous, Ruf and Weichenrieder (2011) argue that corporate taxes may have a smaller impact on mergers and acquisitions and a comparatively larger effect on Greenfield investment. In the former case, a large fraction of future taxes may be capitalized in the acquisition price, which can compensate the foreign investor for the high level of taxation. A possibly important factor in the decision on where to invest is the size of the personal tax for the top management that may come from the parent company's home country to organize the set-up and operation of the affiliate in the host economy. A high level of personal taxation may have to be compensated by a higher level of pre-tax income or otherwise may reduce the willingness of top management to move abroad.

2.2 Determinants of FDI Modes of Entry

Whereas early studies on the theory of international investment treat FDI firms as homogeneous, recent studies distinguish between Greenfield and M&A investments, predicting that firm-specific and country-specific characteristics play the major role in determining the mode of investment.[2] Regarding the role of taxes, Auerbach and Hassett (1993) are among the first to point out that taxes may affect the decision whether to acquire old capital or invest in new capital. In the framework of international tax competition, Becker and Fuest (2010; 2011) argue that raising taxes leads to an increase in the number of M&A investments and lowers the number of Greenfield investments.

Nocke and Yeaple (2008) show that more-productive firms tend to enter the foreign market with a Greenfield rather than a M&A investment. Nocke and Yeaple also provide empirical evidence on U.S. FDI firms from a binary model supporting this theoretical prediction. Neary (2007) introduces an oligopolistic market structure in a general-equilibrium framework and shows that firms acquire their high-cost revivals. In this model there are no Greenfield investments. In Nocke and Yeaple (2007), firms acquire other firms to complement their abilities. Bjorvatn (2004) shows that increased economic integration enhances cross-border M&A by reducing the reservation price and reducing the business-stealing effect. In essence, the incentive of cross-border mergers is to exploit comparative-advantage opportunities. Coeurdacier et al. (2009) find that increased European integration and the euro have fostered M&A activates in manufacturing sectors within Europe. While these models are not necessarily models for horizontal FDI, similar conclusions arise in the context of horizontal FDI models. Raff et al. (2009) show that highly productive firms tend to prefer Greenfield to M&A investments.

[2] See Markusen (2002) and Faeth (2009) for overviews of earlier FDI theories. Helpman (2006) stresses the importance of considering the various forms of FDI projects.

3. Data

3.1 Firm-Level Data

The German foreign trade and payments regulation obliges all German firms and individuals investing abroad to report key information such as balance sheet items of their foreign affiliates as soon as mild thresholds concerning size are exceeded. In contrast to several other firm-level data sources, this leads to a highly representative datathat have been made available to researchers at the MiDi database of Deutsche Bundesbank in Frankfurt.

Since 2005, German investors are required to report whether a new investment is a Greenfield or M&A project. This is a novel piece of information that enables us to directly identify the mode of entry and conduct our empirical investigation. Our sample includes 4263 new outbound FDI affiliates in the pre-crisis period from 2005 to 2007. M&A projects constitute about 64 percent of the new affiliates whereas the rest of the affiliates are Greenfield investments. Due to restrictions in complementary data on the host economies, we restrict our attention to a list of 25 countries as potential host locations in our sample. As each of our observed projects imply that the 24 other countries have not been chosen, the total observations in our panel are more than 100,000.

3.2 Macroeconomic Data

In contrast to most studies in the literature, we summarize the tax system of a host country by two variables instead of only one. The first variable is the statutory corporate income tax rate provided by Mintz and Weichenrieder (2010). The second variable is the marginal personal income tax rate as it applies to labour income at 167% of the country's average income. Alternative, we will also use the average personal income tax rate at this income.

As laid out above, a plausible hypothesis is that the personal tax rate has a higher deterring effect on Greenfield as compared to acquisitions as Greenfield investments usually require a larger number of mobile managers who are sent from the country of the parent to the host economy. Clearly, using a single number to represent the attractiveness of a host economy's tax system for expatriate managers is a stark simplification. The exact tax cost will depend on the general as well as specific exemptions and deductions. Allowances for children should be important as well as the rate and the base of social security contributions. At the same time, the idea that taxes may increase the cost of incentive contracts (Egger and Radulescu, 2011) suggests that the top marginal tax rate is a most relevant indicator and we also decided to use this measure, but in alternative specifications we also use the average personal tax rate as applicable to a worker with 167% of the average income in the respective country.

