Anti-Avoidance Legislations and the Location Choice of Multinational Firms*

Valeria Merlo Nadine Riedel Georg Wamser

Abstract

We analyse whether the location decision of multinational corporations is affected by legislations that restrict tax-motivated profit shifting by multinational firms. Using rich panel information on the location of German multinational firms, we find that the introduction and tightening of thin capitalisation rules and transfer price documentation requirements significantly reduces a country's probability to attract subsidiaries of multinationals. We discuss implications of our findings for the welfare assessment of anti-avoidance laws.

Keywords: Corporate Taxes, Multinational Location Choice, Thin-Capitalization Laws, Transfer Pricing Legislations

JEL Classification: H2, H7

---

*Merlo: University of Tübingen, e-mail: valeria.merlo@uni-tuebingen.de, Riedel: University of Bochum, e-mail: nadine.riedel@rub.de, Wamser: University of Tübingen, e-mail: georg.wamser@uni-tuebingen.de.

1 Introduction

Growing empirical evidence suggests that multinational corporations (MNCs) transfer income from high-tax to low-tax entities by distorting the prices for intra-firm trade and the corporate debt-equity structure (see Devereux and Maffini (2007) for a survey). Tax authorities in high-tax countries have raised concerns about the associated corporate tax revenue losses for many years. With the emergence of the global financial crisis and tight public budgets, critics of multinational income shifting strategies have recently gained new momentum and the issue has moved up on political agendas.

Governments in many countries responded and implemented unilateral measures to hedge against profit outflows from their borders. To cap tax-motivated lending from low-tax entities to high-tax affiliates within multinational groups, many countries enacted so-called thin capitalisation clauses that restrict the deductibility of interest payments from the corporate tax base.[1] To limit tax-motivated mispricing of intra-firm trade, many governments furthermore introduced transfer pricing legislations that require firms to set intra-firm prices according to the arm's length principle[2] and to prepare detailed documentation of intra-firm price choices.

In 2013, the OECD published a report on multinational profit shifting and base erosion together with an action plan that aims to identify policy instruments and best practices to limit shifting activities. The assessment of thin capitalisation clauses and

[1] While many countries put caps on the deductibility of interest on intra-firm debt only, some rules also refer to external corporate debt. See Section 2 for details.

[2] The arm's length principle requires prices for intra-firm trade to adhere to prices that would have been chosen by independent parties.

transfer pricing guidelines are one of the main tasks on the OECD's action list (see OECD (2013)).

While the academic literature brought forward a number of empirical papers that confirm the effectiveness of thin capitalisation rules and transfer pricing laws in limiting multinational shifting behaviour, it has so far largely been ignored that anti-avoidance legislations may also impact on the location of real activity of multinational firms. As introducing or tightening anti-profit-shifting provisions increases the effective corporate tax burden of multinational firms when operating in high-tax countries, MNCs have an incentive to relocate their real activity from high-tax to low-tax entities in response. While anti-avoidance measures may thus benefit high-tax countries by reducing outward profit shifting and increasing corporate tax revenues (from multinational operations located in the country), they may simultaneously lower multinational investments and jobs and might, through this channel, exert detrimental effects on national welfare.

The purpose of the present paper is to identify the impact of anti-avoidance laws on multinational investments. In particular, we assess the impact of thin capitalisation rules and transfer pricing legislations on the location choice of multinational firms. Using rich data on the outbound locations of the universe of German multinational firms between 1999 and 2011, we develop an empirical model that accounts for the worldwide location choices of firms. For that purpose, the firm-level data is augmented by information on thin capitalisation rules, transfer pricing laws and corporate tax provisions in 172 countries around the world. Thin capitalisation clauses are modelled by the debt-to-equity ratio above which debt-holdings are deemed to be excessive and interest deduction from the corporate tax base is denied. Transfer pricing provisions

are captured by two dummy variables. The first dummy indicates whether a country's tax law in general acknowledges that intra-firm transfer prices have to be set according to the arm's length principle. The second dummy indicates whether specific legislations exist that require MNCs to prepare transfer price documentation.

Our baseline analysis models the multinational location choices using a standard conditional logit framework. One well-known limitation of the conditional logit model is that it assumes the error terms related to potential location choices to be independent which endows the model with the independence from irrelevant alternative assumption (IIA). To relax this assumption and allow for a more flexible modelling, we furthermore estimate a mixed logit (or random coefficient) model which allows parameters in the model to be randomly distributed and thus accounts for heterogeneity in the responsiveness of firms to corporate taxation incentives. A key strength of the approach is that this allows computing own and cross-elasticities of our tax and anti-avoidance legislation variables across locations that capture more realistic substitution patterns than the conditional logit model.

Our results indicate that anti-shifting legislations and high taxes deter investment activity. Quantitatively, using the results of the mixed logit model, a one percent lower corporate tax rate in the UK increases the probability to choose the UK as a foreign affiliate location by about 1%. At the same time, a lower tax in the UK would imply a 0.10% lower probability that a randomly drawn firm from the data chooses France as a location and a 0.16% lower probability to locate in the US. We also find a statistically significant impact of thin capitalisation provisions on the location choice of multinational firms, which turns out to be stable across specifications. While our results do not

point to a negative effect on location choices when general transfer pricing provisions are introduced, the implementation of transfer price documentation requirements reduces the probability that a multinational firm locates in a country. Again, using the results of the mixed logit approach, an abolishment of transfer price documentation requirements may lead to interesting substitution patterns. If, for example, the US abolished its transfer pricing documentation requirements, this would benefit the US and increase the location probability of a randomly drawn firm from the data base by 2 percentage points. The results furthermore indicate that countries like France and the UK would suffer in terms of location propensity in this scenario.

The findings may have important implications for economic policy. As sketched above, recent unilateral and multilateral initiatives combat multinational profit shifting with increasing vigor. There is disagreement, though, about instruments and reform options. Broadly speaking, while some actors favour the introduction of comprehensive anti-shifting legislations like thin capitalisation rules and transfer pricing guidelines to limit multinational shifting behaviour, others are skeptic about the instruments' effectiveness and cost-benefit ratio and propose the introduction of a formula apportionment system, where multinational profits are consolidated and apportioned to individual entities according to a formula reflecting the MNC's real activity (see, e.g., European Commission (2011), Avi-Yonah et al. (2009) and Hines (2010) for a survey).[3] Understanding the welfare implications of anti-shifting provisions is thus important to make

[3]The major benefit of formula apportionment is that profit consolidation at the group level abolishes multinational income shifting incentives. But the system gives rise to other distortionary effects, making the welfare consequences of a regime change from the current separate accounting to a formula apportionment system ambiguous.

an informed decision on the optimal design of the international corporate tax system for multinational firms.

