Impact of International Taxation on Mergers and Acquisitions

Harry Huizinga   Johannes Voget

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Abstract

The paper analyzes the impact of international tax regimes on the volume and direction of mergers and acquisitions between the United States, countries of the European Economic Area and Japan.

First, tax regimes have an impact on the direction of mergers: Most countries either supply foreign tax credits or they exempt foreign income from taxation. Furthermore, capital income tax rates vary across countries. In mergers, these differences determine which firm becomes the bidder and which firm becomes the target as the involved firms minimize the additional tax burden.

Second, the difference in tax regimes influences the relative share of mergers between countries: Acquiring firms from countries with exemption systems are over-represented when the target firm is located in a low tax country. Furthermore, mergers between countries with large differences in tax rates occur more frequently than predicted by standard gravity models, due to profit shifting incentives.

These results imply that international discrepancies in foreign income taxation distort flows of foreign direct investment. Furthermore, countries may compete for tax base and corporate headquarters through their design of foreign income taxation.

1 Introduction

The value of cross-border mergers and acquisitions in 2003 was 240 billion dollar. These transactions on the corporate market are the most important means for investment between industrialized countries. In fact, the average ratio of international mergers to foreign direct investment (FDI) was 78.5% between 1988 and 2003 (UNCTAD 2004, 2000, 1996, 1994). These numbers illustrate the importance of cross-border mergers and acquisitions. With increasing economic integration they are the main vehicle for restructuring industries on an international level furthering an efficient production process. Acquisitions by foreign firms are also important for technology transfer and as a growth impulse to countries with lagging economic development.

On the other hand, many countries are quite wary of foreign take-overs. They go long strides to foster their national champions and protect their indigenous firms against take-overs from abroad, because they fear a loss of positive spill-over effects when a multinational's headquarter relocates to another country. Frequently, important parts of the firm like research and development follow suit. The relocation may also negatively affect the remaining firms through the loss of agglomeration effects. Last, but not least, the loss of a multinational's headquarter contributes to the erosion of a country's tax base if the country taxes worldwide income.

In this context, fiscal policy plays a crucial role in channeling international investment. Not only the difference between countries' domestic tax rates matters, but there also exist very different approaches to taxing foreign income. Operating across several countries incurs double taxation and many countries only provide incomplete relief from such double taxation. This paper analyzes the impact of international taxation regimes on the volume and direction of mergers and acquisitions between the US, countries of the European Economic Area and Japan. It addresses the question if and to which degree double taxation distorts international take-overs. Special attention is paid to the subject how incentives for avoiding double taxation shape the organizational structure of multinationals.

1.1 Contribution to previous work on cross-border mergers and acquisitions

Most studies on foreign direct investment do not distinguish between the different forms of FDI such as greenfield investment or corporate takeovers. Looking at aggregate FDI data can be misleading, because the determinants of the subcomponents of FDI differ considerably from each other. Rossi & Volpin (2004), for example, have found a governance motive for cross-border mergers and acquisitions: Firms from countries with strong shareholder protection acquire firms from countries with poor shareholder protection. The latter firms benefit from the resulting increase in corporate governance in form of lower costs of capital. Bris & Cabolis (2002) provide supporting evidence: They find that an industry's market value increases when firms within such industry are acquired by foreign firms coming from countries with better shareholder protection and better accounting standards.

Splitting FDI in its heterogenous subcomponents offers another benefit: Gross bilateral capital flow data are quite rare, but there exist comprehensive databases on cross-border corporate transactions which are the major component of FDI. These data allow the analysis of FDI determinants on a large cross-country basis which is the motivation for Di Giovanni (2005) to estimate a quite comprehensive gravity model for cross-border mergers and acquisitions. His set of explanatory variables includes the corporate income tax rates and information on the existence of tax treaties, but he lacks the information to analyse the role of tax credits

and double taxation. This study aims to fill this gap by providing information on double taxation on a bilateral level and analysing its impact on the pattern of cross-border mergers and acquisitions.

1.2 Contribution to previous work on the impact of taxes on US related FDI

Despite the pessimistic prediction by Markusen (1995) that any effect of taxes on FDI will be dominated by other factors, there is now a large body of literature that gives evidence of a negative correlation between a country's corporate income tax rate and FDI. Higher tax rates reduce after tax returns which explains the negative relation. Cross-sectional studies like Grubert & Mutti (1991), Hines & Rice (1994), or Altshuler et al. (2001) find the elasticity of foreign stock of investment with respect to local tax rates ranging from -0.1 to -2.8. Time series studies like Hartman (1984), Boskin & Gale (1987), Newlon (1987), or Young (1988) have found a tax elasticity of FDI of about -0.6. None of these studies however includes double taxes in their measures of tax burden.

The studies by Slemrod (1990), Swenson (1994) and Hines (1996) do recognize the importance of foreign income taxation regimes for the behavior of international investment, although they do not include explicit measures of double taxation. They distinguish between two sorts of investors: On the one hand there are foreign multinationals that are directly exposed to any changes in the US tax rate, because their home country does not levy additional taxes on their US income. On the other hand, there are foreign firms that are insulated from any changes in US taxation, because their home country imposes additional taxes on US income. Any increase or decrease in US taxes is exactly neutralized by a corresponding change in the additional taxes to be paid at home. The double tax imposed by the home country simply ensures that the firm pays the home country tax rate on worldwide income. Investment from the latter group of countries ("credit countries") should not vary with the US tax rate, but investment from the former group of countries ("exemption countries") should be negatively correlated with US tax rates. Slemrod does not find any time-series evidence for such a difference whereas Swenson does. Hines points out that the different investment behavior can also be observed in a cross-sectional dimension. He reports that firms from exemption countries preferably invest in US states with low state taxes, but firms from credit countries are indifferent to the level of state taxes. The three studies give mixed results, but the evidence that international taxation regimes matter prevails.

The previous work is, however, limited in several respects. First, the classification of investment from credit countries as being insensitive to US tax rates is flawed because it does not take foreign tax rates into account. If foreign tax rates are lower than US tax rates then the difference between exemption and credit countries disappears. Furthermore, the studies

emphasize the multinationals' insensitivity to US tax rate changes due to foreign tax credits, but they are silent about the inseparable other side of the coin: Additional taxation in the home country. Does this double taxation put the concerned firms at a disadvantage with its unburdened competitors such that investment is inhibited? Does the source of double taxation matter? We answer these questions by explicitly quantifying double tax rates according to their two causes: Worldwide taxation by home countries and withholding taxes. The effects may differ to the extent that firms are able to avoid one or both sorts of double taxation. On the other hand, the negative effects of double taxation may also be stronger than for regular corporate income taxes because they represent a disadvantage with respect to unburdened competitors. Our paper also generalizes existing results, because the sample considers investment relations between a large number of countries and is not limited to US-related FDI. In contrast to previous work[1], the panel structure of the data allows controlling for unobservable individual effects that are correlated with tax rates.

Last, but not least, Blonigen & Davies (2004) approach the effect of double taxation in a rather indirect manner: They analyse if the existence of a tax treaty affects US inbound and outbound FDI. They conclude that the provisions of a treaty have no effect or that the positive and negative aspects of treaty formation largely cancel one another. The FDI-promoting aspect of a tax treaty is mainly given by a reduction of double taxation, the FDI-reducing aspect of a treaty is its intent to reduce tax evasion, one of the possible motivations to engage in FDI. Our study aims to quantify the FDI-promoting aspects of tax treaties by explicitly determining the degree of double taxation and its impact on FDI in form of cross-border corporate transactions.

1.3 Contribution to previous work on the impact of taxes on multinationals' organizational structure

Only a few studies have analyzed the impact of taxation on the firm's organizational structure. Devereux & Griffith (1998) model the decision of US firms to serve the European market. The firms can choose between different production locations in Europe, but they also have the option to export to Europe or not to serve the European market at all. The effective average tax rate plays a role in the choice between locations, but not in the choice of whether to locate production in Europe compared with the other options. However, the hierarchical structure is taken as given in their paper as they do not consider the option of inverting the company such that the headquarter is located in Europe and the US market is served through a local US subsidiary.

Corporate inversions are exactly the phenomenon that occupies Desai & Hines (2002): Amer-

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[1]Hines (1996) is a notable exception. His approach controls for unobservable effects with respect to the states that receive FDI.

ican companies seeking to avoid US taxes on their foreign income expatriate. Typically, they "invert" their corporate structure, so that a foreign subsidiary becomes the parent company and the parent company becomes a subsidiary. They find that especially large firms with extensive foreign assets or with considerable debt are likely to expatriate which supports the conjecture that US taxation of foreign income (including the interest expense allocation rules) causes these conversions.

However, there is no reason to limit attention to corporate inversions, because they are only very extreme examples for an incentive to avoid double taxation that is present in many cross-border mergers and acquisitions. Hence, our paper estimates the general effect of double taxation on the direction of international take-overs. Of course, only a minority of mergers is initiated for tax reasons, but since any merger incurs considerable transaction costs it is a natural landmark to reevaluate the optimal corporate structure. In absence of other important considerations, the two firms involved in a merger can decide to perform the transaction in such a way that the surviving company has an organizational structure that minimizes double tax payments. With increasing economic integration and more cross-border mergers and acquisitions, some countries will accumulate corporate headquarters because they exempt foreign income from taxation and offer a advantageous set of bilateral tax treaties that provide low levels of withholding taxes for repatriated profits.

The paper is organized as follows: Section 2 describes existing regimes for taxing foreign income and calculates the corresponding double tax rates. The section points out that double taxation differs considerably across countries and across different tax regimes. Tax treaties are shown to decrease double taxes considerably. Section 3 estimates a gravity model for a panel of cross-border mergers and acquisitions to discover if double taxation depresses the number of mergers between two countries. Section 4 switches from using aggregate data to firm-level data to find out how large the effective double tax burden is for mergers that have taken place. The effect of double taxation on a merger's direction is estimated. Section 5 concludes.

2 International Taxation of Corporate Income

2.1 Taxation Regimes

A multinational's income is potentially taxed twice. First, it pays corporate income taxes according to the source principle, i.e. it pays income taxes in the countries in which the respective income is generated. Second, a multinational company may have to pay additional income taxes in its home country. Even if the firm's operations are spread over several countries, it remains resident of one country. This country of residence may reserve the right to tax worldwide income instead of exclusively taxing income generated on its own territory.

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The firm is then subject to double taxation: The multinational has a higher tax load compared to an indigenous firm, because it does not only pay taxes at the source but it is additionally taxed by its country of residence. On top of that, many countries withhold taxes on dividend payments to foreign shareholders, so additional taxes may have to be paid when a subsidiary operating abroad repatriates profits to its holding company.

The timing of foreign income taxation and withholding taxes can differ substantially from regular corporate income taxation, because home countries may provide relief by deferral of foreign income taxes and withholding taxes are only triggered by repatriation of profits. There also exist means to entirely evade withholding taxes, so it is eventually an empirical question to which degree double taxation poses a burden on multinationals. Three polar cases have to be distinguished:

1. In the first case, worldwide taxation and withholding taxes immediately apply, because multinationals cannot substantially postpone the repatriation of profits (as retaining earnings abroad may be too costly, for example). Withholding taxes cannot be illegaly evaded on a broad scale either. The double tax corresponding to this case is denoted as τ_{ij}^{double} in the following.

2. In the second case, only worldwide taxation by the home country poses a burden. Withholding taxes can either be avoided by postponing the repatriation of profits or they can be illegally evaded by profit shifting or third country transactions[2]. On the other hand, the payment of foreign income taxes cannot be deferred, either because home countries do not provide relief by deferral at all, or because the retained earnings abroad do not satisfy the strict conditions for deferral. (For example, passive investment of retained earnings in financial assets triggers foreign income taxation for multinationals residing in the US.) The double tax corresponding to this case is denoted as τ_{ij}^{regime} in the following.

3. In the third case, neither worldwide taxation nor withholding taxes impose an additional burden, because multinationals can sufficiently postpone the repatriation of profits. Foreign income taxes are deferred on a broad scale. There is no double tax burden in this case.