There is also the issue as to what extent host countries provide specific tax incentives to expatriates coming to their countries. Indeed, some countries, like Austria and the UK, under specific conditions provide special allowances for the housing cost in the host economy. In Belgium, certain foreign expatriates may reduce their taxable income depending on the number of days spent outside Belgium.[3] Arguably the most generous approach is found in the Netherlands where for up to 10 years expatriates may deduct 30 percent of their taxable income. While in most countries the special incentives for high skilled expatriates are selective and more short-term oriented, this seems a more universal and more significant rule.

Regarding the labour market conditions, we employ the OECD labour protection index (*oecd_protec_index*) measure. It is constructed so as to particularly capture the costs involved in dismissing individuals or groups of workers and the problems involved in hiring workers on fixed-term or temporary work agency contracts. Therefore, this index is particularly suited

[3] Cf. CESifo Dice data base (http://www.cesifo-group.de/ifoHome/facts/DICE.html).

to capture the labour market related exit costs for investors. Table 1 also provides the definitions and sources of additional covariates, like the *Real Wage Index*, *Corruption*, and the respective country's distance with respect to Germany.

Table 1

Variable Definitions and Sources

Variable	Definition	Source
Y	A dummy that takes the value 1 for the chosen host economy and the value zero otherwise	Deutsche Bundesbank
MA	A dummy that takes the value 1 if the investment takes the form of M&A and zero if the investment is a Greenfield project	Deutsche Bundesbank
Marginal top personal tax rate	Marginal personal income tax rate for workers with 167% of the average income	OECD
Average top personal tax rate	Average personal income tax rate for workers with 167% of the average income	OECD
Labour Reg Index	The OECD labour protection index. It measures the strictness of regulation of individual dismissal of employees on regular/indefinite contracts.	OECD
Corporate tax rate	The statutory corporate income tax rate	KPMG and Mintz and Weichenrieder (2010)
No. affiliates	The logarithm of the number of affiliates already operating in the host economy	Deutsche Bundesbank
Total assets	The logarithm of total fixed and intangible assets invested by the parent firm in location *l*.	Deutsche Bundesbank
GDP capita	The logarithm of gross domestic product per capita based on PPP of the host economy	International Financial Statistics of the IMF
Population	The logarithm of the total number of inhabitants in the host economy	International Financial Statistics of the IMF
Distance	The logarithm of the distance between Germany and the host economy	CEPII
Market capitalization	The ratio of market capitalization of listed companies to GDP	World Development Indicators of the World Bank
Unit labour cost	Unit labour costs measure the average cost of labour per unit of output and are calculated as the ratio of total labour costs to real output.	OECD
Rule of law	Reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.	World Bank / The Worldwide Governance Indicators

Table 2

Selected Host Economies of New German Outbound FDI Projects in Our Sample (2005 – 2007)

Country	Share of German Greenfield (percent)	Share of German M&A (percent)	Rank Greenfield	Rank M&A	Corporate tax rate	Marginal personal tax	Average personal tax	OECD_ protect_index
USA	17.1	10.3	1	2	40	38.9	29.9	0.17
UK	5	10.8	3	1	28	41	30.8	1.12
France	4.4	7.3	5	3	33.33	42.3	33.1	2.47
Austria	4.3	5.4	6	4	25	37.5	37.9	2.37
Netherlands	4.1	4.9	7	5	25.5	50.7	37.8	2.72
Spain	3	3.4	8	8	30	28	25.3	2.46
Poland	2.7	3	10	9	19	30.3	28.8	2.06
Italy	2.2	4.1	11	6	31.4	49.2	35.5	1.77
Czech Republic	2.2	2.3	11	12	21	40.5	28.1	3.05
Hungary	1.9	1.3	13	20	16	53	44.5	1.92
Canada	1.8	1.9	14	13	33.5	33	26.8	1.25
Japan	1.5	1.3	15	20	40.69	30.3	24.2	1.87
Mexico	1.5	1.3	15	20	28	24	13.9	2.25
Belgium	1.4	2.9	17	10	34	60.9	48.9	1.73
Sweden	1.25	2.4	19	11	28	56.6	37.8	2.86
Turkey	1	1.3	20	20	20	38.6	32.6	2.56
Portugal	0.8	0.8	21	25	25	45	30	4.17
Australia	0.7	1.4	22	17	30	41.5	28.2	1.42
Finland	0.5	1.4	24	17	26	48.6	37.6	2.17
Ireland	0.5	1.2	24	24	12.5	43.3	29.5	1.6

Annotation: The shares of investment projects of the respective host economies are for 2005 through 2007. The values for the corporate tax rate, the top personal tax rate and the OECD labour protection index are for the year 2007.