Our paper contributes to several strands of the literature. First, it relates to a growing number of empirical papers that provide evidence for multinational profit-shifting activities. Among others, Swenson (2001), Clausing (2003) and Bartelsman and Beetsma (2003) show that MNCs distort intra-firm transfer prices in order to relocate income from high-tax to low-tax affiliates. Huizinga et al. (2008), Møen et al. (2011), Buettner and Wamser (2013), Overesch and Wamser (2013), and Egger et al. (2014) present evidence in line with debt-shifting activities and show that corporate taxes distort the debt-equity structure of multinational affiliates (see also Heckemeyer et al. (2013), for a meta-study). As sketched above, recent contributions furthermore find that anti-shifting legislations are effective in limiting multinational income transfers to low-tax entities (see Overesch and Wamser (2010), Buettner et al. (2012), Blouin et al. (2014) for thin capitalisation provisions and Lohse and Riedel (2013) and Beer and Loeprick (2013) for transfer pricing laws).[4] Our paper contributes to the literature by assessing the impact of anti-avoidance legislations on the location of real corporate activity, precisely on the location choice of multinational firms. To the best of our knowledge, this

[4]Note that our data-set does not allow us to assess the impact of another anti-avoidance instrument, so-called controlled foreign company (CFC) legislations, that have been enacted in various countries over the past decades and make passive multinational income located at tax haven affiliates taxable in the MNC's home country. As we study outbound investments of German multinational firms, all corporations in our sample share a common parent country. Changes in German CFC provisions are thus a common shock to all sample firms and potential investment effects can therefore not be disentangled from common trends. Evidence on the impact of CFC rules on company behaviour has recently been reported by Ruf and Weichenrieder (2012).

link has so far largely been ignored.[5]

Our paper can also be connected to prior work which assesses the impact of corporate taxation on the location decision of multinational firms. The large majority of papers on corporate taxation and firm activity analyse corporate tax effects on *marginal* investment decisions (see, e.g., deMooji and Ederveen (2003), and Heckemeyer and Feld (2011)). The impact of corporate taxes on location choices is, on the contrary, studied by a relatively small number of papers only. Early work by Devereux and Griffith (1998) reports evidence that corporate taxation deters the location of multinational subsidiaries. Barrios et al. (2012) recently confirmed this finding using rich data on European multinationals. In line with this evidence, our estimates suggest a negative impact of corporate taxes on multinational location decisions and, additionally indicates a negative impact of anti-avoidance rules. Moreover, contrary to most prior work, our analysis accounts for the worldwide location decision of multinational firms and does not restrict the perspective to a limited set of countries in the OECD, Europe or North America.

The remainder of the paper is structured as follows. Section 2 describes the legal background of the analysis, sketching the development of corporate tax rates and anti-shifting legislations in countries around the world within our sample period. Sections 3 and 4 describe our data-set and the estimation strategy. The results are reported in Section 5. Section 6 discusses policy implications and concludes.

[5]Buettner et al. (2014) look at marginal investment decisions and how these are affected by thin capitalisation rules. They find that they exert negative effects only in countries with relatively high taxes.

2 Corporate Taxes and Anti-Shifting Legislations

In order to test the link between anti-shifting provisions and multinational location choices, we create a comprehensive country-level data-set that comprises corporate tax rates, thin capitalisation requirements and transfer pricing regulations in 172 countries around the world.

2.1 Corporate Tax Rates

The corporate tax rate information was collected from various sources, including IBFD and the corporate tax guides of Ernst & Young, PWC and KPMG.[6] As depicted in Figure 1, our sample period has seen a decline in statutory corporate tax rates. The average rate in our sample countries dropped from 30% in 1999 to 23% in 2011. The declining trend is, moreover, not unique to Europe or the developed world but has also been observed in emerging markets and developing economies (see Figure 1, which shows the development of the average corporate tax rate separately for high, middle and low income countries following the World Bank definition.).[7]

[6]As discussed in detail in previous work, corporate location choices are determined by the average effective tax burden in a potential host country and may thus also be affected by tax depreciation allowances (see, e.g., Devereux and Griffith (1998)). As for highly profitable investments the average corporate tax rate converges to the statutory rate, we abstract from elements related to the tax base definition in the analysis to come.

[7]Recent evidence relates the decline in the statutory corporate tax rates to international competition for mobile capital and profits (see, e.g., Devereux et al. (2008)).

2.2 Thin Capitalization Rules

As described in the introductory section, MNCs have an incentive to distort the financial structure of their operations in order to shift income from high-tax to low-tax entities. A common strategy implies that equity is injected in a low-tax affiliate within the multinational group which then lends to high-tax entities in foreign countries. As interest payments related to the intra-firm lending are deductible from the corporate tax base, the associated income is stripped out of the high-tax country and taxed at a low or zero rate at the tax-haven entity.

The purpose of thin capitalisation rules is to limit the deductibility of interest payments on intra-firm loans from the corporate tax base, thereby reducing the described debt-shifting incentives. The rules define a threshold for the ratio of internal debt and equity, commonly referred to as safe-haven rule. If internal debt holdings exceed the threshold, the firm is deemed to engage in excessive debt-holdings for profit-shifting purposes and interest deduction from the corporate tax base is denied. Following the existing literature (see, e.g., Buettner et al. (2012)), our empirical analysis captures the existence and tightness if thin-capitalization provisions by defining a variable

$$TCR_{it} = \frac{\sigma_{it}}{1 + \sigma_{it}}, \tag{1}$$

where σ_{it} stands for the safe-haven ratio between internal debt and equity. Thus, if a country does not impose any thin capitalisation legislations at time t, σ_{it} converges to infinity and the TCR_{it} measure converges to 1. In turn, if interest deductibility is completely denied and the allowed ratio of internal debt to equity is imposed to be 0, TCR_{it} takes on the value zero. In general, the higher the TCR_{it} measure, the smaller the scope of the thin capitalisation provisions. As an example, Dutch thin capitalisation

provisions allowed for a safe haven debt-equity ratio of 3:1 throughout our sample period. Below this threshold interest deductibility from the corporate tax base is safely granted. Consequently, our TCR measure takes on the value $0.75(= 3/(3+1))$.[8]

The prevalence of thin capitalisation requirements has increased substantially over our sample period. While 34 countries had implemented thin capitalisation provisions in 1999, the number had increased to 58 in 2011 (see Figures 2 and 4). Figure 5 indicates that this upward trend reflects that non-OECD, in particular low and middle income countries, increasingly enacted thin capitalisation provisions over the recent decade.[9] The average safe-haven ratio, however, remained rather stable and only slightly dropped from 0.95 to 0.91 between 1999 and 2012.

2.3 Transfer Pricing Laws

We furthermore augment our data by information on the scope and evolution of transfer pricing laws in our sample countries. Information on transfer pricing regulations was collected from various sources, in particular from the transfer pricing guides published by Deloitte, Ernst & Young, KPMG, and PwC (see also Lohse et al. (2012)).

[8]Note that this variable definition abstracts from some specific details of thin capitalisation laws. For example, some countries' provisions not only refer to internal debt holdings but are extended to external debt. Application of the thin capitalization ratio can additionally be automatic which means that interest deductibility is always restricted if the foreign subsidiary's debt ratio exceeds the relevant ratio. Alternatively, some countries allow for discretion in applying the thin capitalization ratio, considering a foreign subsidiary's leverage in comparison to the leverage of similar resident firms that are not foreign subsidiaries. See Blouin et al. (2014) for further details.

[9]A large fraction of OECD members, in turn, had implemented the provisions in 1999 already.

Our analysis classifies the transfer pricing system in our sample countries along two lines. Firstly, we define an indicator variable, which reflects whether a country's tax law (and/or the tax authority guidelines) acknowledge that intra-firm transfer prices should adhere to the arm's length principle and transfer prices should thus correspond to the prices that would have been chosen by independent parties (TPL_{it} takes value 1 if a country i's legislation requires some compliance in period t, and 0 otherwise). Secondly, we define a dummy variable which, on top, indicates whether countries require firms to prepare documentation of their transfer prices which has to be made available to tax authorities upon request (in the course of audits) or has to be handed in directly with the firm's annual tax return ($TPDOC_{it}$ takes value 1 if country i imposes documentation requirements in period t, and 0 otherwise). Transfer pricing documentation laws are commonly strictly imposed. In many countries, the burden of proof with respect to the appropriateness of a transfer price switches from the tax authorities to the taxpayer if no or only insufficient documentation has been provided, for example.