A convex mix of these three polar cases may describe actual firm behavior the best. In the third case, the double tax is always effectively equal to zero. The double tax burden for the other two cases derives from the home country's and foreign country's tax policy. The home country's tax regime for foreign income is the most decisive factor in that respect, so we

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[2]Note that worldwide taxation cannot be evaded by means of profit shifting or third country transactions, because foreign income taxation applies worldwide at the same rate.

calculate the respective tax rates for all existing tax regimes[3]:

- No relief from double taxation:

  The country of residence applies its regular corporate income tax rate τ_i to foreign income and it does not give any relief from double taxation. In particular, taxes paid abroad are not considered as deductable nor do the companies receive tax credits for foreign taxes. Hence, the total effective tax rate for income deriving from country j is $\tau_i + \tau_j + (1 - \tau_j)\omega_{ij}$ where τ_j indicates the foreign corporate income tax rate and ω_{ij} the withholding tax rate[4] for profits repatriated from country j to country i. The excess tax is found by subtracting the source tax τ_j which applies to all firms regardless of their origin. Hence, the double tax rate is $\tau_{ij}^{double} = \tau_i + (1 - \tau_j)\omega_{ij}$. If withholding taxes can be avoided (such that $\omega_{ij} = 0$), then the double tax rate reduces to $\tau_{ij}^{regime} = \tau_i$.

- Deduction regime:

  The country of residence applies its regular corporate income tax rate τ_i to worldwide income. However, income taxes paid abroad as well as withholding taxes may be deducted from the tax base thereby decreasing the effective double tax rate for income generated in country j, which is $\tau_j + (1 - \tau_j)[\omega_{ij} + (1 - \omega_{ij})\tau_i]$. Again, the excess tax is calculated by subtracting the foreign corporate income tax rate τ_j which applies to all corporate income generated in country j irrespective of firm origin. Hence the double tax rate is $\tau_{ij}^{double} = (1 - \tau_j)[\omega_{ij} + (1 - \omega_{ij})\tau_i]$. If withholding taxes can be avoided (such that $\omega_{ij} = 0$), then the double tax rate reduces to $\tau_{ij}^{regime} = (1 - \tau_j)\tau_i$.

- Foreign-tax credit regime:

  The country of residence applies its regular corporate income tax rate τ_i to foreign income. However, it allows tax credits for income taxes and withholding taxes paid abroad. If the foreign tax payments, including withholding taxes, are larger than the tax burden that the home country would appropriate to the corresponding income (such that $\tau^j + (1 - \tau_j)\omega_{ij} > \tau^i$), then the firm has excess foreign tax credits. It does not have to pay additional taxes in its country of residence, but the excess foreign tax credits are not reimbursed[5]. The ensuing effective tax rate for income generated in country j amounts to $\max[\tau_i; \tau_j + (1 - \tau_j)\omega_{ij}]$. After subtracting the foreign country's income tax rate τ_j, which is applicable to all firms regardless of their origin, we arrive at the

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[3]Some countries slightly modify the tax regimes described here. For example, Belgium and Luxembourg use lower tax rates when applying the deduction regime. These modifications are taken into account when calculating actual double tax rates, but they are suppressed in the narrative, because they would only cloud the issue.

[4]Reduced withholding tax rates often apply if the shareholding is significant which normally corresponds to 10% or 20% of total shares. We have determined withholding tax rates assuming that the parent firm holds at least 50% of the subsidiary's shares, because our primary interest here are mergers and acquisitions that result in a change of control.

[5]If the excess credits were reimbursed, then the double tax rate could be negative.

double tax rate $\tau_{ij}^{double} = \max\left[\tau_i - \tau_j; (1 - \tau_j)\omega_{ij}\right]$. If withholding taxes can be avoided, then the double tax rate simplifies to $\tau_{ij}^{regime} = \max\left[\tau_i - \tau_j; 0\right]$.

- Exemption regime:

  Under this regime, the country of residence exempts foreign income from taxation. There is no additional tax burden imposed by the home country, so the effective tax rate for income generated in country j is $\tau_j + (1 - \tau_j)\omega_{ij}$. The excess tax is again found by subtracting the generally applicable foreign income tax rate τ_j, which results in a double tax rate of $\tau_{ij}^{double} = (1 - \tau_j)\omega_{ij}$. If withholding taxes can be avoided then there is no double tax burden at all: $\tau_{ij}^{regime} = 0$.

Table 1: Calculation of double tax rates for different tax regimes

	Total tax rate	τ_{ij}^{double}	τ_{ij}^{regime}
No relief	$\tau_i + \tau_j + (1 - \tau_j)\omega_{ij}$	$\tau_i + (1 - \tau_j)\omega_{ij}$	τ_i
Deduction regime	$\tau_j + (1 - \tau_j)\left[\omega_{ij} + (1 - \omega_{ij})\tau_i\right]$	$(1 - \tau_j)\left[\omega_{ij} + (1 - \omega_{ij})\tau_i\right]$	$(1 - \tau_j)\tau_i$
Credit regime	$\max\left[\tau_i; \tau_j + (1 - \tau_j)\omega_{ij}\right]$	$\max\left[\tau_i - \tau_j; (1 - \tau_j)\omega_{ij}\right]$	$\max\left[\tau_i - \tau_j; 0\right]$
Exemption regime	$\tau_j + (1 - \tau_j)\omega_{ij}$	$(1 - \tau_j)\omega_{ij}$	0

τ_i: Corporate income tax rate in country of parent firm
τ_j: Corporate income tax rate in country of subsidiary
ω_{ij}: Withholding tax rate for dividends repatriated from subsidiary in country j to parent firm in country i

The simultaneous use of different tax regimes for foreign income creates strong asymmetries in international taxation: Multinationals residing in countries with a worldwide taxation regime (credit regime and deduction regime) may experience a much higher tax burden on their foreign operations than their counterparts from countries with a territorial taxation regime (exemption regime). The same investment project offers different after-tax returns depending on the investor's origin, so these asymmetries have a potential effect on flows of capital like cross-country mergers and acquisitions. A target firm can have a different value for two potential acquiring firms that are identical except for their country of residence. It is thus more likely that the firm with the lower double taxation burden will eventually acquire the target firm. In such a way, the differences in international taxation regimes should be reflected in the pattern of cross-country mergers and acquisitions.

2.2 Empirical Evidence on Double Taxation

A look at the data confirms the co-existence of different tax regimes for foreign income. The dataset contains information about the United States, Japan and the members of the European Economic Area (EEA)[6] for the period from 1985 until 2004. The Eastern European

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[6]Table 6 in the appendix gives a detailed list of countries covered in the dataset. Liechtenstein, Cyprus, Malta and Slovenia (the latter three having become members of the EU and EEA on 1 May 2004) had to

countries that have been in the process of joining the European Union enter the dataset successively during the 1990s as data become available.

For a given year there can be up to 870 country relationships as 30 countries tax income originating from 29 partner countries. Table 6 in the appendix sketches the situation in the year 2004 listing corporate income tax rates and the tax regimes that applied to foreign income streams between countries. It is apparent that the exemption regime and the credit regime prevail. The deduction regime or no relief from double taxation at all are rare exceptions in 2004.

The respective tax regimes are determined in bilateral[7] tax treaties.[8] The treaties normally resemble the OECD model tax treaty (OECD 2005), which recommends the exemption regime or the credit regime for taxing foreign income, explaining the prevalence of these two tax regimes. The contracting countries also regularly agree on lower than standard withholding tax rates. If two countries have not signed a bilateral tax treaty yet, then (higher) standard withholding tax rates apply and it is up to the individual countries if and how they want to provide relief from double taxation unilaterally.

Table 7 in the appendix lists the unilateral relief method and the relative use of tax regimes for foreign income averaged over time and over partner countries. Again, the table illustrates the prevalent use of the exemption and the credit regime. Most countries systematically choose for one of the two tax regimes. On the one hand, there is a block of continental countries comprised of France, the Netherlands, Belgium, Luxembourg, Switzerland, Germany, Austria and Hungary, that consistently chooses to apply the exemption regime when concluding a tax treaty. All other countries now prefer the credit regime as their principal method of relief for double taxation. Some countries, like Norway, Sweden, Spain and the Eastern European countries (except Hungary) have switched from using the exemption regime to the credit regime when concluding tax treaties[9]. Depending on the time of such a regime switch, these countries still have a number of older tax treaties active in which they have committed to using the exemption regime. That explains the co-existence of the credit regime and the exemption regime in some countries.

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be excluded due to a lack of information. Bulgaria, Croatia and Romania, on the other hand, are included, because they are in accession talks with the European Union and poised to join the EU (and hence the EEA) in the foreseeable future. Also Switzerland is included, because it has been a member of EFTA – European Free Trade Agreement – for a long time. Ideally, we would have liked to include all left-out OECD countries as well, but the number of bilateral relations grows exponentially with the number of countries quickly raising the cost of data research to an impractical level.

[7]The Nordic tax treaties between Denmark, Finland, Iceland, Norway and Sweden are a multilateral exemption. Also the older tax treaty COMECO between several members of the Warsaw pact in 1977 is such an exemption.

[8]The provisions of a tax treaty are taken into account when the treaty becomes effective. Alternatively, a tax treaty could be taken into account when it is concluded. Empirical estimates remain unaffected by this choice.

[9]Interestingly, no country has switched from the credit regime to the exemption regime.

Another reason for the simultaneous use of different tax regimes is the tendency of smaller countries (for example Austria, Hungary or Iceland) to determine the same tax regime as their partner country when concluding a tax treaty, so they are willing to deviate from their principal method of relief for double taxation[10]. Bigger countries virtually never deviate from their principal method of relief.

Another source of heterogeneity is the incomplete coverage of bilateral tax treaties. The last column of table 7 lists the share of relations that are covered by a tax treaty averaged over partner countries and over time. Especially smaller countries have incomplete sets of tax treaties, so foreign income taxation is more often subject to unilateral rules. For some countries, the lack of a tax treaty then results in the application of the deduction regime.

Table 2 illustrates the overall frequency of different tax regimes and the corresponding average double tax rates. The tax rates are calculated as previously described.

Table 2: Double tax rates across different tax regimes for foreign income

Tax Regime	Frequency	$\bar{\tau}^{regime}$	$\bar{\omega}$	$\bar{\tau}^{double}$
Credit	5,796	4.5	4.2	7.1
Deduction	433	17.1	6.9	22.5
Exemption	4,829	0.0	3.0	3.0
Total	11,058	3.0	3.7	5.7

The third column lists the average double tax rate that is due to worldwide taxation of corporate income, $\bar{\tau}^{regime}$. As expected, the relationships governed by the deduction regime exhibit the highest tax rate with 17.1%, followed by the credit regime relationships with a tax rate of 4.5%. For the exemption regimes, worldwide taxation is not applicable and the rate is therefore 0%.

The last column reports $\bar{\tau}^{double}$, the average double tax rates for repatriated profits, which takes withholding taxes into account. The difference in tax rates between regimes remains pretty much the same, but it is important to note that also firms from countries with exemption regimes are subject to double taxation once withholding taxes are taken into account.

The fourth column reports average withholding tax rates that apply to significant shareholders, $\bar{\omega}$. Surprisingly, the withholding tax rates differ across tax regimes. How can this pattern be explained? As described before, the use of the deduction regime is highly correlated with the lack of a bilateral tax treaty. Withholding taxes tend to be higher in absence of a tax treaty, which explains the association of the tax regime with higher average withholding taxes.

Table 3 provides evidence that indeed the lack of a tax treaty results in higher average withholding taxes $\bar{\omega}$. But tax regimes tend to be less favorable in general even when withholding

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[10]It is not clear if the small countries have a certain incentive to follow such a strategy or if they simply accept the terms set by the bigger country.

taxes are not taken into account, which is illustrated by the difference in the tax rate $\bar{\tau}^{regime}$ in the third column.

Table 3: Double tax rates with/ without a double tax treaty

	Frequency	$\bar{\tau}^{regime}$	$\bar{\omega}$	$\bar{\tau}^{double}$
No tax treaty	2,170	6.7	7.8	12.1
Active tax treaty	8,888	2.1	3.0	4.5
Total	11,058	3.0	3.7	5.7

The information contained in the previous tables already indicates in which countries firms are more likely to experience higher double taxation: In high tax countries applying the credit regime and in countries with a low coverage of tax treaties (as withholding taxes are higher and the disadvantageous deduction regime may apply). Table 8 in the appendix confirms this intuition.

The countries in table 8 are ordered by the average double tax rate that applies to repatriated profits, $\bar{\tau}_{i.}^{double}$, which is reported in the third column. The three countries with the lowest rates - the Netherlands, France, and Germany - are all countries that consistently apply the exemption regime to foreign income. All other countries that regularly apply the exemption regime are also found in the top of the table. On the bottom of the list are the countries that have relatively high corporate income tax rates and that regularly apply the credit regime to foreign income, for example Japan, Italy or the United States. The second column reports the average withholding tax that foreign countries applied to repatriated profits, $\bar{\omega}_{i.}$. It is interesting that especially the countries dominantly using the exemption regime also negotiate the lowest withholding tax rates in their tax treaties. The average withholding tax rate to profits repatriated to the Netherlands is 1.3%. The corresponding rate for France and Luxembourg is 2%.