Our sample includes 25 countries that together account for more than 75 percent of all new German M&A projects or all Greenfield projects in the MiDi worldwide data base.[4] Table 2 provides selected countries in our sample and their corresponding Greenfield and M&A shares in total Germany FDI in 2005. While there are some differences in the importance of countries depending on whether we consider M&A or Greenfield, the numbers of Greenfield and M&A are highly correlated among countries. The Spearman rank coefficient between Rank M&A and Rank Greenfield that can be calculated from table 2 is 0.78, which together

[4] These countries are: Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Greece, Hungary, Ireland, Italy, Japan, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovenia, Spain, Sweden, Turkey, UK, and USA.

with table 2 suggests that there is no single country driving the empirical analysis that will follow.

A possible problem is the high correlation between the personal and the corporate tax variables. Therefore, table 3 reports the pattern of correlation. The coefficient of correlation between the top marginal personal tax rate and the corporate tax rate is -0.07 whereas the coefficient of correlation between the top average personal rate and the corporate tax rate is -0.10. This makes for a rather weak correlation. Conversely, the average personal tax and marginal average tax variables are highly correlated reaching a coefficient of 0.85.

Table 3

Correlation Matrix between Tax Rates in the Sample

	top marginal personal rate	top average personal rate	corporate rate
top marginal personal rate	1		
top average personal rate	0.8518	1	
corporate rate	-0.0762	-0.1088	1

4. Empirical Analysis

4.1 Investigation Approach

Consider a firm that selects a location abroad for its new FDI. We assume that the observed chosen location is associated with the highest expected profit. Let Π_i denote the profit function associated with each potential location $i = 1, 2, \ldots, n$:

$$\Pi_{k,i} = (1-\tau_i)\left[R_{k,i} - C^j_{k,i}(PT_i)\right] - I^j_{k,i}(\tau_i, PT_i),$$

where the subscript k denotes affiliates and j denotes either a Greenfield or a M&A investment. The variable τ_i is the corporate income tax rate in location i. R_i is revenue. The

cost function C_i^j depends on various factors. Our focus in this study is on personal income taxation in the host country (PT_i).

The term $I_i^j(\tau_i, PT_i)$ captures the initial cost of the FDI in the case of Greenfield projects and the purchase price in the case of M&A projects. As discussed in Swenson (2001) and Hebous, Ruf, and Weichenrieder (2011), we expect $\frac{\partial I_{k,i}^{M\&A}(\tau_i)}{\partial \tau_i} < 0$ due to the capitalization of taxes in the acquisition price. The value of a firm is the present value of the cash payoffs that the claim holders of the firm receive. Corporate taxation reduces the value of a firm not only for the acquirer, but also to the incumbent owner and will therefore reduce his reservation price. Such a reduction of the reservation price of the incumbent will be missing in the case of Greenfield or will be restricted to immobile factors such as land.

Whether the capitalization argument can be extended to the case of personal taxation is unclear. Potentially, some of the effects may be capitalized in local wages rather than in the acquisition price and it is an empirical question whether Greenfield and M&A react differently to these host country characteristics. In any case, a higher level personal taxation and labour market rigidity increase expected costs and hence are expected to reduce the probability of selecting a location. Apart from the potential difference in the capitalization, Greenfield and M&A projects typically differ with respect to the number of managers that are sent from the parent company into the host country (Herzing, 2002). For this reason, we expect a more pronounced negative effect of the personal tax on Greenfield investment.