As depicted in Figures 3 and 4, a rising number of countries around the world enacted general transfer pricing legislations and specific transfer price documentation requirements within our sample period. While in 1999, 34 and 14 countries had implemented general transfer pricing laws and documentation requirements, respectively, the number had increased to 69 and 64 countries in 2011. The steep increase in the prevalence of transfer pricing provisions is observed in both developed as well as developing economies (see Figure 6).

2.4 Correlation among Policy Instruments

Table 1 reports a strong positive correlation between different anti-avoidance measures. In particular, countries that have enacted thin capitalisation provisions observe a higher probability to also have implemented transfer pricing legislations and vice versa. The correlation between the variables is determined with around 0.4 and is statistically significant. Intuitively, the data furthermore shows that general transfer pricing laws are commonly augmented by specific documentation requirements (correlation coefficient of 0.8). The anti-avoidance provisions furthermore exhibit a positive and statistically significant correlation with the host country's corporate tax rate, reflecting that high-tax economies have a higher incentive to augment their tax law by provisions that limit outward multinational profit shifting to tax haven economies.

3 Firm Level Data and Control Variables

To test whether thin capitalization rules and transfer pricing requirements affect the location choice of MNCs, we make use of the German firm-level census-type data MiDi (Microdataset Directinvestment) provided by Deutsche Bundesbank. This annual database comprises information on direct investment stocks of German enterprises held abroad and provides information about each foreign affiliate's balance sheet, ownership and the German investor. Data collection is enforced by German law, which determines reporting mandates for international capital links if the balance-sheet total of the direct investment enterprise exceeds 3 million Euro.[10] This data-set is particularly well suited

[10] All German firms and households which hold 10 percent or more of the shares or voting rights in a foreign enterprise with a balance-sheet total of more than 3 million euros are required by law to report

to explore the determinants of corporate location choices, as we observe all (directly and indirectly held) new entities established by German firms in foreign countries over a 12 year period between 1999 and 2011.

Our basic sample includes 31,090 location choices made by 7,274 multinational firms. We exclude firms from the financial services sector and holding companies as many countries grant such entities special (often preferential) tax treatments (e.g. special tax exemptions and special safe haven ratios in thin capitalisation laws). Overall, we account for the worldwide location choice of the multinational firms in 172 countries (only 115 locations are actually chosen in our estimation sample, though). In long-format, the data comprises 2,167,339 observations.

The multinational firms' location choice is explained by the corporate tax rate and anti-avoidance provisions described above as well as a rich set of control variables that have been identified in previous research as determinants of corporate location decisions. In particular, we include the log of a country's GDP, which captures local market size and demand conditions. We expect that the location choice probability is positively related to this variable, ceteris paribus. The log of GDP per capita proxies for a country's labor productivity. If this variable is a proxy for purchasing power and

balance-sheet information to Deutsche Bundesbank. Indirect participating interests had to be reported whenever majority-owned foreign affiliates held 10 percent or more of the shares or voting rights in other foreign enterprises until the end of year 2006. Thereafter, indirect participating interests had and have to be reported whenever foreign affiliates held more than 50 percent or more of the shares or voting rights in other foreign enterprises with a balance-sheet total of more than 3 million euros. The reporting requirements are set by the Foreign Trade and Payments Regulation. For details and a documentation of MiDi, see Lipponer (2009).

the foreign entity is part of a horizontal FDI strategy, we would expect a positive impact. If, on the other hand, the foreign entity is part of a vertically integrated firm and the MNE produces intermediate goods in low wage countries, a higher GDP per capita, and thus higher labor productivity and higher average wages, might as well have a negative impact on location choice. GDP growth is a general measure for the economic attractiveness of a country. We furthermore include a control variable for financial depth that measures domestic credits provided to the private sector in a country relative to a country's GDP. The variable is positively correlated with the quality of a country's financial market, so it should increase the location probability as access to financing of foreign entities is facilitated. Furthermore, we use information on the country's inflation rate. All five variables are all taken from the World Bank's World Development Indicators Database.

Finally, information on the country's institutional quality as proxied by indicators for a country's financial freedom, investment freedom, labor freedom and property rights provided by the Heritage Foundation. Higher values of these indices should be associated with lower costs in the foreign country, so we would expect that estimated coefficients are positive.

The analysis furthermore accounts for control variables that reflect the geographic distance between the potential host location and the parent country Germany. In particular, we include the log of the distance of a potential host country to Germany as well as an indicator whether or not Germany and the potential host country share a common border. These variables are often included in gravity-type specifications of trade and control for geographical closeness. We furthermore include control variables

which indicate whether the potential host country is a former German colony and whether the potential host country and Germany share a common language. The latter four bilateral variables are taken from the CEPII database to capture geographical and cultural closeness. Hence, all four variables are expected to be associated with a positive effect on the probability to choose a location.

Finally, we include information on the cost of business start-up procedures in percent of gross national income per capita and internet users per 100 people, respectively, provided by the World Bank's Development Indicator Database. While the cost of business start-up seems to be clearly an entry cost factor for MNEs (irrespective of whether FDI is vertical or horizontal), so its impact is expected to be negative, the number of internet users may increase the probability to choose a specific country if high values reflect low cost due to reliable infrastructure. However, if vertical production is the purpose of the foreign activity, low values could capture characteristics of those countries that are often chosen as locations for vertical FDI, so the impact of the number of internet users may as well be negative.

4 Empirical Methodology

Following McFadden (1974), we model a choice decision, where a multinational firm obtains payoff from locating a subsidiary n in a host country j at time t

$$\pi_{njt} = V_{jt} + \epsilon_{njt}. \tag{2}$$

V_{jt} is a function of observable host country attributes $\mathbf{x_{jt}}$. ϵ_{njt} is unknown and treated as random. The parent firm chooses the location that yields the highest payoff. The

probability that the parent n chooses alternative i is thus given by

$$P_{nit} = Pr(\pi_{nit} > \pi_{njt}) \quad (3)$$

$$= Pr(V_{it} + \epsilon_{nit} > V_{jt} + \epsilon_{njt}) = Pr(\epsilon_{njt} - \epsilon_{nit} < V_{it} - V_{jt}), \forall j \neq i. \quad (4)$$

Assuming that the random terms are IID type I extreme value distributed, yields the conditional logit model:

$$P_{nit} = \frac{exp(V_{it})}{\sum_{j=1}^{J} exp(V_{jt})} \quad (5)$$

with the representative payoff being defined as

$$V_{it} = \alpha_1 \tau_{it} + \alpha_2 TCR_{it} + \alpha_3 TPDOC_{it} + \mathbf{x'_{it}}\beta. \quad (6)$$

In specification (6), τ_{it} indicates the host country's corporate tax rate, TCR_{it} describes the existence and scope of a host country's thin capitalisation requirements as measured by the safe haven debt-equity rule defined in the previous section and $TPDOC_{it}$ is a dummy variable indicating whether the host country's tax authorities require transfer price documentation (additionally, we include the variable TPL_{it} which indicates whether country i's tax legislation requires arm's length transactions). Following our argumentation above, we expect high corporate tax rates to deter the multinational location choice ($\alpha_1 < 0$) and stricter anti-shifting legislations to equally exert a negative impact on the location propensity (reflected in a positive coefficient estimate $\alpha_2 > 0$ as a higher TCR_{it} indicates more leeway in the deductibility of interest payments on debt from the corporate tax base and is thus expected to increase the location propensity). Transfer price documentation requirements are equally expected to reduce profit-shifting options and thus lower a country's attractiveness for multinational sub-

sidiaries ($\alpha_3 < 0$). The vector $\mathbf{x_{it}}$ comprises the rich set of control variables described above.