At this point, it should be noted that the use of the credit regime does not automatically imply a high double tax burden. Great Britain and the Nordic countries, for example, have relatively moderate double tax rates. Their corporate income tax rates are relatively low in comparison to foreign countries, so the average double tax caused by the home country's tax regime ($\bar{\tau}_{i.}^{regime}$ reported in the first column) is quite small.

The last column in table 8 lists the average double tax rate that applies to income flows that *leave* the country, $\bar{\tau}_{.j}^{double}$. A comparison with the third column (containing the double tax rate that applies to *incoming* dividends) shows that some countries like the Netherlands or Sweden are relatively more suited to receive dividends, whereas other countries like the US or Ireland are relatively more suited to repatriate dividends to other countries.

These survey tables show that strong asymmetries in international taxation exist indeed. The regression analysis in the next section will show that these strong differences in double

taxation have repercussions on the pattern of cross-border mergers and acquisitions. Mergers that are subject to high double taxation are infrequent for two reasons: First, competitors from countries with low double taxes value target firms more. Second, multinationals will over time assume such an international structure that holding companies are situated in countries with low double taxes. Double taxation has an impact on the pattern of cross-border mergers through these two channels.

3 Impact of Double Taxes on the Pattern of Mergers and Acquisitions

3.1 Methodological Framework

The number of inward and outward acquisitions per country over the sample period is listed in table 9 in the appendix. The figures suggest that country-specific effects play an important role, as the ratio of bidding firms to target firms varies strongly between countries. Observable variables like proximity or the use of a common language will also affect the number of acquisitions between two countries. In order to find the the true effect of double taxation on the pattern of mergers and acquisitions we must control for other effects, especially if they are correlated with tax variables.

The basic framework for the empirical analysis is the gravity model which has been widely used in the trade literature. The earliest applications date back to studies by Beckerman (1956), Poyhonen (1963), Tinbergen (1962) and Linnemann (1966). A more recent popular example is a study by Rose (2000) about the effect of currency unions on trade. Several studies have shown that the gravity model is also succesful in describing not only trade flows but also asset flows: Portes & Rey (2001) have applied the gravity approach to international asset trade and Di Giovanni (2005) has used it to model cross-border mergers and acquisitions. The intuition of the model is borrowed from physics: Gravity forces increase in the mass of two objects and they decrease in the distance between two objects. Similarly, the frequency of cross-border mergers MA_{ijt} increases in the economic size of two countries and it decreases with the distance between two countries:

$$MA_{ijt} \simeq \ exp^{\beta_0} \ \frac{GDP_{it}^{\beta_1} \ \times \ GDP_{jt}^{\beta_2}}{Distance_{ij}^{\beta_3}} \tag{1}$$

The indices i and j denote the bidding firms' country and the target firms' country. The index t counts the years. The relation is loglinearized to allow estimation. Following control variables and the variables of interest are added to complete the model: (Table 10 in the appendix contains the variable definitions and sources, table 11 in the appendix displays the variables' summary statistics.)

τ_{ijt}^{double}: The variable of interest is the double tax rate τ_{ijt}^{double}. This tax rate compounds the effects of worldwide income taxation regimes and withholding taxes. The rate can be split into its two sub-components which are listed as the next two items.

τ_{ijt}^{regime}: This variable indicates the part of double taxation which is due to worldwide income taxation in the country of residence. As explained in the previous section, the expected coefficient is negative if there is no significant deferral possible and it is 0 if deferral of tax payments sufficiently alleviates the double tax burden.

τ_{ijt}^{extra}: This variable indicates the additional burden that is caused by withholding taxes when profits are repatriated. The (negative) effect should be equal to the effect of worldwide income taxation (τ_{ijt}^{regime}) if profits are relatively quickly repatriated. There is no effect if firms are able to postpone profit repatriation for long periods of time. Intermediate coefficient values indicate the extent to which firms are able to postpone the repatriation of profits. The relation of the three variables of interest is given by the equation $\tau_{ijt}^{double} = \tau_{ijt}^{regime} + \tau_{ijt}^{extra}$.

Difference in corporate income tax rates, $\tau_i - \tau_j$: Previous empirical studies (for example, Grubert & Mutti (1991) or Hines (1994)) have established that foreign direct investment increases as the local corporate income tax decreases. There are three explanations for this phenomenon. First, higher corporate taxes decrease the after-tax return, so the incentive to invest decreases in the target country's tax rate (e.g., Devereux & Griffith 1998). Second, when the production process involves intangible capital (like patents or licences), the firm wants to locate the intangible capital and the respective returns to intangible capital in a country with lower corporate income taxes than its home country (Gordon & Hines 2002). Third, companies from high tax countries want to decrease their tax payments by shifting profits to subsidiaries in low tax countries (Hines & Rice 1994). Normally, one would not expect firms subject to double taxation to invest in low tax destinations, because unburdened competitors would outbid them for any profitable investment project. However, the above-mentioned advantages like profit shifting or locating patents are firm-specific, so they cannot be exploited by unburdened competitors. This explains investment in low tax destinations by firms subject to double taxation.

Difference in wealth, $(GDP_{it}/Population_{it})/(GDP_{jt}/Population_{jt})$: FDI regularly flows from rich countries to poor countries. It is rather the exception than the rule that firms from poor countries acquire firms from rich countries. The relative capital abundance in rich countries in comparison to poor countries may cause such a direction of capital flows. Furthermore, the wealth difference is based on a technological advantage. Firms from rich countries are able to create value by taking over less advanced target firms and transferring their technology to their subsidiary.

Difference in Financial Depth: Firms need access to well-functioning capital markets in order to finance acquisitions, because retained earnings often do not suffice. Large and liquid capital markets decrease the cost of capital, the ability and the incentives of firms to grow by acquisitions increases. On the other hand, firms from countries with small financial markets are good acquisition targets because they have investment opportunities, but they are financially constrained. Di Giovanni (2005) finds that indeed acquirers tend to come from countries having financially deep markets. Financial depth is measured by two ratios: stockmarket capitalization over GDP and credit provided to the private sector over GDP. The second measure is important, because in some economies like Germany or Italy corporate financing is based on lending by banks rather than provision of funds by public capital markets. Following Di Giovanni, we lag the variables for financial depth by one period to avoid endogeneity.

Adjacent countries: Countries with a common land border have more trade with each other (e.g., Rose 2000). Transportation costs are small and people are well informed about the neighboring country, especially in border regions. These factors should have a positive impact on cross-border mergers and acquisitions as well. However, if trade and FDI are substitutes rather than complements, then adjacency may actually have a negative impact on the frequency of cross-border acquisitions. A dummy variable indicates if two countries are adjacent.

Common language: Language barriers inhibit cross-border mergers and acquisitions, because they decrease information flows between countries. Potential mergers may collapse, because the use of several languages would result in higher operational costs Different languages also signal cultural differences which allegedly play a crucial role in cross-country mergers. A dummy variable indicates if two countries speak the same language.

Free Trade Unions: Membership of the European Union and the accompanying common market do not only increase inter-communal trade, but they should also spur the consolidation of the European industrial structure. The corporate structure before economic integration was constrained by national borders and too fragmented with respect to the common European market. There should be an increased frequency of cross-border mergers and acquisitions between EU-countries as firms try to profit from economies of scale and scope. A dummy variable indicates if two countries are both members of the European Union.

Currency Unions: In 1999, the Euro replaced 12 national currencies. The currency union is supposed to further increase trade, because it enhances price transparency and because it removes currency risk. These factors could also affect the frequency of cross-border

mergers and acquisitions. A dummy variable indicates if two countries are both members of the Euro zone.

The above list of variables inevitably excludes many important determinants of mergers and acquisitions. The estimates are biased if these omitted variables are correlated with the measures for double taxation. These determinants often have a qualitative nature or they are unobservable at all. For example, high tax rates are correlated with a well developed infrastructure or with a high skill level. High taxes may also represent rents on agglomerations that attract companies as described by Baldwin & Krugman (2004).

We have already observed a strong variation in the ratio of inward acquisitions to outward acquisitions reported by table 9 in the appendix. Some countries have a more than proportional share of bidding firms whereas other countries have a very low share of target firms. For example, the number of Japanese target firms is relatively low due to cultural or institutional barriers. On the other hand, Eastern European firms rarely act as the bidding firm, because their countries are very young market economies and firms' technologies were lagging behind. The observable variables listed above are insufficient to explain these differences. Two sets of country dummy variables are added to capture these country-individual effects. The first set captures effects that influence the level of outward acquisitions, the second set accounts for country-specific circumstances that affect the level of inward acquisitions. The dummy variables account for any country-specific characteristics that are time-constant. They control for hard-to-measure attributes "such as those that make Silicon Valley or midtown Manhattan special" as Gordon & Hines (2002) put it. For another example, Rossi & Volpin (2004) have made the point that firms from countries with high accounting standards and high levels of shareholder protection transfer their quality in corporate governance to their acquired subsidiaries in countries with low levels of shareholder protection. The higher level of corporate governance decreases risk and informational asymmetries. The consequent reduction in the cost of capital creates the value that makes the acquisition profitable. Rossi & Volpin (2004) show empirically that the differences in shareholder protection and accounting standards are indeed useful in predicting the level of cross-country mergers. However, the respective indicators are country-specific and time-invariant, so they are fully captured by the dummy variables.

Note, however, that the two sets of country dummy variables fall short of the "classic" fixed effects estimator. The fixed effects estimator would have allowed a fixed effect for every country-pair. That would correspond to 869 fixed effects since there are 30 countries in the sample. This deviation from the classic fixed effect estimator is deliberate, because it allows to exploit not only variation over time, but also variation on a bilateral level - across country-pairs. This is quite important because the bilateral nature of tax treaties introduces a lot of useful variation caused by differing withholding tax rates and tax regimes. Earlier studies

like Slemrod (1990) relied exclusively on time series variation, but they were not able to identify tax effects. The insufficient time variance of tax rates requires an additional source of variation which is in this case available in country-pair differences.

3.2 The Regression Equation

When all variables are included the estimating equation is:

$$
\begin{aligned}
\ln MA_{ijt} = {} & \beta_0 + \beta_1 \ln GDP_{it} + \beta_2 \ln GDP_{jt} + \beta_3 \ln Dist_{ij} \\
& + \beta_4 \tau_{ijt}^{regime} + \beta_5 \tau_{ijt}^{extra} + \beta_6 \left[\tau_{it} - \tau_{jt} \right] \\
& + \beta_7 \left[\ln \frac{GDP_{it}}{Pop_{it}} - \ln \frac{GDP_{jt}}{Pop_{jt}} \right] + \beta_8 \left[\ln \frac{StockMkt_{it-1}}{GDP_{it-1}} - \ln \frac{StockMkt_{jt-1}}{GDP_{jt-1}} \right] \quad (2) \\
& + \beta_9 \left[\ln \frac{Credit_{it-1}}{GDP_{it-1}} - \ln \frac{Credit_{jt-1}}{GDP_{jt-1}} \right] + \beta_{10} Border_{ij} + \beta_{11} Language_{ij} \\
& + \beta_{12} EU_{ijt} + \beta_{13} Euro_{ijt} + \gamma_i + \delta_j + \epsilon_{ijt}
\end{aligned}
$$

Tobit regressions are the appropriate estimation method, because the data are in fact censored: There is a considerable share of country-pairs that do not conclude any mergers in certain years. These observations are all registered as zero despite the fact that for one country-pair it is close to impossible to ever have a merger due to large distance and small country size, whereas for another country-pair it is just a peculiar combination of factors that causes a zero observation for a given year.[11] Zero mergers are recorded in both cases, although the inclination to a potentially positive value is very different. The inclination to cross-border acquisitions is the latent variable which is unobservable. A further problem is, that the value for censored observations does not provide a feasible censoring point, because the logarithm of zero does not exist. However, the lower bound of the uncensored range is given: The lowest possible uncensored value is $\ln(1)$. Consequently the censoring point for the tobit regression is set in the lower proximity at the point $\ln(1) - \lambda$. This value is assigned to all censored observations. The parameter $\lambda = 0.0001$ is chosen small such that the censoring point is close to the uncensored range[12].