4.2 Empirical Specification

Most studies in the literature on international location decisions rely on a variety of the conditional/multinomial logit model with restrictive assumptions. We first follow the literature and estimate a conditional logit model. Empirically, we observe the binary variable:

$$y_{k,l} = \begin{cases} 1 \text{ if } \Pi^*_{k,l} > \Pi^*_{k,i}, i = 1,2,...n, \text{and } l \neq i \\ 0 \text{ otherwise} \end{cases}, \quad (1)$$

Profits are functions of country-specific variables as follows:

$$\Pi^*_{k,l} = \phi_1 \tau_l + \phi_2 PT_l + \boldsymbol{\theta} \mathbf{Z}_{k,l} + \varepsilon_{k,l}. \quad (2)$$

Our focus is on the estimates of ϕ_1 and ϕ_2. The vector $\boldsymbol{\theta}$ is a vector of coefficients corresponding to the control variables in **Z**, and $\varepsilon_{k,l}$ is a residual.

However, the above specified model entails restrictive substitution patterns between potential host counties and relies on the assumption of independence of irrelevant alternatives (IIA). The IIA assumption implies that, ceteris paribus, the relative odds of choosing between two countries are the same independently from the other available alternatives. Under this assumption, disallowing investment in the US means that investments in France and Canada would increase by the same proportions. Hence, in addition, we estimate a random-coefficients probability (mixed logit) model that allows the coefficients ϕ_1, ϕ_2, and $\boldsymbol{\theta}$ to be random and that relaxes the IIA assumption.

Let β be the associated vector of all coefficients ϕ_1, ϕ_2, and those in $\mathbf{Z}$. We treat β_k as random variables with $\beta_k \sim \mathcal{N}[\beta, \Sigma]$. The analogous to equation (2) is:

$$\Pi^*_{k,l} = \phi_{k,1}\tau_l + \phi_{k,2}Pk, T_l + \boldsymbol{\theta}_{\mathbf{k}}\mathbf{Z}_{k,l} + u_{k,l}\,, \tag{3}$$

where

$$u_{k,l} = X_{k,l}v_k + \varepsilon_{k,l}\,,$$

and

$$v_k \sim N[0, \Sigma].$$

The vector *X* is the vector of all covariates. Furthermore, through the $COV(v_{kl}, v_{ij}), l \neq i$, the model permits profits across potential locations to be correlated. Cameron and Trivedi (2005) show that the probability of choosing a location in this model is given by a multidimensional integral without a closed solution. Therefore, the estimation employs simulation methods to maximize the following likelihood function:

$$\ln \widehat{L}\,(\beta, \Sigma) = \sum_{k=1}^{K}\sum_{l=1}^{L} y_{k,l} \ln \left[\frac{1}{N}\sum_{n=1}^{N} \frac{e^{(\Pi^*_{k,l} - u_{k,l})\beta_k}}{\sum_{m=1}^{M} e^{(\Pi^*_{k,i} - u_{k,i})\beta_k}}\right], \tag{4}$$

where *N* is the number of evaluations of the multidimensional integral expression of the choice probability at random draws of β from the normal distribution.[5]

5. Empirical Results

Based on the above arguments and the literature review, we can summarize our hypotheses as follows:

> **Hypothesis 1**: High values of personal income tax rate reduce the probability of selecting a location. That is, we expect ϕ_2 to be negative.

[5] Train (2009) provides a detailed treatment of the derivation of the likelihood function and the computational methods for simulation.

Hypothesis 2: The effect of personal income taxation on attracting new FDI is more pronounced in the case of Greenfield investments. That is, we expect the marginal effect of the personal tax to be larger in absolute value in the case of Greenfield investments.

Table 4 displays estimation results obtained from the standard discrete choice model for the location decision. Estimated coefficients of non-linear models cannot be interpreted as marginal effects. Therefore, all results in table 4 are reported in terms of elasticities to allow direct interpretation of the economic magnitudes. In the full sample, in column (1), the statutory corporate income tax rate and the top marginal personal tax rate are statistically significant and have the expected signs. This is in line with the results in Hebous, Ruf and Weichenrieder (2011). Additionally, the marginal top personal tax rate is also negative and significant lending support to hypothesis 1. However, column (2) displays an unexpected result that the top average personal tax rate is an insignificant determinant of the location choice. This is particularly puzzling because the *marginal* personal tax rate in column (1) is significant and has the expected negative sign. The statutory corporate income tax rate maintains its significance and has the expected negative sign in both columns.