The conditional logit model relies on the assumption that the stochastic error term is IID distributed which rules out correlation in latent payoffs. This feature endows the model with the independence of irrelevant alternatives (IIA) property, which implies constant relative choice probabilities and equal proportional substitution between the location alternatives.

To allow for a more flexible modelling, we also estimate a mixed (or random coefficients) logit model that incorporates observed and unobserved heterogeneity in firms' location choices (see inter alia, Berry et al. (1995, 2004), Nevo (2001) and Train (2003)). The key strength of this approach is that it allows computing own and cross elasticities of our tax and anti-avoidance legislation variables across locations that reflect patterns of correlation in observed choices in the data, and therefore to capture more realistic substitution patterns than the conditional logit model described above.

The mixed logit model particularly allows parameters in the model to be randomly distributed and thus accounts for heterogeneity in the responsiveness of firms to tax incentives when deciding on the location of new subsidiaries. Specifically, we allow some parameters in the model (those for the tax and anti-avoidance measures) to vary across firms. The function of payoff-determining host country controls becomes

$$V_{nit}^{mix} = \alpha_{1n}\tau_{it} + \alpha_{2n}TCR_{it} + \alpha_{3n}TPDOC_{it} + \mathbf{x_{it}'}\beta, \tag{7}$$

where α_{1n}, α_{2n} and α_{3n} are assumed to be normally distributed ($\alpha_{1n} \sim N(a_1, \sigma_1)$, $\alpha_{2n} \sim N(a_2, \sigma_2)$ and $\alpha_{3n} \sim N(a_3, \sigma_3)$) and uncorrelated with each other and with other covariates. As in the conditional logit model, ϵ_{nit} is assumed to be distributed iid

type I extreme value. The parameters a_1, a_2 and a_3 capture the mean marginal effect of tax and anti-shifting provisions on the payoff, σ_1, σ_2 and σ_3 stand for the standard deviation in the effect of tax and anti-shifting provisions on the payoff.

If α_{1n}, α_{2n} and α_{3n} were known, the choice probability would correspond to the standard conditional logit model, and condition on α_{1n}, α_{2n} and α_{3n}

$$P_{nit} = \frac{exp(V_{nit}^{mix})}{\sum_{j=1}^{J} exp(V_{njt}^{mix})}. \tag{8}$$

The unconditional probability is the integral of P_{nit} over all possible parameters:

$$\rho_{nit} = \int \frac{exp(V_{nit}^{mix})}{\sum_{j=1}^{J} exp(V_{njt}^{mix})} f(\alpha) d\alpha, \tag{9}$$

where α is the coefficient vector comprising α_{1n}, α_{2n} and α_{3n} and coefficients vary over location choices in the population of firms with density $f(\alpha)$. This density, in turn, is a function of the parameters a_1, a_2, a_3 and σ_1, σ_2, and σ_3.

The effect of marginal changes in the corporate tax rate or anti-avoidance provisions on location probabilities can be computed based on equation (9). If jurisdiction j, for example, reduces the scope of its thin capitalisation provision, the effect on the location propensity of jurisdiction i reads

$$\frac{\partial \rho_{nit}}{\partial TCR_{jt}} = \int \frac{\partial P_{nit}}{\partial TCR_{jt}} f(\alpha) d\alpha \tag{10}$$

5 Empirical Results

Table 3 presents conditional logit estimates. Specification (1) models the MNCs' location choice as a function of the host country's corporate tax rate and a number of basic country control variables, precisely GDP, GDP per capita, GDP growth, and the

distance from the MNCs' parent country, in our case Germany. The coefficient estimate for the corporate tax rate turns out negative and statistically significant as expected, suggesting that a higher corporate tax rate reduces the probability of MNCs to choose a location. Specification (2) augments the set of regressors by additional control variables reflecting geographical, historical and social ties between the parent country Germany and the potential host country for the MNCs' investment as well as credit market access and variables that capture the host country's governance situation. Again, the coefficient estimate for the corporate tax variable turns out negative and statistically significant.

Specification (3) augments the model by the TCR_{it} variable defined in Section 2, which indicates the safe haven debt-to-equity ratio above which the deduction of interest income from the corporate tax base is denied. In line with the intuition spelled out above, the coefficient estimate for the variable is positive and statistically significant, indicating that the location propensity increases if a host country allows a larger fraction of interest payments on internal debt to be tax deductible. Specification (4) reestimates Specification (3) replacing the safe-haven variable TCR_{it} with a binary measure, which indicates whether the host country has implemented thin capitalisation rules or not. The coefficient estimate for the thin capitalisation measure again turns out to be positive, although it does not fully gain statistical significance. Specification (5) furthermore augments the model in Specification (3) by dummy variables indicating whether potential host countries have enacted general transfer pricing legislations and transfer price documentation requirements, respectively. The coefficient estimate for the documentation requirement indicator turns out negative and statistically significant, suggesting that MNCs' location choices are deterred if transfer price

documentation rules exist. The coefficient estimate for the general transfer pricing law variable in turn exhibits a positive sign, which seems counterintuitive. However, note that the literature on thin capitalisation rules and also, for example, research on double tax agreements put forth the argument that introducing some form of legislation reduces investment risk and uncertainty for investors. Ceteris paribus, particularly when documentation requirements for transfer prices are controlled for, such arguments may similarly apply in the context of the transfer pricing law dummy variable. Note that the coefficient estimate for the corporate tax variable and the thin capitalisation rules remain unaffected by the inclusion of the transfer pricing variables.

The results suggest that anti-avoidance legislations exert a quantitatively important impact on the location propensity of new multinational subsidiaries. If the US, for example, decided to simultaneously abolish its thin capitalisation law and transfer price documentation requirement, the probability that a multinational affiliate locates in the US would increase by 4.65 percentage points. Abolishing just the thin capitalisation law or the documentation rule would result in a 2.17 and 2.13 percentage points increase in the propensity to locate in the US. Analogously, if the UK or Denmark decided to simultaneously abolish their thin capitalisation rules and transfer price documentation laws, the location propensity in the respective country would rise by 3.72 and 0.59 percentage points respectively.

Furthermore note that the control variables exhibit the expected signs. A country's size, development level and economic conditions (as measured by GDP, GDP per capita and GDP growth) as well as geographic proximity (as measured by distance and sharing of a common border) increase the location propensity of multinational firms. Social or

historical ties like a common language and the status as a former German colony equally raise the probability to observe the location of a new multinational subsidiary as do high-quality institutions and easy domestic credit market access.

As described above, the conditional logit model relies on the independence of irrelevant alternatives assumption which implies that relative location propensities remain unaffected by the modelling of additional choice options. To relax this assumption, we furthermore estimate the mixed logit model described above. The results are presented in Table 4. Specification (1) accounts for the set of regressors in Specification (5) of Table 3. The findings are consistent with the previous estimates in the sense that the estimated coefficient mean for the corporate tax variable turns out negative and statistically significant, while the estimated coefficient mean for the thin capitalisation debt-equity rule and the transfer price documentation variable are positive and negative, respectively. The findings, thus, again indicate that high corporate tax rates deter the location of multinational affiliates, as do strict thin capitalisation laws and transfer price documentation requirements. The standard deviation of all three coefficients is not found to be statistically different from zero.

Specification (2) augments the set of regressors by an additional control variable to make sure that country controls do not capture features of a market's general attractiveness from the perspective of German firms. We use the first lag of total sales of German multinationals in a particular country to proxy for this. While the coefficient estimate for the new control variable turns out positive and statistically significant, as expected, the inclusion leaves the coefficient estimate of interest for our tax and anti-avoidance variables largely unchanged.