Previous studies, for example Di Giovanni (2005), have tackled the non-existence of the zero logarithm by applying a Box-Cox transformation to the dependent variable y: Either they

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[11]The nature of censoring is equivalent to the censoring observed by Fair (1977) in his study on extramarital affairs: Some spouses would never in their life cheat their partner whereas others just did not get the chance yet. Both situations are zero observations although the qualitative nature is very different.

[12]Regression results are robust to changes in the parameter λ. The estimates are very similar when $\lambda = \ln(0.5)$.

add a number λ, so that the dependent variable becomes $\ln(y + \lambda)$;[13] or they apply the transformation

$$g(y, \lambda) = \begin{cases} \frac{y^\lambda - 1}{\lambda} & \text{if} \quad \lambda \neq 0 \\ \ln y & \text{if} \quad \lambda = 0 \end{cases} \tag{3}$$

where y represents the original value of the dependent variable. This latter approach is especially problematic, because the transformation is only valid for $y > 0$! The choice of the parameter λ is either arbitrary, or it is based on a maximum likelihood procedure. A first step determines which transformation (which λ) maximizes the likelihood. In the second step, estimation results are based on the transformed data. However, the estimation results do not take into account that the variables have been transformed such as to maximize the likelihood. The p-values and confidence intervals are therefore not valid.[14] Furthermore, the simple logarithmic structure for $E(y)$ is lost and the coefficients cannot be interpreted as elasticities anymore.

In a Tobit model, the marginal effect of a change in the regressor on the frequency of mergers and acquisitions in the Tobit model is:

$$\frac{\partial E[y_{ijt}|x_{ijt}]}{\partial x_{ijt}} = \beta \times \text{Prob}\left[a < y_{ijt}\right] \tag{4}$$

where $a = \ln(1) - \lambda$ is the lower censoring point, y_{ijt} and x_{ijt} represent the dependent and explanatory variables. The coefficients β give an upper bound of marginal effects. The marginal effects for country-pairs that involve two big countries will approximate this upper bound, because the probability of a positive number of acquisitions is very high. On the other hand, the marginal effects for two small and very distant countries will be much lower, because they are not very likely to have a merger at all. The marginal effect must be interpreted as an elasticity due to the logarithmic form of the estimating equation. Only tax rates enter in percentage points, then the marginal effect denotes a semi-elasticity.

3.3   Estimation Results

Regression (1) in table 12 serves as the baseline specification. The compounded burden due to worldwide income taxation and due to withholding taxes is measured by the variable τ^{double}. The corresponding coefficient is significant at the 1% level, so we conclude that double

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[13]This is actually a special case of the more general Box-Cox transformation

$$g(y, \lambda_1, \lambda_2) = \begin{cases} \frac{(y + \lambda_2)^\lambda - 1}{\lambda} & \text{if} \quad \lambda_1 \neq 0 \\ \ln(y + \lambda_2) & \text{if} \quad \lambda_1 = 0 \end{cases}$$

[14]A one-step procedure that maximizes the likelihood with respect to all parameters is computationally infeasible.

taxation has a negative effect on the frequency of cross-border acquisitions. An increase of double taxes by one percentage point decreases the frequency of cross-border mergers by up to 2.3%

Regression (2) in table 13 distinguishes between double taxes due to worldwide income taxation (τ^{regime}) and double taxation caused by withholding taxes (τ^{extra}) in order to assess if the two different sources have the same effect. If a share α of the firms can avoid withholding taxes by postponing the repatriation of profits then we would expect the latter variable's coefficient to be smaller than the former variable's coefficient by the factor α. This is however not the case. The two coefficients are virtually equal. The p-value of the Wald test is 0.95. Firms react the same to the burden posed by worldwide income taxation as well as to withholding taxes.

Domestic tax rates also play an important role. The attractiveness of low tax destinations for foreign direct investment that has been found in many previous studies is confirmed by our results: An increase in the difference of corporate income tax rates ($\tau_i - \tau_j$) by one percentage point increases the frequency of cross-border acquisitions by up to 1%.

The combination of all tax-related effects gives rise to interesting conclusions: Suppose Great Britain decreases its corporate income tax rate by one percentage point from 30% to 29%. Hence, British firms become more attractive targets to invest in. The number of acquisitions by, for example, French and US firms increases both by 1% on average. However, the decrease in British corporate income tax simultaneously increases the double tax burden of US investors, because the US applies a foreign tax credit system. The increase of double taxes by 1 percentage point decreases acquisitions of British firms by US firms by 2.3% on average. French firms are not affected, because their foreign income is exempted, so in the end the decrease in the British corporate income tax rate results in a substitution of French bidders for US bidders.

The coefficients of the control variables are also of intrinsic interest although they are not the main focus in this study. Their size and significance can give evidence on the sensibility of the empirical model. The coefficients related to the gravity variables are very reasonable: The elasticity with respect to distance amounts to -1. Taking into account that the coefficients in the tobit regression represent an upper bound for marginal effects, this is quite similar to the elasticity of trade to distance. Many gravity model studies for trade have found a distance elasticity of about -0.6 (Leamer & Levinsohn (1995)).

The elasticity with respect to the countries' economic size is significantly positive. Increases in the "target" country's size seem to have a stronger effect than increases in the "acquiring" country's size. The latter has an elasticity of up to 1.4 whereas the former has an elasticity of up to 2.4. Furthermore, the elasticity seems to be larger than one which implies that the frequency of cross-border acquisitions increases more than proportional with country size.

18

Other significant variables are the dummy variable for adjacency and the dummy variable for a common language: Having a common land border increases the frequency of acquisitions by up to 12.1%. Having a common language increases the frequency by up to 21.6%. Both countries being member of a free trade zone or being member of a currency union does not seem to matter. The respective dummy variables are insignificant. Also the coefficient for the difference in wealth is only weakly significant.

Regression (3) in table 14 and regression (4) in table 15 extend the specification of regression (1) and (2) by two variables that approximate a country's financial depth. The sample size is reduced by about 25% because these variables are not available for all observations. The coefficients of the tax related variables remain unaffected by this change in specification. The first additional variable, financial depth measured by a country's market capitalization over GDP, matters: The elasticity with respect to the difference in relative market capitalization is up to 0.12. The second variable, which measures financial depth in terms of credit provision to the private market, is not a significant factor.

3.4 Robustness

3.4.1 Robustness with respect to sample selection and variable definitions

Regression (5) in table 16 in the appendix tests the geographic robustness. Eastern European countries are excluded, because they may not be comparable to the established economies of the US, Japan and Western Europe. Nevertheless, estimation results are very similar.

The negative effect of double taxation is also observed when the sample is restricted with respect to time. Regression (6) in table 17 in the appendix excludes all observations before 1990, because the American based data provider (Thomson Financial) may not have a complete unbiased coverage of worldwide mergers and acquisitions in the early sampling period.

Regression (7) in table 18 in the appendix uses the aggregated transaction values of mergers and acquisitons instead of their frequency as dependent variable. In this case, the negative effect of double taxes even increases. We have not used transaction values of mergers and acquisitions as the standard dependent variable for several reasons: The value is missing for the majority of transactions. For some years, there is no value registered at all although acquisitions did take place. The estimator may still be consistent given that the missing values are randomly distributed, but contrary to Di Giovanni (2005) we do find a strong pattern in the missing values: For example, the share of mergers and acquisition with US involvement rises by 4 percentage points whereas the share of transactions with German involvement falls by 4 percentage points when only transactions are taken into account that report a transaction value. This sampling bias is due to national differences in corporate

financing and corresponding differences in publicity of firm information.[15] The transaction values of acquisitions also exhibit large outliers that dominate the estimation results, so the frequency of acquisitions is preferred to transaction values because it contains less noise.

3.4.2 Robustness with respect to different Estimation Methods

Regression (8) to (11) report variations in the estimation procedure. They are meant to test the sensitivity of estimation results to the use of the Tobit estimator. Regression (8) in table 19 reports ordinary least squares estimates that consider only uncensored observations (i.e. observations with at least one acquisition). The regression's R^2 is 61% and the results are similar to the Tobit regression, although more than 50% of the observations are not taken into account, because they are censored. Discarding the censored observations should result in an attenuation of coefficient estimates (see for example Greene 2000, p.902). This expectation is satisfied by the estimation results: The coefficients are smaller in size. In all other respects, the estimates resemble previous regression results despite the strong decrease in sample size.

The lower censoring point of the previous Tobit regressions has been set in the lower proximity of the smallest uncensored observation at $\ln(1) - \lambda$ where the parameter λ is set to 0.0001. Regression (9) in table 20 tests the sensitivity of estimation results with respect to this choice of parameter and λ is set to $\ln(2)$ such that the lower censoring point is equal to $\ln(1) - \ln(2) = \ln(0.5)$. The estimation results are unaffected: The size of most coefficient increases, but the size of the estimated standard error increases as well, so the significance of coefficients remains eventually unaffected.[16]

The dependent variable is discrete whereas the Tobit regression imposes a (continuous) normal distribution. Regression (10) and (11) apply discrete count models to check the sensitivity of estimation results with respect to the assumption of a normally distributed error term. Regression (10) in table 21 assumes that the dependent variable y_i is Poisson distributed such that

$$\text{Prob}(Y_i = y_i) = \frac{\exp^{-\lambda_i} \lambda_i^{y_i}}{y_i!}, \qquad y_i = 0, 1, 2, \ldots \tag{5}$$

where $\ln(\lambda_i) = \beta' x_i$. However, the Poisson model implicitly assumes that the variance of y_i

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[15]Transaction values are known when the acquisition is open to public scrutiny which is often the case when the target firm is listed. Anglo-Saxon companies are more likely to be publicly listed than German companies, due to differences in corporate financing. US firms become listed at an earlier stage in the corporate life cycle. German firms, on the other hand, traditionally rely on relationship lending from banks. This feature explains the sampling bias when only transactions with reported values are considered.

[16]The dependent variable is discrete, so there remains a large range for choosing the lower censoring point somewhere between the lowest uncensored observation with the value $\ln(1) = 0$ and the value of censored observations which is $\ln(0) = -\infty$. Hence, the lowering censoring point is set to $\ln(1) - \lambda$ and $\lambda \epsilon (0, \infty)$. The model is most sensible if $\lambda \to 0$ because it imposes the least restrictions on the distance between the lowest uncensored values and the unobserved "true" values of the censored observations. (This unobserved true value would measure the inclination to having at least one acquisition.)

equals its mean. An overdispersion test rejects this restriction at the 1% significance level, so regression (11) in table 22 should be preferred as it relaxes this restriction. Regression (11) assumes that the dependent variable is distributed according to the negative binomial distribution. Equation 5 still applies, but now with $\ln(\lambda_i) = \beta' x_i + \ln(u_i)$. The last summand $\ln(u_i)$ represents additional sources of variance such as unobservable or omitted variables and it is distributed as $u_i \sim \text{Gamma}(1/\alpha, \alpha)$ where α is estimated jointly with the coefficients β. A likelihood ratio test reconfirms that the additional term $\ln(u_i)$ cannot be neglected. In most respects, the estimation results are very close to the Tobit estimations: The semi-elasticity of acquisitions to changes in double taxation is -2.5 (compared to -2.3 in the Tobit regression). The semi-elasticity of acquisitions to differences in domestic tax rates is 1.2 (compared to 1.0 in the Tobit regression). Also the coefficients for distance, common language and adjacency change very little. The coefficients for country size now even have the appeal that they are symmetric: Size of the "acquiring" country has the same impact on the number of cross-border acquisitions as the size of the "target" country.

3.4.3 Robustness with respect to different Panel specifications

Regression (12) and (13) eventually test the robustness of estimation results with respect to modelling individual-specific or time-specific effects. Regression (12) in table 23 not only includes two sets of country dummy variables but also a set of time dummy variables to account for period-specific effects. The variation in country size is now for a large part captured by the time dummy and the country dummy variables, so the coefficients for country size have become insignificant. The other coefficients retain their size and significance compared to the baseline regression (1). Only the effect of double taxation decreases slightly in size, but it remains significant at the 1% level: The semi-elasticity of acquisitions with respect to the double tax rate is estimated at -1.6.