In our setup, we examine Hypothesis 2 based on two different sub-samples for the new FDI entry equation: the sample of Greenfield projects and the sample of M&A projects. We compare, for instance, the estimates in column (3) with those in column (5). The elasticities of the corporate income tax rates are in line with the capitalization hypothesis. In particular, corporate taxation has a more pronounced effect on Greenfield investment than on M&A.

Table 4

Estimation Results for the Location Equation (Elasticities)

	Full Sample		Greenfield Sample		M&A Sample	
	(1)	(2)	(3)	(4)	(5)	(6)
Corporate tax rate	-0.867 [a]	-1.042 [a]	-1.654 [a]	-1.982 [a]	-0.508 [a]	-0.575 [a]
	(0.136)	(0.143)	(0.220)	(0.230)	(0.175)	(0.184)
Marginal top personal	-0.425 [a]		-0.525 [b]		-0.436 [a]	
tax rate	(0 .140)		(0.268)		(0.165)	
Average top personal		0.001		0.364		-0.237
tax rate		(0.143)		(0.261)		(0.170)
Labour unit_cost	-0.104 [c]	-0.046	-0.311 [a]	-0.189 [c]	0.016	0.047
	(0.063)	(0.062)	(0.110)	(0.104)	(0.078)	(0.077)
Labour Reg Index	-0.310 [a]	-0.193 [b]	-0.345 [b]	-0.090	-0.281 [a]	-0.237 [b]
	(0.088)	(0.089)	(0.162)	(0.160)	(0.105)	(0.106)
Distance	-0.452 [a]	-0.407 [a]	-0.238 [a]	-0.140 [a]	-0.575 [a]	-0.557 [a]
	(.0282)	(0.029)	(0.048)	(0.048)	(0.035)	(0.036)
Population	0.720 [a]	0.779 [a]	0.882 [a]	0.980 [a]	0.633 [a]	0.666 [a]
	(0.038)	(0.038)	(0.067)	(0.067)	(0.045)	(0.046)
GDP capita	0.868 [a]	0.878 [a]	1.418 [a]	1.491 [a]	0.604 [a]	0.562 [a]
	(0.131)	(0.134)	(0.211)	(0.216)	(0.172)	(0.176)
Market capitalization	-0.189 [b]	-0.198 [b]	-0.469 [a]	-0.445 [a]	-0.020	-0.049
	(0.083)	(0.086)	(0.145)	(0.153)	(0.102)	(0.105)
Rule of law	0.429 [a]	0.446 [a]	0.417 [b]	0.398 [a]	0.423 [a]	0.468 [a]
	(0.111)	(0.116)	(0.186)	(0.198)	(0.140)	(0.145)
No. affiliates	0.330 [a]	0.333 [a]	0.160 [a]	0.164 [a]	0.430 [a]	0.431 [a]
	(0.034)	(0.035)	(0.050)	(0.050)	(0.049)	(0.049)
Total assets	0.018 [a]	0.018 [b]	0.076 [a]	0.075 [a]	-0.015	-0.015
	(0.007)	(0.007)	(0.011)	(0.011)	(0.010)	(0.001)
Observations	89,214	89,214	32,179	32,179	57,035	57035
Log likelihood	-12214	-12219	-4182	-4183	-7948	-7951

Notes: [a] indicates significance at the level of 1%. [b] indicates significance at the level of 5%. [c] indicates significance at the level of 10%. Robust standard errors are reported between parentheses. All level variables are expressed in natural logarithm. If a German parent invests in a specific host country, the latent variable corresponding to the logit model is $y_l = 1$ for this host country and $y_l = 0$ for all other countries that were omitted by this parent. See the table in section 3 for detailed definitions and sources of the variables.

With regard to the labour protection index and the labour unit costs both are significant and negative. Still, the marginal personal tax rate is negatively significant whereas the average personal tax rate is not. We may note that the latter result can be reversed if we drop US investments. In this case the average tax rate, as the marginal personal tax rate, appears with a negative and significant sign (results are not reported). One problem may be that tax rate differentials between US states exist that we cannot exploit as the exact location of the German affiliates within the US is not revealed in our data.