Moreover, as described in Section 4, the random coefficients have so far been assumed to vary across subsidiary location choices of the population of firms. This allows for a correlation in latent payoffs across alternatives for a given subsidiary location decision. In Specification (3), we estimate a model where the random coefficients vary at the level of the multinational firm, which accounts for the fact that MNCs may decide on more than one subsidiary location within our sample frame and allows for a correlation in latent payoffs across all subsidiary location decisions made by one multinational firm. The results are presented in Column (3) of Table 4. While the estimated coefficient means are comparable to the previous specifications, the estimated standard deviations now turn out statistically significant as well, suggesting heterogeneity in responses to tax and anti-avoidance legislations across multinational firms.

The mixed logit approach allows for interesting policy experiments. Based on estimates from specification (1) in Table 4, Table 5 presents own- and cross-tax-elasticities for some selected countries. The diagonal elements of this matrix typically display positive elasticities as we quantify the effect of a tax reduction. For example, the estimate of 0.79 for Switzerland (line CHE, column CHE) implies that a 1% tax reduction in Switzerland increases the probability to locate there by 0.79%.[11] The other entries in Table 5 refer to cross-tax-elasticities. For a given country in a given line, the elements in that line display the effects on countries in columns. For example, the first line in Table 5 shows that a tax reduction in Canada, and the positive relocation effect for

[11] To be precise, the elasticity of the probability to locate in country i in year t with respect to the tax in location j is

$$e_{nijt} = \frac{\partial \rho_{nit}}{\partial \tau_{jt}} \frac{\tau_{jt}}{\rho_{nit}} = \int \frac{\partial P_{nit}}{\partial \tau_{jt}} f(\alpha) d\alpha \frac{\tau_{jt}}{\int P_{nit} f(\alpha) d\alpha}$$

Canada, will mainly come at the expense of the US.

Table 6, finally, presents the base probability of choosing one of the selected countries. Given our data, this base probability is highest for the USA. The interpretation for the estimate of 0.10 and 0.06 for the US and UK, respectively, for example, is that a randomly chosen affiliate in our data locates with a probability of 10 and 6 percent in the US and UK, respectively. The next column in Table 6 then examines the impact on countries given in lines if the US abolished all documentation requirements. Since we estimate a negative impact for $TPDOC$, this obviously implies that the US gain (the location probability increases by about 2 percentage points). As the numbers show, the abolishment of transfer pricing documentation in the US comes mainly at the cost of France and the UK. The last column in Table 6 moreover presents changes in probabilities referring to an experiment where all countries abolish their documentation requirements. Given the data, this has very different implications for the countries presented. While UK and the US are, for example, predicted to gain in terms of location propensity (0.5 and 0.9 percentage points respectively), France, Italy and Switzerland face reductions in location propensities by 0.4 percentage points or more.

6 Conclusion

The purpose of this paper was to assess the impact of anti-avoidance legislations on the location decision of multinational firms. Using comprehensive data on worldwide foundations of new affiliates of German multinationals, our findings indicate that thin capitalisation provisions and transfer price documentation requirements deter multinational location decisions. Both, the tax effects and the effects of the anit-shifting

provisions moreover turn out to be economically significant.

The findings may have important implications for the welfare assessment of anti-shifting provisions. In particular, while thin capitalisation rules and transfer pricing laws may limit multinational shifting activities as shown by previous papers, they also imply that high-tax countries lose out in terms of real investment and employment, which may, in consequence, exert detrimental effects on national welfare. Thus, while international tax competition for attracting mobile multinational paper profits is likely reduced by the introduction of anti-shifting provisions, our results indicate that countries may still be reluctant to increase corporate tax rates as this may trigger an outflow of real corporate activities from their borders. This may dampen the hope that anti-avoidance legislations are an effective instrument to limit international tax competition behaviour, especially relative to alternative approaches like the introduction of formula apportionment regimes.

7 References

Avi-Yonah, R.S., M.C. Durst and K. Clausing (2009), Allocating business profits for tax purposes: A proposal to adopt a formulary profit split, *Florida Tax Review* 9(5), 497-553.

Barrios, S., Huizinga, H.P., Laeven, L., and Nicodème, G. (2012), International taxation and multinational firm decisions, *Journal of Public Economics*, 96(11-12), 946-958.

Bartelsman, E. J. and R.M.W.J. Beetsma (2003), Why pay more? Corporate tax avoidance through transfer pricing in OECD countries, *Journal of Public Economics* 2003, 2225-2252.

Berry, S., J. Levinsohn and A. Pakes (1995), Automobile prices in market equilibrium, *Econometrica* 63 (4), 841-890.

Berry, S., J. Levinsohn and A. Pakes (2004), Differentiated products demand systems from combination of micro and macro data: the new car market, *Journal of Political Economy* 112 (1), 68-105.

Blouin, J., H.P. Huizinga, L. Laeven and G. Nicodème (2014), Thin capitalization rules and multinational firm capital structure, CentER Discussion Paper, 2014-007, Tilburg: Finance.

Buettner, T., M. Overesch, U. Schreiber, and G. Wamser (2012), The impact of thin-capitalization rules on the capital structure of multinational firms, *Journal of Public Economics* 96, 930-938.

Buettner, T., M. Overesch, and G. Wamser (2014), Anti profit-shifting rules and foreign direct investment, CESifo Working Paper No. 4710, 03/2014.

Buettner, T. and G. Wamser (2013), Internal debt and multinationals profit shifting - Empirical evidence from firm-level panel data, *National Tax Journal* 66, 63-95.

Clausing, K.A. (2003), Tax-motivated transfer pricing and US intrafirm trade prices, *Journal of Public Economics* 87, 2207-2223.

de Mooij, R.A. and S. Ederveen (2003), Taxation and foreign direct investment: a synthesis of empirical research, *International Tax and Public Finance* 10(6), 673-93.

Devereux, M. and R. Griffith (1998), Taxes and the location of production: evidence from a panel of US multinationals, *Journal of Public Economics* 68 (3), 335-367.

Devereux, M.P. and G. Maffini (2007), The impact of taxation on the location of capital, firms and

profit: a survey of empirical evidence, Oxford University Centre for Business Taxation, WP 07/02.

Egger, P., V. Merlo and G. Wamser (2012), Unobserved profit shifting and the tax elasticity of FDI, mimeo, ETH Zurich.

Egger, P., C. Keuschnigg, V. Merlo, G. Wamser (2014), Corporate taxes and internal borrowing within multinational firms, *American Economic Journal: Economic Policy*, forthcoming.

European Commission (2011), Council Directive on a Common Consolidated Corporate Tax Base (CCCTB), COM(2011) 121/4, 2011/0058.

Heckemeyer, J. and L. P. Feld (2011), FDI and taxation: A meta-study, *Journal of Economic Surveys* 25, 233-272.

Heckemeyer, J., M. Overesch and L.P. Feld (2013), Capital structure choice and company taxation: a meta-study, *Journal of Banking and Finance* 37, 2013, 2850-2866.

Hines, J. (2010), Income misattribution under formula apportionment, *European Economic Review* 54(1), 108-120.

Hong, Q. and M. Smart (2010), In praise of tax havens: International tax planning and foreign direct investment, *European Economic Review* 54(1), 82-95.

Huizinga, H. and L. Laeven (2008), International profit shifting within multinationals: A multi-country perspective, *Journal of Public Economics* 92, 1164-1182.

Huizinga, H., L. Laeven, and G. Nicodème (2008), Capital structure and international debt shifting, *Journal of Financial Economics* 88, 80-118.

Lipponer, A., Microdatabase Direct Investment (MiDi). A Brief Guide, Deutsche Bundesbank, Technical Documentation, Frankfurt, 2009.

Lohse and Riedel (2013), Do transfer pricing laws limit international income shifting? Evidence from European multinationals, CESifo Working Paper Series No. 4404.