We could also replace the two sets of country dummy variables (indicated by γ_i and δ_j in equation (2) by a country-pair specific effect ψ_{ij}. Implementing this country-pair specific effect as a fixed effect would bring about two problems: First, the tobit regressions are no longer consistent if a fixed effect is introduced for every country-pair and if the time dimension is fixed (Baltagi 2005, pg. 224).[17] Second, the use of country-pair fixed effects wipes out any bilateral variation in the explanatory variables. Most of the variation in double taxation is across country-pairs and not over time, so its effect would become unidentifiable. Also the effects of adjacency and common language could no longer be observed, because they only

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[17]Although one could argue that it is not the time dimension that is fixed in our sample. Contrary to samples that are typically used in microeconometrics it is rather the cross-sectional dimension N that is fixed. Once all existing countries are included in the sample, there is no way to further extend the cross-sectional dimension. The timespan T, on the other hand, could be easily expanded by simply waiting a couple of years until the data becomes available. Furthermore, Greene (2004) has shown that for samples with $N = 1000$ and $T \leq 20$ there is almost no bias (although the estimated standard deviations are biased downward.)

vary across country-pairs. Hence, regression (13) in table 24 estimates a Tobit model with country-pair random effects. All coefficients except one are significant at the 1% level. The size and significance of the tax-related coefficients are very similar to the baseline regression (1). On the other hand, estimates for the effect of country size or common language, for example, change substantially. The high significance of the coefficient estimates is quite suspicious. Most probably, the rather strict assumptions for the use of random effects — like independence between explanatory variables and the individual-specific effect — are not satisfied.[18] Random effects also miss an intuitive interpretation in a macroeconomic panel.

4   The Direction of Cross-border Mergers and Acquisitions

The last section analyzed the impact of double taxation on the pattern of cross-border mergers and acquisition on the basis of aggregate numbers. This section will analyze double taxation from a micro-perspective by analyzing the mergers themselves, especially the direction of mergers, i.e. which of the two involved companies takes the role of the parent company and which one assumes the role of the subsidiary. If double taxation has an impact on the choice of direction, then multinationals will over time assume a corporate structure such that double taxation is minimized.

Desai & Hines (2002) and Hines (1991) give very extreme examples for such behavior. They investigate so-called corporate inversions: A foreign subsidiary incorporated in a tax haven takes over the parent company for the sake of avoiding double taxation.[19] From 1996 to 2002, they list 22 corporate inversions in the United States among which there are several S&P 500 companies. The principal motivation for these cross-border acquisitions is the avoidance of double taxation.

The majority of mergers, on the other hand, is based on motives that are not directly related to taxation. However, the incentives that cause corporate inversions are also present in the conduct of a "regular" merger. In fact, every merger represents a natural milestone for reevaluating the optimal country of residence: The geographical spread of the merged company will be different and the merger will incur unavoidable costs (like capital gains taxes) anyway. Tax considerations will especially tip the scale when the merger's principal motivation does not automatically imply a certain direction. For example, when firms merge to acquire economies of scale they are generally very flexible in choosing the eventual corporate

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[18]The Hausman test cannot be used to judge the appropriatness of the random effects specification, because the counterpart with country-pair fixed effects is not consistent.

[19]Or as one of the concerned firms puts it in its prospectus (Mc Dermott International Inc. (1982)): "The principal purpose of the reorganization is to enable the McDermott Group to retain, reinvest and redeploy earnings from operations outside the United States without subjecting such earnings to United States income tax."

structure.[20]

Several recent cases provide some evidence for such behavior. When Daimler (from Germany) and Chrysler (from the US) merged in 1998, management deliberated about the future country of residence. In the end, they chose to have a German corporation as the top parent company. Daimler-Chrysler's chief tax counsel stated before the US Ways and Means Committee on 30 June 1999 that the German tax system was one main reason for the structure chosen: Germany's partially territorial tax system in conjunction with the US/Germany tax treaty renders dividends paid by Chrysler Corporation to Daimler-Chryler AG tax exempt (Bogenschütz & Wright 2000).

Another example is the recent reorganization of Shell/Koninklijke Olie which originally resided in the UK and the Netherlands respectively. The two firms originally merged in 1903. However, they were retained as two separate entities with separate stock listings and separate tax residences in the UK and the Netherlands respectively. The firms simply shared all revenues. In 2005, in the wake of a recent accounting scandal the shareholders of the two firms approved following reorganization: The two separate firms will formally merge to one entity. The new company will have the form of a British plc (public listed company) with its main listing on the London stock exchange, but it will be tax resident of the Netherlands. This peculiar structure may have political reasons, but it also makes the Dutch tax regime applicable to all foreign income. The Netherlands exempt foreign income from taxation whereas Great Britain only allows tax credits for income taxes paid abroad.

4.1 Descriptive Statistics

What is the actual double tax burden of mergers and acquisitions that have taken place? The sample contains 626 take-overs that have information on pre-tax income for the acquiror as well as for the target.[21] With this information the effective double tax rate on the combined pre-tax income can be calculated as:

$$\theta_{ij}^{double} = \tau_{ijt}^{double} \times \frac{(PretaxIncome)_j}{(PretaxIncome)_i + (PretaxIncome)_j} \tag{6}$$

where i and j indicate the bidding firm and the the target firm and τ_{ijt}^{double} is the statutory double tax rate which takes worldwide income taxation imposed by country i and withholding taxes imposed by country j into account. This effective double tax rate is more accurate in

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[20]Tax considerations only play a marginal role if the principal motivation for an acquisition directly implies a certain direction, for example when the acquiror wants to replace incompetent management in the target firm or when a firm wants to gain market access abroad by means of an acquisition. A high double tax burden may not change a merger's direction in such a case. Instead, the merger will not take place at all. Nevertheless, the marginal effect is measurable exactly because of the absence of acquisitions implying high double tax burdens.

[21]Mergers between listed companies may be over-sampled, because their financial information is readily available.

measuring the actual burden on individual mergers than statutory rates. It is not a forward looking measure, but the information on current income is the best available predictor for future income. Table 4 reports some summary statistics for the effective double tax rate.

Table 4: Effective Double Tax Rate for Actual Mergers (in percent)

Double tax rate	Mean	Std.Dev.	Percentile				
			50th	75th	90th	95th	99th
θ_{ij}^{double}	0.50	1.89	0.00	0.05	1.07	2.73	10.00

The average effective double tax rate is half a percent. With an average combined pre-tax income of about 800 million US dollars, this translates into an absolute average burden of 4 million US dollars. The distribution is quite skewed: Positive double tax rates apply to 28% of the mergers, whereas 72% of the mergers are not subject to any extra tax burden.

What would have been the double tax burden if the direction of these 626 mergers were inverted? Table 5 lists the effective double tax rates as if acquiror and target had changed roles:

Table 5: Effective Double Tax Rates if Actual Mergers were Inverted

Double tax rate	Mean	Std.Dev.	Percentile				
			50th	75th	90th	95th	99th
θ_{ji}^{double}	2.46	4.39	0.00	3.38	9.09	11.71	18.89

The mean effective double tax rate for inverted mergers would be 2.46%, which is much higher than before. Even more informative, the share of mergers that would be subject to double taxation also increases considerably: 38% of the firms would be subject to double taxes and only 62% of the firms would remain without any extra burden. These figures strongly suggest that the threat of double taxation affects the direction of mergers.

4.2 Methodological Framework

Other factors have to be controlled for before we can draw firm conclusions: The direction of the take-over can be modeled as a binary choice conditional on the information that an acquisition takes place. Let

$$V_{ab} = x'_{ab}\beta + \varepsilon_{ab} \tag{7}$$

be the value of the combined company when firm a takes over firm b. x_{ab} is a vector of independent variables that are relevant when the merger takes the direction such that firm a is the parent firm. β is the vector of coefficients. Similarly, let

$$V_{ba} = x'_{ba}\beta + \varepsilon_{ba} \tag{8}$$

be the value of the new firm when firm b takes over firm a. x_{ba} is a vector of independent variables that are relevant when the merger takes the direction such that firm b is the parent firm. The error terms ε_{ab} and ε_{ba} capture all unobserved factors and are assumed to be Weibull distributed. Firm a taking over firm b reveals that

$$V_{ab} - V_{ba} = (x_{ab} - x_{ba})'\beta + (\varepsilon_{ab} - \varepsilon_{ba}) > 0 \tag{9}$$

where the error term $(\varepsilon_{ab} - \varepsilon_{ba})$ follows a logistic distribution. Hence, the conditional probability of firm a taking over firm b is

$$\text{Prob } (V_{ab} - V_{ba} > 0 \,|\, x_{ab}, x_{ba}) = \frac{\exp\left[(x_{ab} - x_{ba})'\beta\right]}{1 + \exp\left[(x_{ab} - x_{ba})'\beta\right]} \tag{10}$$

which is estimated by maximizing the joint likelihood over all mergers. The indices a and b can be distributed arbitrarily over the two firms involved in a merger. The independent variables are all symmetric to zero in the sense that switching indices for any observation simply changes the sign of the corresponding explanatory variable. Hence, the value of the likelihood function remains unaffected and estimation results are equivalent.

The variables of interest is the difference in the effective double tax rate $\theta_{ab}^{double} - \theta_{ba}^{double}$. This variable should have a negative coefficient if double taxation affects the direction of mergers. Differences of following control variables complete the specification (Table 25 in the appendix contains the summary statistics) :

Size: Size is an important explanatory variable, because small firms suffer several handicaps when taking over a large firm: First, a small firm would have to raise considerable amounts of outside funds to take over a larger firm. External funds have higher costs of capital than internal funds due to informational asymmetries between the firm and outside investors. Myers & Majluf (1984) have laid down the theory for such a pecking order of financing sources and Fazzari et al. (1988) provided empirical evidence for its existence. The informational asymmetries are aggravated if a smaller company takes over a larger company, because the value of such a deal involves much more uncertainty than if a large company takes over a small company. Often the costs of capital for external funds would be prohibitive. Carpenter et al. (1994) and Gilchrist & Himmelberg (1995) have found that it is especially small companies that are financially constrained due to informational asymmetries. Second, it is important to preserve both sets of shareholders when the acquisition is done by a share trade. However, it is the norm that shareholders of the target firm subsequently sell off the shares they received which puts pressure on the share price (Ruegger 1999). This phenomenon called "flow back" is in line with the Feldstein-Horioka puzzle (1980) that most financial investment takes place within national borders. It may be explained by the fact that institutions like

pension funds or investment funds have strict rules on the amount of foreign assets that they are allowed to have in their portfolio. The "flow back" is minimized when the large firm takes over the small firm. The relative size is measured as:

$$Size_{ab} = \frac{(TotalAssets)_a}{(TotalAssets)_a + (TotalAssets)_b}$$

Liquidity: The ratio of liquid assets to total assets indicates the amount of retained earnings. A high amount of internal funds reduces the need for more costly external funds when financing an acquisition. Low liquidity, on the other hand, signals difficult access to external funds potentially constraining investment (Fazzari et al. 1988). Hence, the firm with the higher liquidity ratio should be the bidder. Furthermore, a low liquidity ratio may signal a firm in financial distress which reduces firm value. A take-over by a financially solid firm can increase firm value by removing the financial distress (Jaffe et al. 1999, pg. 796). The firm with the higher liquidity ratio should also in this case be the bidder.

Leverage: Desai & Hines (2002) have pointed out that a low debt ratio may reflect high costs of borrowing from unrelated parties leaving the firm financially constrained. Borrowing from a new parent company would alleviate financial constraints and it would increase the tax shield provided by interest payments[22], both increasing the merger's value. Accordingly, the firm with the lower leverage tends to be the target firm.[23]

Profitability: Ailing companies with inefficient management are characterized by low levels of profitability. Hence, firms with high return on assets (ROA) should take over those with low return on assets replacing the inefficient incumbent management (Palepu 1986).

Investment: Investment is a dynamic process because it is subject to adjustment costs as training the workforce in using the new capital equipment or integrating a new subsidiary into the existing organization. It is better to approach the optimal level of capital gradually than in one big adjustment. Hayashi (1982), for example, has developed a theoretical model of investment that comprises adjustment costs. Virtually all recent empirical studies on capital investment (e.g., Mairesse et al. 1999) take the implied dynamics into account: Past investment is correlated with present investment

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[22]Having a foreign parent firm (and not a domestic one) offers the additional advantage that increased borrowing from the parent firm shifts profits abroad where corporate income taxes may be lower.