Further, concerning the other control variables, distance to the host country has a negative effect as expected and consistent with existing studies. The development of the host country as measured by the GDP per capita has a positive effect on the probability of receiving new FDI projects. *No. affiliates* enters positively indicating a positive effect of the experience of German firms in the respective country. *Total assets*, which measures the total fixed and intangible assets of the parent firm in the respective location is also entering positively, while only insignificantly in column (3). The coefficients of *GDP per capita* and *Population* clearly indicate the attractiveness of larger markets and higher income levels. The estimated coefficient on the role of law index has positive sign pointing on that a good quality of institution encourages FDI.

The above results are based on a discrete choice model assuming the independence of irrelevant alternatives. We test this assumption based on the following Hausman-test procedure. First, we estimate the unrestricted model including all possible locations. Second, we estimate a restricted model in which one potential location is discarded. Third, we test whether or not there are systematic differences in the estimated coefficients of the restricted and the unrestricted model. The null hypothesis is that there are no systematic differences in

the estimated coefficients; that is, the IIA holds. The overall results of Hausman tests that we conducted tend to reject the IIA. For this reason, we proceed to estimations using the random-coefficients mixed logit model described in (3). Table 5 shows the estimation results. Corporate taxes have a negative effect on the probability of choosing a location for a Greenfield investment, but not for M&A. This finding is in line with that in table 4 and in Hebous, Ruf, and Weichenrieder (2011) based on conditional logit estimations. Personal taxation continues to deter investment projects when the tax is measured by the marginal personal tax rate and the focus is on the full sample. However, unlike the conditional logit results, we now find that the marginal tax rate has a different impact depending on whether we look at Greenfield or M&A projects. The estimates for the sample of Greenfield investments report a significant coefficient of the marginal personal tax rate whereas in the case of M&A it is insignificant. Broadly, this finding is still in line with the notion that M&A projects are less sensitive to taxes. Further, unlike in most of the columns of table 4, the mixed logit regressions do not confirm a significantly negative effect of *Labour unit_cost* and *Labour Reg Index*. Similarly, the significance is lost for *Rule of law* and *Market capitalization*.

As discussed in section 3.2, the Netherlands is a country that provides comparatively large and widespread tax incentives for foreign high skilled labour. As our tax variables do not take up these special incentives, the problem of correctly measuring the personal tax burden may be particularly pronounced for the Netherlands, which is also a quantitatively important host country in our sample. Therefore, we re-estimated the random-coefficients probability model excluding the possibility of locating the new target investment in the Netherlands. The results are reported in table 6. They hardly differ from the results for the full OECD in table 5, which suggests that measurement problems of the tax burden is not a major issue for the estimations.

Table 5

Random Coefficient (Mixed Logit) Estimation Results for the Location Equation

	Full Sample		Greenfield Sample		M&A Sample	
	(1)	(2)	(3)	(4)	(5)	(6)
Corporate tax rate	-1.425[c]	-2.057[a]	-3.944[a]	-4.904[a]	-0.049	-1.316
	(0.748)	(0.802)	(1.082)	(1.263)	(1.205)	(0.808)
Marginal top personal	-1.566 [a]		-2.441 [a]		-1.046	
tax rate	(0.533)		(0.724)		(0.678)	
Average top personal		-0.978		-0.329		-0.383
tax rate		(0.710)		(0.923)		(0.628)
Labour unit_cost	0.001	0.001	-0.002	0.003	0.004	0.002
	(0.001)	(0.001)	(0.002)	(0.003)	(0.002)	(0.001)
Labour Reg Index	-0.076	-0.000	-0.060	0.082	-0.014	0.025
	(0.054)	(0.055)	(0.081)	(0.090)	(0.066)	(0.067)
Distance	-0.565[a]	-0.499[a]	-0.388[a]	-0.242[a]	-0.573[a]	-0.543[a]
	(0.049)	(0.064)	(0.069)	(0.071)	(0.065)	(0.047)
Population	0.530 [a]	0.604 [a]	0.694 [a]	0.774 [a]	0.501[a]	0.592[a]
	(0.056)	(0.062)	(0.108)	(0.125)	(0.057)	(0.074)
GDP capita	0.525[a]	0.612[a]	1.037[a]	0.967[a]	0.421	0.493[c]
	(0.180)	(0.197)	(0.292)	(0.330)	(0.317)	(0.268)
Market capitalization	0.001	0.001	-0.001	-0.002	0.003	0.001
	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)
Rule of law	0.210	0.239	0.147	0.307	0.266	0.257
	(0.177)	(0.189)	(0.261)	(0.249)	(0.252)	(0.266)
No. affiliates	0.860[a]	0.807[a]	0.679[a]	0.700[a]	0.628[a]	0.616
	(0.185)	(0.097)	(0.103)	(0.112)	(0.132)	(0.127)
Total assets	0.039[b]	0.049[c]	0.126[a]	0.145[a]	0.022	0.024[a]
	(0.020)	(0.026)	(0.020)	(0.021)	(0.022)	(0.021)
Observations	81,097	81,097	29,021	29,021	52,076	52,076
Log likelihood	-8280	-8300	-2709	-2702	-5509	-5509