Lohse, T., N. Riedel, and C. Spengel (2014), The increasing importance of transfer pricing regulations: a worldwide overview, *Intertax*, forthcoming.

J. Men,D. Schindler, G. Schjelderup and J. Tropina (2011), International debt shifting: Do multina-

tionals shift internal or external debt?, CESifo Working Paper Series No. 3519.

Nevo, A. (2001), Measuring market power in the ready-to-eat cereal industry, *Econometrica* 69 (2), 307-342.

OECD (2013), Action plan on base erosion and profit shifting, Paris.

Overesch, M. and G. Wamser (2010), Corporate tax planning and thin-capitalization rules: Evidence from a quasi-experiment, *Applied Economics* 42, 2010, 563-573.

Overesch, M. and G. Wamser (2014), Bilateral internal debt financing and tax planning of multinational firms, *Review of Quantitative Finance & Accounting* 42, 2014, 191-209.

Ruf, M. and A. Weichenrieder (2012), The taxation of passive foreign investment: Lessons from German experience, *Canadian Journal of Economics* 45(4), 1504-1528..

Martin Simmler (2013), Heterogeneity in tax-motivated debt shifting and its effects on corporate investment, mimeo, DIW Berlin.

McFadden, D. (1974), Frontiers in Econometrics, in: Zarembka, P., Conditional Logit Analysis of Qualitative Choice Behaviour, Academic Press, New York, 105-142.

Swenson, D. (2001), Tax reforms and evidence of transfer pricing, *National Tax Journal* 54, 7-25.

Train, K. (2003), Discrete Choice Methods with Simulation. Cambridge University Press.