[23]Desai & Hines (2002) describe yet another possible relationship between leverage and cross-border acquisitions: U.S. taxation of foreign income is burdensome to taxpayers with significant domestic expenses (particularly interest charges) that must partly be allocated against foreign income. They argue that such a rule reduces the tax shield effect of interest payments. The tax shield can be fully repaired if a foreign parent company acquires the US firm and reorganizes the subsidiaries such that they are not subordinate to the US firm anymore. Desai & Hines find that such an incentive causes corporate inversions. (A foreign subsidiary — typically located in a tax haven — acquires the whole conglomerate and becomes the new parent firm.) Highly leveraged firms are more likely to invert.

due to adjustment costs. This result can be used to predict a merger's direction: High investment expenditures in the past indicate that a firm is the the bidder and not the target as the acquisition is part of a dynamic investment strategy. Investment efforts are measured by the ratio of cashflow from investments over total assets (so high investment activity is reflected by a negative indicator).

Country dummy variables: A set of country dummy variables controls for country-specific effects like technological progress or shareholder protection. Rossi & Volpin (2004), for example, have shown that firms from countries with high levels of shareholder protection transfer their high corporate governance standards and the corresponding low costs of capital to firms from countries with low levels of shareholder protection by means of acquisitions. Section 3 contains a more detailed discussion of the factors that the country dummy variables capture.

4.3   Estimation Results

Regression (1) in table 26 has the most parsimonious specification in order to maximize the sample size. It includes only the most important control variable, $\Delta(Size)$, which measures the relative size difference of the two merging firms, and the variable of interest, $\Delta\theta^{double}$, which measures the difference in effective double taxation when firm a acquires firm b compared to the situation that firm b acquires firm a. A set of country dummy variable controlling for country-specific effects is included as well.

The richer specification of Regression (2) in table 27 also includes the difference in liquidity ratios, the difference in leverage ratios and the difference in profitability. The sample size decreases by 20% due to missing explanatory variables. Most of the following discussion is based on this regression because it offers the best trade-off between sample size and richness of specification. Regression (3) in table 28 finally adds the difference in investment activity which further reduces the sample size by another 30%.

Relative size difference is, as expected, the most significant variable with a p-value virtually equal to zero. In a merger of equals – when all variables are exactly zero as they measure differences between firms – an increase in the relative size difference by one percentage point would increase the chance of the larger firm being the bidder by 1.6%. On average, the larger firm contributed 86% and the smaller firm 14% of total assets, so size is the most decisive variable for determining the direction of a merger.

The importance of firm size accentuates the role of double taxation as an important variable for mergers of equals. The impact of double taxation on a merger's direction is largest when the two firms are of similar size. On the other hand, double taxation will only play a marginal role when there are large size differences. For a merger of equals, an increase in the effective

double tax rate by one percentage point lowers the probability of the burdened firm being the bidder by 8.5%. Or stated differently, the chance of being the bidder increases by 8.5% for the firm that would not incur double taxes after acquiring the other firm. Hence, the direction of mergers is sensitive to double tax incentives. On average, the difference in effective double tax rates is 2 percentage points, so the effect of double taxes will be dwarfed by the size effect when firms are very different. However, double taxation can be quite decisive for determining the direction in a merger of equals.

The negative effect of double taxation on the probability of being the bidding firm can also be explained along the lines of the previous section on the overall pattern of mergers and acquisitions: A merger that would take place in the absence of double taxes is inhibited by the looming double tax burden. Either the direction of the merger is inverted, or the merger does not take place at all, or an unburdened competitor from a different country takes the place of the bidding firm. In all three cases, the proportion of bidding firms subject to double taxation decreases which is reflected in our estimates.

The control variables difference in leverage and difference in profitability are not significant. Liquidity, on the other hand, has the expected positive effect: An increase in the difference of liquidity ratios by one percentage point raises the chances of the liquid company being the bidder by 0.8%. Also here, the total effect may be dominated by size as the average difference in liquidity ratios is 13.3 percentage points.

The specification of regression (3) in table 28 also includes the difference in investment activity in the explanatory variables. This unfortunately reduces sample size by a further 30%. Nevertheless, past investment activity significantly increases the probability of being the bidding firm. Hence, acquisitions form part of a dynamic investment process. The other coefficient estimates remain stable with one exception: The effect of leverage increases fourfold and becomes significantly positive. This finding supports the hypothesis that some target firms exhibit low leverage ratios, because they are financially constrained. An acquisition by a firm with better access to external funds (and therefore with a higher leverage) removes this financial constraint. The merger creates value by enabling investment projects and by increasing the tax shield of interest payments.

4.3.1 Robustness with Respect to Estimation Method

Regressions (4) to (6) in tables 29 to 31 are similar to regressions (1) to (3) in terms of specification, but they are Probit estimates and not Logit estimates to test the robustness of estimation results with respect to assumptions about the distribution of error terms. This change in modeling is not relevant for eventual conclusions: The size of marginal effects decreases for all variables by about 20%, but the significance remains equivalent to the previous regressions. In particular, the effect of a one percentage point increase in the prospective

double tax rate decreases the probability of the burdened firm being the bidder by 6.8% (compared to previously 8.5%). The significance of this effect remains unaffected by the change in estimation method.

4.3.2 Robustness with Respect to Omitted Variables

The previous specifications have not explicitly included any macroeconomic variables, but only firm-level variables and country-specific effects. These country dummy variables capture any time-invariant country-specific effect, like the general country size, the level of infrastructure or institutional factors. Regression (7) in table 32 explicitly includes several macroeconomic variables to analyse if changes in country-level variables over time have an effect on the direction of mergers and if coefficient estimates of other variables remain stable. The specification includes the difference between countries in corporate income tax rates $\Delta\tau$, the difference in relative market capitalization $\Delta(Stockmarket/GDP)$, the difference in relative credit provision $\Delta(Credit/GDP)$, the difference in per capita income $\Delta(GDP/Capita)$ and the difference in relative country size $\Delta Countrysize$. Only the difference in corporate income tax rates turns out to be significant. In regression (8) in table 33 all insignificant macro-level variables are excluded and only the difference in corporate income tax rates is added to the baseline specification. The positive coefficient indicates that a percentage point decrease in the domestic corporate income tax rate decreases the probability of domestic firms being the bidding party in a merger by 8.8%. (To be precise: We again assumed a merger of equals for calculating the marginal effect.) This reconfirms that lower corporate income taxes attract FDI also in the form of corporate take-overs. Foreign investors become more interested in the domestic corporate market which increases the proportion of target firms with respect to bidding firms.

The inclusion of the difference in corporate income tax rates as a control variable sligthly increases the size of the remaining coefficients. The significance remains unaffected. In particular, a percentage point increase in the effective double tax rate now decreases the chance of the burdened firm being the bidder by 10.8% (compared to 8.7% in the baseline specification.)

5 Conclusion

We have found that an increase in double taxation by one percentage point decreases the frequency of cross-border mergers and acquisitions by as much as 2.3%. The double taxation can be either caused by a worldwide taxation regime in the bidder's country or by withholding taxes imposed by the target firm's country; the effect remains the same. This result has several implications. First, it shows that companies cannot avoid the additional burden of

double taxation on a broad scale. If deferral of foreign income taxes alleviated the effects of worldwide income taxation then higher home country taxes should not have a negative effect. If companies were able to evade withholding taxes, for example by shifting profits, then we should not find a negative effect for withholding taxes.

The high elasticity even indicates that firms subject to double taxation are driven out of the corporate transaction market by their unburdened competitors. As a consequence, the share of bidders from countries with an exemption regime will increase as the target country's tax rate decreases. Their competitors from foreign-tax-credit countries cannot profit from the target country's low level of taxes, because they are subject to double taxation. This confirms the findings by Hines (1996).[24] The results also hold a lesson for countries trying to attract FDI in the form of acquisitions: Low withholding taxes will keep double taxation low and attract more foreign investors.

When investigating individual mergers we found that double taxation has an effect on a merger's direction. For a merger of equals, an increase in the effective double tax rate by one percentage point lowers the probability of the burdened firm to be the bidder by 8.5%. This implies that multinationals will over time assume a corporate structure that minimizes double taxation. Industries are reorganized on an international level through cross-border mergers to achieve production efficiency with respect to integrating economies. In every merger, the parent firm tends to reside in the country offering the lower double tax burden.

That also implies that countries taxing worldwide income tend to loose multinationals' headquarters over time and every relocated headquarter contributes to the erosion of the corporate income tax base. The countries can slow this process by lowering their corporate income tax rate as this reduces the double tax burden with respect to its trading partners. Some countries may even actively cater to multinationals as a location for headquarters by exempting foreign income from taxation and offering a complete set of tax treaties with other countries that offer advantageous withholding tax rates.

The findings in this paper raise quite a few further questions: The residence of multinationals is sensitive to double taxation, but what is the exact value of having a multinational's headquarter in the country? Of course, for countries with worldwide taxation their presence increases the tax base, but are there any positive spill-over effects? After all, a headquarter employs high-skilled labor. Research and development often takes place close to the headquarter's location. Maybe there even exists a home bias in multinationals' investment decisions.

The choice of taxation regime for foreign income is decisive for the eventual size of double tax

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[24]Although he described the underlying mechanism very differently: Hines (1996) wrote that "the ability to apply foreign tax credits against home-country tax liabilities reduces an investor's incentive to avoid high-tax foreign locations". We would formulate the sentence from a slightly different point of view: "The inability to avoid double taxation restricts investors subject to worldwide taxation to high-tax foreign locations."

burdens. Do countries make their choice in a strategic manner or is it a result of tradition and history? How does the choice of taxation regime interact with the level of the tax rate? Foreign-tax-credit countries in general have lower corporate income tax rates than countries that exempt foreign income from taxation. Is that pure coincidence or is this difference caused by the countries' desire to keep double taxation at a minimum? The limitation of double taxes would reduce incentives to relocate headquarters and also support the activities of indigenous multinationals abroad where they have to compete with other multinationals whose foreign income is exempt from taxation. Does it amplify the degree of tax competition if foreign-tax-credit countries have such an additional incentive to reduce corporate income taxes? These kind of questions are left for future research.

References

Altshuler, R., Grubert, H. & Newlon, T. (2001), Has u.s. investment abroad become more sensitive to tax rates?, *in* J. Hines, Jr., ed., 'International Taxation and Multinational Activity', University of Chicago Press, Chicago, pp. 9–32.

Baldwin, R. & Krugman, P. (2004), 'Agglomeration, integration and tax harmonisation', *European Economic Review* **48**, 1–23.

Baltagi, B. (2005), *Econometric Analysis of Panel Data*, 3rd edn, John Wiley & Sons, Chichester.

Beckerman, W. (1956), 'Distance and the pattern of intra-european trade', *Review of Economics and Statistics* **38**.

Blonigen, B. & Davies, R. (2004), 'The effects of bilateral tax treaties on u.s. fdi activity', *International Tax and Public Finance* **11**(5), 601–622.

Bogenschütz, E. & Wright, K. (2000), 'Daimler-chrysler merger', *International Tax Review* .

Boskin, M. & Gale, W. (1987), New results on the effects of tax policy on the international location of investment, *in* M. Feldstein, ed., 'The Effects of Taxation on Capital Accumulation', University of Chicago Press, Chicago, pp. 201–219.

Bris, A. & Cabolis, C. (2002), 'Corporate governance convergence by contract: Evidence from cross-border mergers', *Yale ICF Working Paper* (32).

Carpenter, R., Fazzari, S. & Petersen, B. (1994), 'Inventory investment, internal-finance fluctuations, and the business cycle', *Brookings Papers on Economic Activity* **2**, 75–122.

Chennells, L. & Griffith, R. (1997), *Taxing Profits in a Changing World*, The Institute for Fiscal Studies, London.

Coopers & Lybrand (1998), *International Tax Summaries: A Guide to Planning and Decisions (1985–1998)*, John Wiley & Sons, Chichester.

Desai, M. & Hines, Jr., J. (2002), 'Expectations and expatriations: Tracing the causes and consequences of corporate inversions', *NBER Working Paper Series* (9057).

Devereux, M. & Griffith, R. (1998), 'Taxes and the location of production: evidence from a panel of us multinationals', *Journal of Public Economics* **68**, 335–67.

Di Giovanni, J. (2005), 'What drives capital flows? the case of cross-border m&a activity and financial deepening', *Journal of International Economics* **65**(1), 127–149.

Eurostat (2004), *Structures of the Taxation Systems in the European Union*, Office for Official Publications of the European Communities, Luxembourg.

Fair, R. (1977), 'A theory of extramarital affairs', *Journal of Political Economy* **86**, 45–61.

Fazzari, S., Hubbard, R. & Petersen, B. (1988), 'Financing constraints and corporate investment', *Brookings Papers on Economic Activity* **1**, 141–195.