Notes: [a] indicates significance at the level of 1%. [b] indicates significance at the level of 5%. [c] indicates significance at the level of 10%. Robust standard errors are reported between parentheses. All level variables are expressed in natural logarithm. If a German parent invests in a specific host country, the latent variable corresponding to the logit model is $y_l = 1$ for this host country and $y_l = 0$ for all other countries that were omitted by this parent. See the table in section 3 for detailed definitions and sources of the variables.

6. Conclusions

This study sheds additional light on two issues. One issue concerns the heterogeneity of FDI. Almost all studies that have dealt with tax effects on FDI have ignored the different entry modes of multinational firms and the potentially different effects that taxes may have in these different cases. In support of the limited evidence so far, we find that the estimated elasticities with respect to corporate taxes seem to be larger in the case of Greenfield investment. Since previous estimates do not distinguish between the mode of investment, or employ aggregate FDI statistics, they offer an average marginal effect over both modes and hence may underestimated the negative effects of taxes.

Another issue that has received quite little attention so far is the role of personal taxation on FDI location. In line with the limited previous empirical work that exists we find a significant role of the top marginal income tax rate on the FDI if we use top marginal tax rates. However, the results are not clear-cut when we use the average personal tax rate. Our results are mixed when it comes to labour market regulations. Here the detrimental effects on FDI is significantly documented in the simple logit regressions, but not in the mixed logit regressions.

Table 6

Random Coefficient Estimation Results for the Location Equation (Excluding the Netherlands)

	Greenfield Sample		M&A Sample	
	(1)	(2)	(3)	(4)
Corporate tax rate	-3.388[a]	-4.691[a]	-0.488	-1.076
	(1.010)	(1.117)	(0.973)	(1.079)
Marginal top personal tax rate	-2.048 [a]		-0.957	
	(0.688)		(0.649)	
Average top personal tax rate		-0.380		-0.460
		(0.985)		(0.771)
Labour unit_cost	-0.002	0.003	0.004	0.004
	(0.004)	(0.003)	(0.002)	(0.003)
Labour Reg Index	-0.152[c]	0.086	-0.013	0.022
	(0.092)	(0.103)	(0.064)	(0.076)
Distance	-0.314[a]	-0.217[a]	-0.577[a]	-0.542[a]
	(0.069)	(0.066)	(0.058)	(0.055)
Population	0.591 [a]	0.671[a]	0.532[a]	0.607[a]
	(0.101)	(0.112)	(0.071)	(0.083)
GDP capita	1.747[a]	0.881[a]	0.418	0.485[b]
	(0.257)	(0.330)	(0.260)	(0.250)
Market capitalization	-0.002	-0.002	0.003	0.002
	(0.003)	(0.003)	(0.002)	(0.002)
Rule of law	0.220	0.268	0.214	0.306
	(0.251)	(0.297)	(0.239)	(0.232)
No. affiliates	0.602[a]	0.578[a]	0.793[a]	0.849[a]
	(0.146)	(0.111)	(0.083)	(0.082)
Total assets	0.135[a]	0.161[a]	0.001	0.016
	(0.023)	(0.023)	(0.019)	(0.021)
Observations	25,997	25,997	46,414	46,414
Log likelihood	-2446	-2433	-4965	-4956

Notes: [a] indicates significance at the level of 1%. [b] indicates significance at the level of 5%. [c] indicates significance at the level of 10%. Robust standard errors are reported between parentheses. All level variables are expressed in natural logarithm. If a German parent invests in a specific host country, the latent variable corresponding to the logit model is $y_l = 1$ for this host country and $y_l = 0$ for all other countries that were omitted by this parent. See the table in section 3 for detailed definitions and sources of the variables.

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