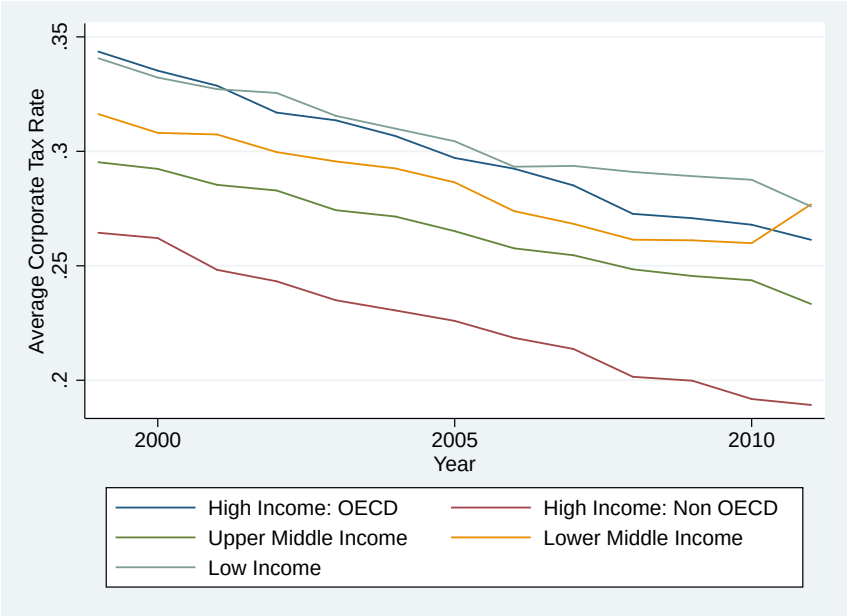

Figure 1: Development Corporate Tax Rates over Time

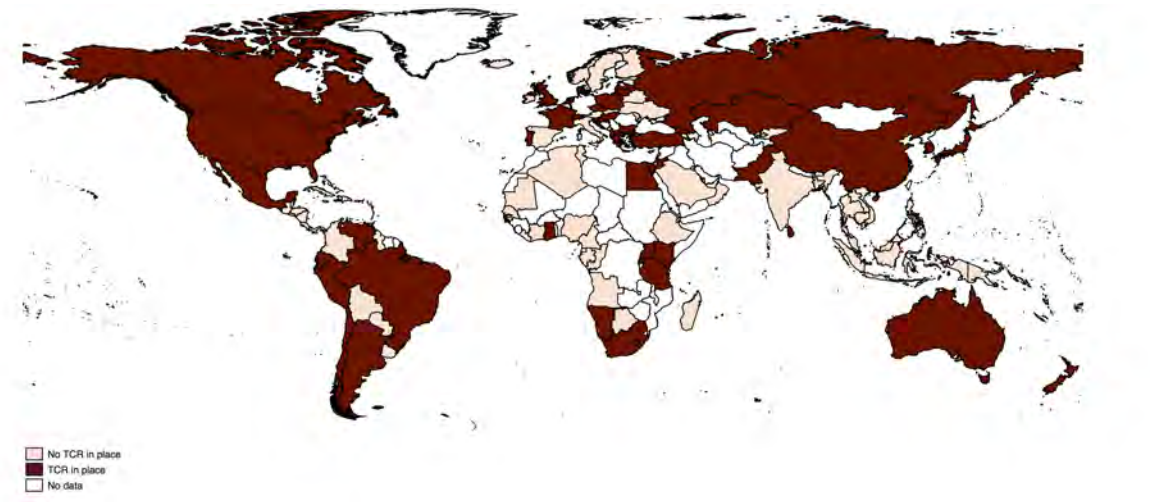

Figure 2: Countries with Thin Capitalization Rules in 2011

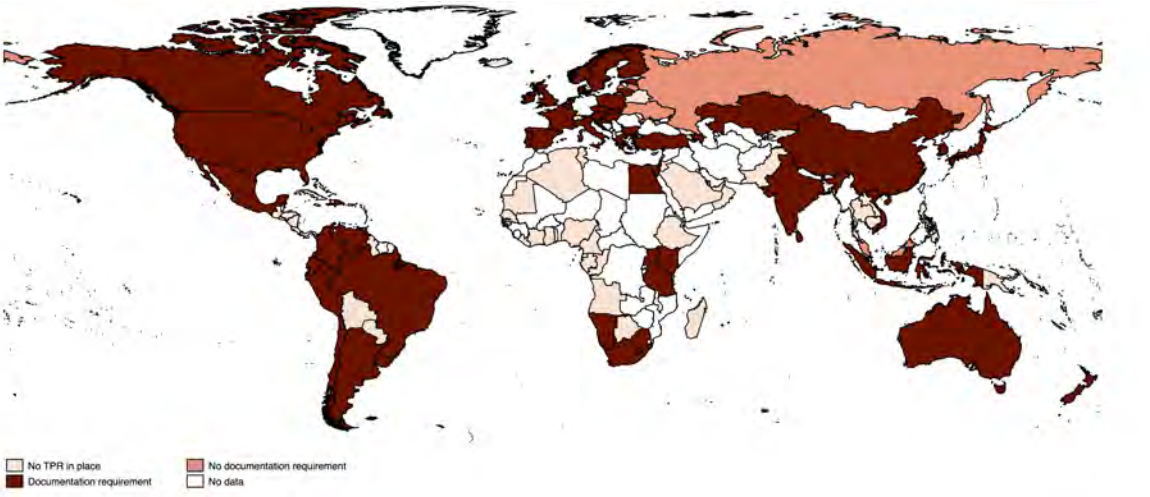

Figure 3: Countries with Transfer Pricing Laws in 2011

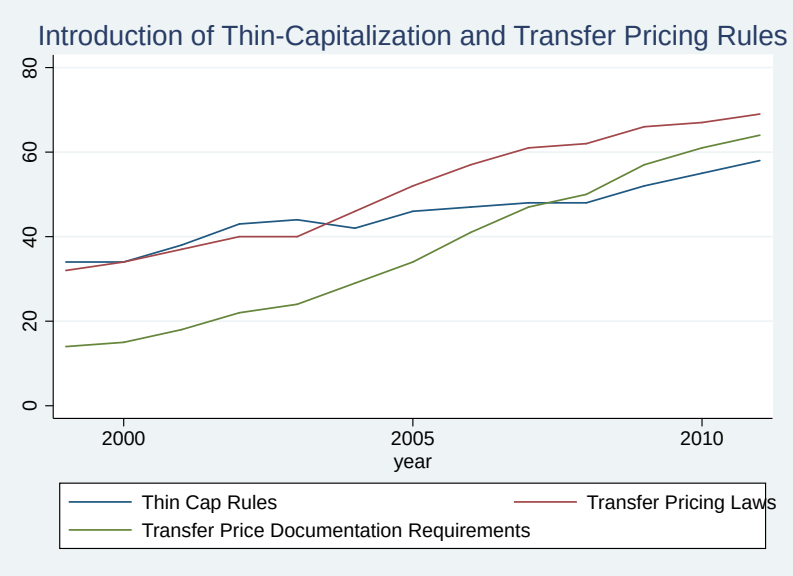

Figure 4: Number of Countries with Anti-Avoidance Legislations

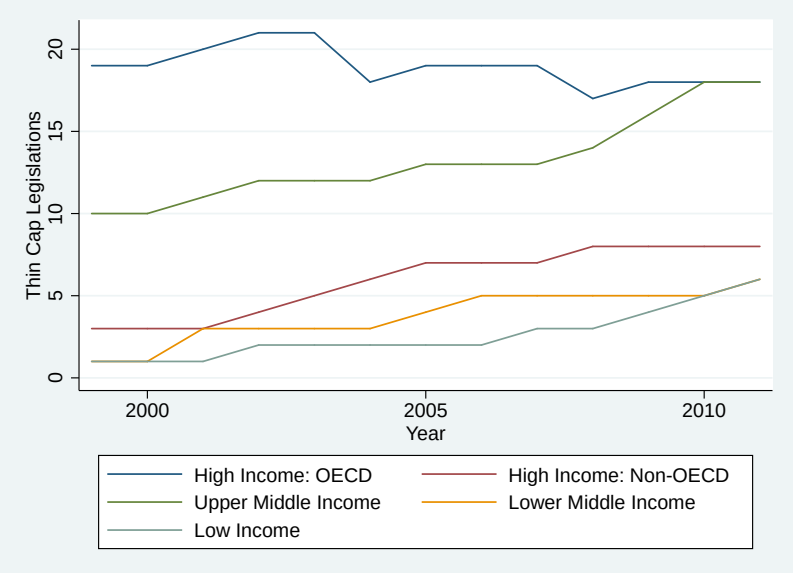

Figure 5: Development Thin Capitalization Rules: Developed vs. Developing Countries

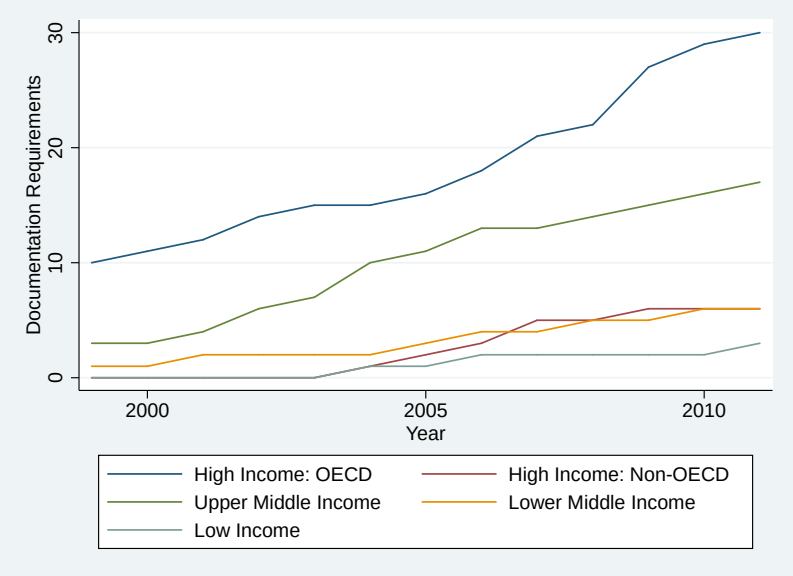

Figure 6: Development Transfer Price Documentation Laws: Developed vs. Developing Countries

8 Tables

Table 1: Correlation between Policy Instruments

	Thin-Cap Rules	Transfer Pricing Laws	Doc. Requirements
Transfer Pricing Laws	0.4600		
	(0.000)		
Doc. Requirements	0.4310	0.8079	
	(0.000)	(0.000)	
Corporate Tax	0.1277	0.1326	0.0883
	(0.000)	(0.000)	(0.000)

Table 2: Descriptive Statistics

Variable	No. of Obs.	Mean	Std. Dev.
Choice	2,167,339	.0100432	.0997112
Corporate Tax Rate	2,167,339	.2834803	.077133
Debt-Equity	2,167,339	.9147491	.1304094
Transfer Pricing Laws	2,167,339	.3974667	.4893741
Transfer Price Doc. Requ.	2,167,339	.2648718	.441265
Investment Freedom	2,167,339	56.15212	18.25205
Financial Freedom	2,167,339	55.86987	18.91829
Property Rights	2,167,339	52.53731	22.63333
Labor Freedom	2,167,339	62.41023	15.29789
Costs Business Startup	2,167,339	45.26853	109.1316
Credit to Private Sector	2,167,339	60.81497	52.63156
GDP Growth	2,167,339	.0430286	.0422074
Internet Users	2,167,339	24.07059	24.92884
Common Border	2,167,339	.0843426	.277901
Common Language	2,167,339	.0301296	.1709438
Former German Colony	2,167,339	.0325039	.1773342
Log GDP	2,167,339	25.32473	1.82061
Log GDP pC	2,167,339	9.023165	1.106785
Log Distance	2,167,339	8.212027	1.062244
Inflation	2,167,339	.0700511	.1710439
Lag Log Sales German Firms, t-1	2,167,339	12.4048	4.718474

Table 3: Conditional Logit Model

	(1)	(2)	(3)	(4)	(5)
Corporate Tax Rate	-2.529***	-2.769***	-2.891***	-2.812***	-3.271***
	(.173)	(.195)	(.199)	(.198)	(.224)
Thin Cap Rules			.466***		.513***
(Threshold)			(.127)		(.135)
Thin Cap Rules				.039	
(Existence)				(.035)	
Transfer Price Laws					.450***
(Existence)					(.042)
Transfer Price Laws					-.202***
(Documentation)					(.033)
log(GDP)	.759***	.794***	.825***	.798***	.796***
	(.012)	(.012)	(.014)	(.012)	(.014)
log(GDPPC)	.414***	.252***	.239***	.252***	.159***
	(.022)	(.033)	(.034)	(.033)	(.034)
GDP Growth	1.786***	2.465***	2.173***	2.391***	2.739***
	(.317)	(.376)	(.373)	(.376)	(.371)
log(Distance)	-.465***	-.261***	-.273***	-.259***	-.251***
	(.015)	(.015)	(.016)	(.015)	(.016)
Common Border		.484***	.496***	.500***	.526***
		(.048)	(.048)	(.048)	(.048)