Feldstein, M. & Horioka, C. (1980), 'Domestic saving and international capital flows', *Economic Journal* **90**(358), 314–329.

Gilchrist, S. & Himmelberg, C. (1995), 'Evidence on the role of cash flow for investment', *Journal of Monetary Economics* **36**(3), 541–572.

Gordon, R. & Hines, Jr., J. (2002), 'International taxation', *NBER Working Paper Series* (8854).

Greene, W. (2000), *Econometric Analysis*, 4th edn, Prentice-Hall, Upper Saddle River, New Jersey.

Greene, W. (2004), 'The behaviour of the maximum likelihood estimator of limited dependent variable models in the presence of fixed effects', *Econometrics Journal* **7**, 98–119.

Grubert, H. & Mutti, J. (1991), '1991', *Review of Economics and Statistics* **73**, 285–293.

Hartman, D. (1984), 'Tax policy and foreign direct investment in the united states', *National Tax Journal* **37**, 475–487.

Hayashi, F. (1982), 'Tobin's marginal q and average q: A neoclassical interpretation', *Econometrica* **50**(1), 213–224.

Hines, Jr., J. (1991), 'The flight paths of migratory corporations', *Journal of Accounting, Auditing and Finance* **6**(4), 447–79.

Hines, Jr., J. (1994), 'Credit and deferral as international investment incentives', *Journal of Public Economics* **55**, 323–347.

Hines, Jr., J. (1996), 'Altered states: Taxes and the location of foreign direct investment in america', *American Economic Review* **86**(5), 1076–94.

Hines, Jr., J. & Rice, E. (1994), 'Fiscal paradise: Foreign tax havens and american business', *Quarterly Journal of Economics* **109**, 149–182.

IBFD (2005*a*), *Corporate Investment Income*, IBFD Publications, Amsterdam.

IBFD (2005*b*), *Corporate Taxation in Europe*, IBFD Publications, Amsterdam.

IBFD (2005c), *IBFD Tax Treaties Database*, IBFD Publications, Amsterdam.

IBFD (2005d), *Taxation & Investment in Central and East European Countries*, IBFD Publications, Amsterdam.

Jaffe, J., Ross, S. & Westerfield, R. (1999), *Corporate Finance*, 5th edn, McGraw-Hill, Singapore.

KPMG International Tax and Legal Center (2003), *KPMG's Corporate Tax Rate Survey 1998-2003*, KPMG International.

Leamer, E. & Levinsohn, J. (1995), International trade theory: The evidence, *in* G. Grossman & K. Rogoff, eds, 'Handbook of International Economics', Vol. 3, Elsevier Science, Amsterdam, pp. 1339–1394.

Linnemann, H. (1966), *An Econometric Study of International Trade Flows*, North-Holland, Amsterdam.

Mairesse, J., Hall, B. & Mulkay, B. (1999), 'Firm-level investment in france and the united states: An exploration of what we have learned in twenty years', *Annales d'Economie et de Statistique* **55–56**, 27–67.

Markusen, J. (1995), 'The boundaries of multinational enterprises and the theory of international trade', *Journal of Economic Perspectives* **9**(2), 169–189.

Mc Dermott International Inc. (1982), *Exchange Offer for up to 30,000,000 Shares of Common Stock of Mc Dermott Incorporated*, Mc Dermott International Inc.

Myers, S. & Majluf, N. (1984), 'Corporate financing and investment decisions when firms have information that investors do not have', *Journal of Financial Economics* **13**(2), 187–221.

Newlon, T. (1987), Tax Policy and the Multinational Firm's Financial Policy and Investment Decisions, Ph.d. dissertation, Princeton University, Princeton (NJ).

OECD (2005), *Model Tax Convention on Income and on Capital*, OECD, Paris.

Palepu, K. (1986), 'Predicting takeover targets: A methodological and empirical analysis', *Journal of Accounting and Economics* **8**, 3–35.

Portes, R. & Rey, H. (2001), *The Determinants of Cross-Border Equity Flows: The Geography of Information*, Mimeo, Princeton University.

Poyhonen, P. (1963), 'A tentative model for the volume of trade between countries', *Weltwirtschaftliches Archiv* **90**, 93–99.

Rose, A. (2000), 'One money, one market: Estimating the effect of common currencies on trade', *Economic Policy* **15**(30), 8–45.

Rossi, S. & Volpin, P. (2004), 'Cross-country determinants of mergers and acquisitions', *Journal of Financial Economics* **74**, 277–304.

Ruegger, P. (1999), *Structuring International Acquisitions Part 1*, FindLaw, Minnesota.

Slemrod, J. (1990), Tax effects on foreign direct investment in the united states: Evidence from a cross-country comparison, *in* A. Razin & J. Slemrod, eds, 'Taxation in the Global Economy', University of Chicago Press, Chicago, pp. 79–117.

Swenson, D. (1994), 'The impact of u.s. tax reform on foreign direct investment in the united states', *Journal of Public Economics* **54**(2), 243–266.

Tinbergen, J. (1962), *Shaping the World Economy: Suggestions for an International Economic Policy*, Twentieth Century Fund, New York.

United Nations Conference on Trade and Development (1994), *World Investment Report 1994: Transnational Corporations, Employment and the Workplace*, United Nations, New York.

United Nations Conference on Trade and Development (1996), *World Investment Report 1996: Investment, Trade and International Policy Arrangements*, United Nations, New York and Geneva.

United Nations Conference on Trade and Development (2000), *World Investment Report 2000: Cross-border and Acquisitions and Development*, United Nations, New York and Geneva.

United Nations Conference on Trade and Development (2004), *World Investment Report 2004: The Shift towards Services*, United Nations, New York and Geneva.

Worldbank (2004), *World Development Indicators*, Worldbank, Washington D.C.

Young, K. (1988), 'The effects of taxes and rates of return on foreign direct investment in the united states', *National Tax Journal* **41**, 109–121.

Table 6: Tax Regimes and Tax Rates in 2004

Country of Residence	Tax Rate	Aut	Bel	Bul	Cro	Cze	Den	Est	Fin	Fra	Ger	Gre	Hun	Ice	Ire	Ita	Jap	Lat	Lit	Lux	Net	Nor	Pol	Por	Rom	Slk	Sln	Spa	Swe	Swi	UK	US
Austria	34.0		E	E	E	E	E	E	E	E	E	E	E	E	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	C
Belgium	34.0	E		E	E	E	E	E	E	E	E	E	E	E	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Bulgaria	19.5	E	E		C	E	E	C	E	E	E	E	E	C	C	E	E	C	C	E	E	E	E	E	E	C	E	E	E	E	E	C
Croatia	20.0	C	E	C		C	C	C	C	E	E	E	E	C	C	E	E	E	E	C	E	E	C	C	C	C	C	C	E	C	E	C
Czech Republic	28.0	E	C	E	C		E	C	C	E	E	E	C	C	E	C	E	C	C	E	E	C	C	C	C	C	C	E	C	D	E	C
Denmark	30.0	E	C	E	C	E		C	E	E	E	C	C	C	C	C	E	C	C	E	C	C	C	C	C	C	C	C	C	D	E	C
Estonia	0.0	C	C	D	D	C	C		C	C	D	D	C	C	C	C	D	C	C	D	C	C	D	D	C	C	D	D	D	D	C	C
Finland	29.0	C	C	C	C	C	C	C		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	E	C	C	C	C	C
France	35.4	E	E	E	E	E	E	E	E		E	E	E	E	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Germany	38.3	E	E	E	E	E	E	E	E	E		E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Greece	35.0	E	C	C	C	C	C	C	C	C	E		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Hungary	17.7	E	E	E	E	E	E	C	E	E	E	C		C	E	E	C	C	C	E	E	E	C	E	E	C	E	E	E	E	E	E
Iceland	18.0	C	E	C	C	E	E	E	E	E	E	C	C		E	E	C	E	E	E	E	C	C	C	C	C	C	C	E	C	E	E
Ireland	12.5	C	C	C	C	C	C	C	C	C	C	C	C	D		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Italy	37.3	C	C	C	C	C	C	C	C	C	C	C	C	C	C		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Japan	42.0	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Latvia	15.0	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		C	C	C	C	C	C	C	C	C	C	C	C	C	C
Lithuania	15.0	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	E		C	C	C	C	C	C	C	C	C	C	C	C	C
Luxembourg	30.4	E	E	E	L	E	E	E	E	E	E	E	E	E	E	E	E	L	L	E	E	E	E	E	E	E	E	E	E	E	E	E
Netherlands	34.5	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E		E	E	E	E	E	E	E	E	E	E	E
Norway	28.0	C	E	E	E	C	E	C	C	C	C	C	C	C	C	C	C	C	C	C	C		C	C	C	C	C	C	C	C	C	C
Poland	19.0	E	C	C	E	C	C	D	C	C	C	C	C	C	C	C	C	C	C	C	E	E		E	C	C	E	C	C	E	C	C
Portugal	27.5	E	C	C	C	C	E	D	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		C	C	E	C	C	E	C	C
Romania	25.0	E	E	E	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		E	E	E	C	E	C	C
Slovak Rep	19.0	E	C	C	C	E	N	C	E	E	E	C	C	C	E	C	C	C	C	E	E	E	C	C	C		C	E	C	C	E	C
Slovenia	25.0	C	C	C	C	C	C	C	C	E	E	C	E	C	C	C	C	C	C	C	E	E	C	C	C	E		C	C	C	C	C
Spain	35.0	C	C	C	C	C	C	C	E	C	C	C	C	C	C	C	C	C	C	E	E	C	C	C	C	C	C		C	E	C	C
Sweden	28.0	C	C	C	E	C	C	C	C	C	E	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		E	C	C
Switzerland	24.0	E	E	E	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E		E	E
United Kingdom	30.0	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		C
United States	40.0	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	

Source Country

Table notes: The letters indicate the tax regime that countries of residence (listed on the left-hand side) apply in 2004 to foreign source income originating from the countries listed at the top: E=Exemption regime, C=Credit regime, D=Deduction regime, L=Milder version of the deduction regime used in Luxembourg, N=No relief from double taxation. The latter two regimes are classified as deduction regimes in the tables that are to follow, because they are very similar in nature. The rate reported in the second column is the top statutory corporate income tax rate that comprises average local taxes.

A Appendix

Table 7: Tax Regimes across Countries

Country of residence	Relative Share of Tax Regimes			Unilateral Relief	Share of Relations with tax treaty
	Credit	Deduction	Exemption		
Austria	25%	0%	75%	Exemption	89%
Belgium	0%	10%	90%	Deduction	90%
Bulgaria	28%	0%	72%	Credit	76%
Croatia	61%	0%	40%	Credit	56%
Czech Republic	39%	0%	61%	Credit	87%
Denmark	80%	0%	20%	Credit	98%
Estonia	42%	51%	7%	Deduction	45%
Finland	76%	0%	24%	Credit	100%
France	0%	0%	100%	Exemption	95%
Germany	0%	0%	100%	Credit	99%
Greece	96%	0%	4%	Credit	64%
Hungary	16%	0%	84%	Credit	83%
Iceland	62%	0%	38%	Credit	37%
Ireland	74%	26%	0%	Deduction	72%
Italy	94%	0%	6%	Credit	91%
Japan	100%	0%	0%	Credit	79%
Latvia	93%	0%	7%	Credit	39%
Lithuania	93%	0%	7%	Credit	36%
Luxembourg	0%	25%	75%	Deduction	72%
Netherlands	2%	0%	98%	Exemption	91%
Norway	27%	0%	73%	Credit	98%
Poland	26%	0%	74%	Credit	83%
Portugal	96%	0%	4%	Credit	57%
Romania	81%	0%	19%	Credit	78%
Slovak Rep	16%	19%	65%	None	79%
Spain	53%	0%	47%	Credit	80%
Sweden	88%	0%	12%	Credit	96%
Switzerland	0%	0%	100%	Exemption	84%
United Kingdom	100%	0%	0%	Credit	94%
United States	100%	0%	0%	Credit	87%
Total	52%	4%	44%		80%

Table notes: Column 2, 3 and 4 report the average share of tax regimes that are applied by the country of residence (listed on the left-hand side) to foreign source income. The average is taken across partner countries and across time. Column 5 reports the unilateral method of relief that applies in absence of a tax treaty in the year 2004. The last column shows the average share of relationships that are governed by a tax treaty. The average is taken across partner countries and across time.