Table 3, Continued: Conditional Logit Model

	(1)	(2)	(3)	(4)	(5)
Former German		.521***	.542***	.526***	.537***
Colony		(.075)	(.076)	(.075)	(.075)
Common		.409***	.322***	.391***	.414***
Language		(.047)	(.045)	(.045)	(.047)
Domestic Credit		.001***	.001***	.001***	.002***
to Private Sector		(.000)	(.000)	(.000)	(.000)
Inflation Rate		-.617***	-.450***	-.559***	-.443**
		(.178)	(.172)	(.175)	(.193)
Financial Freedom		.007***	.008***	.007***	.010***
		(.001)	(.001)	(.001)	(.001)
Investment Freedom		.008***	.007***	.008***	.006***
		(.001)	(.001)	(.001)	(.001)
Labor Freedom		-.006***	-.007***	-.006***	-.005***
		(.001)	(.001)	(.001)	(.001)
Property Rights		.003**	.004***	.003*	.005***
		(.001)	(.001)	(.001)	(.001)
Costs Business		-.006***	-.007***	-.006***	-.007***
Startup		(.001)	(.001)	(.001)	(.001)
Number Internet		-.008***	-.008***	-.008***	-.008***
Users		(.001)	(.001)	(.001)	(.001)

Table 4: Mixed Logit Model

Variable	**(1)**	**(2)**	**(3)**
Corporate Tax (Mean)	-3.623632***	-1.886214***	-3.628965***
	(.1521513)	(.1650484)	(.1947916)
Corporate Tax (Std.Dev.)	.0201514	.0476021	6.474231***
	(.5509987)	(2.373205)	(.1821323)
Debt-Equity (Mean)	.8559377***	.585957***	.7061262***
	(.0637876)	(.0644099)	(.0763508)
Debt-Equity (Std.Dev.)	.0317333	.03647	2.175505***
	(.1839024)	(.2019883)	(.0850029)
Transfer Pricing Rules (Mean)	.6481653***	.3150592***	.8056596***
	(.0899693)	(.1019019)	(.038254)
Transfer Pricing Rules (Std.Dev.)	.5918885***	.7929734***	.9823898***
	(.2724878)	(.249793)	(.0427071)
Documentation Requirements (Mean)	-.2016198***	-.1205903***	-.1533538***
	(.0221619)	(.0223869)	(.0278472)
Documentation Requirements (Std.Dev.)	.1608088	.2057029	.8391758***
	(.1750336)	(.1828433)	(.0320948)
Lag, Log Sales German Firms t-1		.5971768***	
		(.0127069)	
Log GDP	.8327469***	.1919003***	.8253106***
	(.0090351)	(.0157856)	(.0094133)
Log GDP per Capita	.084200***	-.1730343***	.0148754
	(.0215902)	(.0237838)	(.0228243)

Table 4, Continued: Mixed Logit Model

Variable	**(1)**	**(2)**	**(3)**
GDP Growth	2.882308***	5.01368***	3.07718***
	(.3228788)	(.3387713)	(.3356877)
Log Distance	-.2288892***	-.1546456***	-.233684***
	(.0101693)	(.0106373)	(.0109006)
Common Border	.5360586***	.2423485***	.6294278***
	(.0269635)	(.0269532)	(.0286854)
Former German Colony	.4764441***	.2864906***	.4208545***
	(.0393069)	(.038862)	(.0410388)
Common Language	.4380717***	-.094754***	.442398***
	(.0319091)	(.0340305)	(.0337137)
Credit to Private Sector	-.0000579	.0001717	-.0000737
	(.0002286)	(.0002235)	(.0002421)
Inflation	-.7076464***	.2996804*	-.6142623***
	(.1683132)	(.156368)	(.1737597)
Financial Freedom	.0124967***	.0018879***	.0119478***
	(.0006602)	(.0006879)	(.0006992)
Investment Freedom	.0008778	.0003275	.0016707**
	(.0007791)	(.0008109)	(.0008218)
Labor Freedom	-.0052096***	.0002129	-.0064386***
	(.0006985)	(.0007075)	(.0007388)
Property Rights	-.0000859	.0007702	.0001603
	(.000897)	(.0009272)	(.0009383)
Costs Business Start Up	-.0065291***	-.0015856***	-.0079083***
	(.0005764)	(.0006055)	(.0006186)

Table 5, Cross- and Own Tax-Elasticities of a Tax Reduction

	CAN	CHE	CHN	FRA	GBR	HKG	IRL	ITA	NLD	NOR	RUS	SGP	USA
CAN	1.3713	-0.0289	-0.0391	-0.1056	-0.0716	-0.0060	-0.0052	-0.0523	-0.0606	-0.0106	-0.0311	-0.0040	-0.1625
CHE	-0.0164	0.7901	-0.0523	-0.0987	-0.0641	-0.0078	-0.0066	-0.0492	-0.0601	-0.0087	-0.0299	-0.0047	-0.1455
CHN	-0.0138	-0.0326	1.0763	-0.0977	-0.0615	-0.0076	-0.0058	-0.0480	-0.0623	-0.0063	-0.0312	-0.0050	-0.1390
FRA	-0.0175	-0.0288	-0.0458	1.1868	-0.0683	-0.0064	-0.0051	-0.0525	-0.0605	-0.0091	-0.0317	-0.0042	-0.1546
GBR	-0.0181	-0.0287	-0.0442	-0.1047	1.0143	-0.0063	-0.0051	-0.0522	-0.0604	-0.0095	-0.0312	-0.0042	-0.1585
HKG	-0.0152	-0.0349	-0.0549	-0.0984	-0.0634	0.6074	-0.0062	-0.0488	-0.0609	-0.0079	-0.0305	-0.0049	-0.1435
IRL	-0.0164	-0.0366	-0.0520	-0.0969	-0.0628	-0.0076	0.4350	-0.0476	-0.0601	-0.0083	-0.0297	-0.0047	-0.1459
ITA	-0.0175	-0.0291	-0.0455	-0.1064	-0.0690	-0.0064	-0.0051	1.2943	-0.0599	-0.0094	-0.0316	-0.0042	-0.1564
NLD	-0.0167	-0.0292	-0.0487	-0.1008	-0.0657	-0.0066	-0.0053	-0.0493	1.0628	-0.0079	-0.0314	-0.0045	-0.1494
NOR	-0.0212	-0.0305	-0.0353	-0.1094	-0.0748	-0.0062	-0.0053	-0.0560	-0.0570	1.0189	-0.0301	-0.0038	-0.1716
RUS	-0.0167	-0.0284	-0.0476	-0.1033	-0.0663	-0.0064	-0.0051	-0.0507	-0.0614	-0.0081	0.8821	-0.0044	-0.1499
SGP	-0.0152	-0.0318	-0.0535	-0.0977	-0.0630	-0.0073	-0.0057	-0.0477	-0.0624	-0.0073	-0.0314	0.7764	-0.1426
USA	-0.0181	-0.0287	-0.0439	-0.1043	-0.0698	-0.0063	-0.0052	-0.0521	-0.0605	-0.0096	-0.0311	-0.0042	1.3241

Table 6, Abolishment of TPDOC

	Base location probability	*Change in probability if US abolishes TPDOC requirements*	*Change in probability if all countries abolish TPDOC requirements*
CAN	0.0148	-0.0003	0.0014
CHE	0.0361	-0.0008	-0.0039
CHN	0.0422	-0.0009	-0.0015
FRA	0.0791	-0.0019	-0.0078
GBR	0.0615	-0.0013	0.0054
HKG	0.0108	-0.0002	-0.0007
IRL	0.0134	-0.0003	-0.0015
ITA	0.0375	-0.0009	-0.0036
NLD	0.0544	-0.0011	0.0029
NOR	0.0129	-0.0003	-0.0013
RUS	0.0343	-0.0008	-0.0040
SGP	0.0057	-0.0001	-0.0001
USA	0.1021	0.0199	0.0090