Table 8: Double Tax Rates per Country

Country	Inflows			Outflows		
	$\bar{\tau}_{i\cdot}^{regime}$	$\bar{\omega}_{i\cdot}$	$\bar{\tau}_{i\cdot}^{double}$	$\bar{\tau}_{\cdot j}^{double}$	$\bar{\omega}_{\cdot j}$	$\bar{\tau}_{\cdot j}^{double}$
Netherlands	0.0	1.3	1.3	2.2	1.4	3
France	0.0	2.0	2.0	1.6	2.6	3.5
Germany	0.1	2.8	2.8	0	2.6	2.6
Finland	1.4	2.2	3.1	2.9	3.7	5.5
United Kingdom	1.4	2.3	3.1	4.1	0	3.9
Switzerland	0.0	3.2	3.2	5.9	5.6	8.3
Norway	0.5	2.9	3.3	2.6	2.6	4.7
Sweden	1.8	2.0	3.3	3.8	3.7	6.3
Luxembourg	2.8	2.0	3.4	1.7	0	1.7
Belgium	1.2	3.1	3.9	1.4	4.3	4.8
Denmark	2.3	2.3	4.0	1.9	2.3	3.8
Austria	1.2	3.6	4.6	1.3	4.8	5.4
Spain	1.8	3.5	4.7	3.4	4.8	6.4
Poland	1.5	4.4	5.0	2	4.1	4.7
Hungary	0.4	5.3	5.3	7.3	5	10.3
Czech Republic	2.7	4.6	6.1	1.8	4.8	5.2
Iceland	2.1	5.6	6.1	4.9	9.1	11.6
Bulgaria	2.3	5.1	6.3	1.9	6.3	7.1
Ireland	8.0	2.8	6.7	3.8	0.3	3.6
United States	5.1	3.6	6.8	1.8	0	1.8
Croatia	1.1	6.3	6.9	5.9	7.1	10.4
Portugal	4.4	5.1	7.5	2.3	5.6	6.7
Latvia	0.4	7.6	7.9	7.8	5.7	10.8
Romania	4.4	5.7	8.0	2.5	6.4	7.3
Lithuania	0.4	8.1	8.3	7.3	5.5	10.3
Greece	6.1	4.2	8.8	1.9	1.4	2.9
Estonia	5.5	5.0	9.3	13.3	6.3	16.6
Slovak Rep	6.7	5.0	10.3	2.1	5.5	6.2
Italy	9.9	4.5	11.5	0.8	5	5.2
Japan	12.7	5.3	13.8	0.4	5.8	5.9
Total	3.0	3.7	5.7	3.0	3.7	5.7

Table notes: The first three columns report average double tax rates and withholding tax rates in % that apply to foreign source income repatriated to the country of residence (which are listed on the left-hand side). Averages are taken across all potential source countries and time. The table is ordered in an ascending manner with respect to the average double tax rate $\bar{\tau}_{i\cdot}^{double}$ in the third column, which takes withholding taxes and worldwide taxation into account. The first column lists the average double tax rate $\bar{\tau}_{i\cdot}^{regime}$, which excludes the effects of withholding taxes. The second column reports the average withholding tax rate $\bar{\omega}_{i\cdot}$. The last three columns report average double tax rates from the point of view of source countries. The countries listed on the left-hand side now represent the respective source country and the tax rates apply to flows *leaving* the country. The definition of the last three columns is equivalent to the first three columns except that averages are taken across all potential residence countries and time.

Table 9: Frequency of Bidding Firms and Target Firms across Countries

Country	# of bidding firms	# of target firms
Austria	540	503
Belgium	892	898
Bulgaria	0	61
Croatia	4	41
Czech Republic	17	439
Denmark	790	676
Estonia	30	113
Finland	719	648
France	2515	3288
Germany	3111	3957
Greece	113	85
Hungary	36	391
Iceland	20	8
Ireland	710	436
Italy	813	1480
Japan	1026	347
Latvia	9	54
Lithuania	7	79
Luxembourg	185	116
Netherlands	2039	1578
Norway	518	568
Poland	23	536
Portugal	85	278
Romania	4	103
Slovak Rep	7	82
Spain	347	1385
Sweden	1543	1177
Switzerland	1220	1013
United Kingdom	5971	4934
United States	7395	5415
Total	30689	30689

Table 10: List of Variables (Pattern of M&A)

Variable	Description and Source
MA_{ijt}	Frequency of cross-border mergers and acquisitions. A transaction is registered if the bidding firm acquires the controlling stake in the target firm. Source: Thomson Financial, SDC Database.
τ_{ijt}^{regime}	Double tax rate due to worldwide taxation. Sources are listed below.
τ_{ijt}^{extra}	Additional double tax due to withholding taxes. Sources are listed below.
GDP_{it}	Gross domestic product of the bidding country in constant 1995 \$. Source: World Development Indicators 2004, Worldbank (2004).
GDP_{jt}	Gross domestic product of the target country in constant 1995 \$. Source: World Development Indicators 2004, Worldbank (2004).
$Distance_{ij}$	Distance between the bidding country and the target country measured in miles. Source: Rose (2000).
$\tau_{it} - \tau_{jt}$	Difference in corporate income tax rates between the bidding country and the target country. Sources are listed below.
$\Delta(GDP/Capita)_{ijt}$	Ratio of bidding country's wealth to target country's wealth. Wealth is measured by GDP over total population. Source: World Development Indicators 2004, Worldbank (2004).
$\Delta(Stocks/GDP)_{ijt-1}$	Ratio of bidding country's financial depth to target country's financial depth. Financial depth is measured as stock market capitalization over GDP. Source: World Development Indicators 2004, Worldbank (2004).
$\Delta(Credit/GDP)_{ijt-1}$	Ratio of bidding country's financial depth to target country's financial depth. Financial depth is measured as domestic credit to the private sector in relation to GDP. Domestic credit to private sector refers to financial resources provided to the private sector, such as through loans, purchases of nonequity securities, and trade credits and other accounts receivable, that establish a claim for repayment. Source: World Development Indicators 2004, Worldbank (2004).
$Border_{ij}$	Dummy variable indicating if bidding country i and target country j have a common land border. Source: Rose (2000).
$Com.Language_{ij}$	Dummy variable indicating if bidding country i and target country j speak the same language. Source: Rose (2000).
EU_{ijt}	Dummy variable indicating if bidding country i and target country j were both members of the European Union in year t. Source: Rose (2000).
$Euro_{ijt}$	Dummy variable indicating if bidding country i and target country j were both members of the Euro currency union in year t. Source: Rose (2000).

Table notes: All variables except for tax rates and dummy variables are measured in logarithms. The calculations of double tax rates are based on following sources:

Sources for corporate income tax rates are:
Structures of the Taxation Systems in the European Union, Eurostat (2004).
Taxing Profits in a Changing World, Chennells & Griffith (1997).
KPMG Corporate Tax Rate Surveys 1998-2003, KPMG International Tax and Legal Center (2003).

Sources for tax regimes, tax treaties and withholding taxes are:
IBFD Tax Treaties Database, IBFD (2005c).
International Tax Summaries 1985–1998, Coopers & Lybrand (1998).
Corporate Taxation in Europe, IBFD (2005b).
Corporate Investment Income, IBFD (2005a).
Taxation & Investment in Central and East European Countries, IBFD (2005d).

Table 11: Summary Statistics (Pattern of M&A)

Variable	Obs	Mean	Std. Dev.	Min	Max
MA_{ijt}	9856	0.5	0.9	0.0	5.9
τ_{ijt}^{double}	9856	5.7	6.6	0.0	68.5
τ_{ijt}^{regime}	9856	2.8	6.1	0.0	45.0
τ_{ijt}^{extra}	9856	2.8	4.0	0.0	26.4
$Distance_{ij}$	9856	6.9	0.9	4.4	8.8
GDP_{it}	9856	12.2	1.9	8.3	16.0
GDP_{jt}	9856	12.2	1.9	8.3	16.0
$\tau_{it} - \tau_{jt}$	9856	0.2	11.7	-51.6	51.6
$\Delta(GDP/Capita)_{ijt}$	9856	0.0	1.3	-3.7	3.7
$\Delta(Stocks/GDP)_{ijt}$	7700	0.0	1.7	-7.0	7.0
$\Delta(Credit/GDP)_{ijt}$	7700	0.0	1.0	-3.3	3.3
$Border_{ij}$	9856	0.1	0.3	0.0	1.0
$Com.Language_{ij}$	9856	0.1	0.2	0.0	1.0
EU_{ijt}	9856	0.3	0.4	0.0	1.0
$Euro_{ijt}$	9856	0.1	0.2	0.0	1.0

Table notes: For definitions of variables and data sources, see table 10.

Table 12: Regression (1)— Baseline Specification

Variable	Coefficient
	(Std. Err.)
τ_{ijt}^{double}	-0.023**
	(0.003)
$Distance_{ij}$	-0.966**
	(0.037)
GDP_{it}	1.430**
	(0.550)
GDP_{jt}	2.418**
	(0.563)
$\tau_{it} - \tau_{jt}$	0.010**
	(0.002)
$\Delta(GDP/Capita)$	1.027†
	(0.597)
Border	0.121*
	(0.055)
Common Language	0.216**
	(0.052)
EU-Members	0.010
	(0.045)
Euro Area Members	-0.036
	(0.055)
Standard Error	0.868**
	(0.010)
N	9856
Log-likelihood	-6305.927
F $_{(67,9789)}$	9866.287
Significance levels : $\dagger$: 10% $*$: 5% $**$: 1%	

Dependent variable: MA_{ijt}, frequency of mergers and acquisitions in year t in which the bidder comes from country i and the the target comes from country j.

Estimation method: Tobit regression; lower censoring point: $\ln(1) - \lambda = -0.0001$.

The table reports the coefficients corresponding to the explanatory variables listed on the left-hand side. The standard errors are listed in parentheses below the coefficient estimates. The intercept and the coefficients for the two sets of country dummy variables (bidding country and target country) are not reported.

Table 13: Regression (2)— Split of Tax Variable

Variable	Coefficient (Std. Err.)
τ_{ijt}^{regime}	-0.023**
	(0.004)
τ_{ijt}^{extra}	-0.023**
	(0.006)
$Distance_{ij}$	-0.967**
	(0.037)
GDP_{it}	1.429**
	(0.551)
GDP_{jt}	2.418**
	(0.563)
$\tau_{it} - \tau_{jt}$	0.010**
	(0.002)
$\Delta(GDP/Capita)$	1.027†
	(0.597)
Border	0.121*
	(0.056)
Common Language	0.216**
	(0.052)
EU-Members	0.010
	(0.046)
Euro Area Members	-0.036
	(0.055)
Standard Error	0.868**
	(0.010)
N	9856
Log-likelihood	-6305.925
$F_{(68,9788)}$	9866.291

Significance levels :   † : 10%   ∗ : 5%   ∗∗ : 1%

Dependent variable: MA_{ijt}, frequency of mergers and acquisitions in year t in which the bidder comes from country i and the the target comes from country j.

Estimation method: Tobit regression; lower censoring point: $\ln(1) - \lambda = -0.0001$.

The table reports the coefficients corresponding to the explanatory variables listed on the left-hand side. The standard errors are listed in parentheses below the coefficient estimates. The intercept and the coefficients for the two sets of country dummy variables (bidding country and target country) are not reported.

Table 14: Regression (3)— Extended Specification

Variable	Coefficient
	(Std. Err.)
τ_{ijt}^{double}	-0.021**
	(0.004)
$Distance_{ij}$	-0.975**
	(0.038)
GDP_{it}	0.575
	(0.649)
GDP_{jt}	2.480**
	(0.667)
$\tau_{it} - \tau_{jt}$	0.009**
	(0.002)
$\Delta(GDP/Capita)$	1.814*
	(0.711)
$\Delta(Stockmarket/GDP)$	0.123**
	(0.025)
$\Delta(Credit/GDP)$	0.059
	(0.044)
Border	0.152**
	(0.057)
Common Language	0.242**
	(0.055)
EU-Members	-0.010
	(0.047)
Euro Area Members	0.029
	(0.056)
Standard Error	0.820**
	(0.010)
N	7700
Log-likelihood	-5085.295
F $_{(69,7630)}$	8584.223
Significance levels :	† : 10% ∗ : 5% ∗∗ : 1%

Dependent variable: MA_{ijt}, frequency of mergers and acquisitions in year t in which the bidder comes from country i and the the target comes from country j.

Estimation method: Tobit regression; lower censoring point: $\ln(1) - \lambda = -0.0001$.

The table reports the coefficients corresponding to the explanatory variables listed on the left-hand side. The standard errors are listed in parentheses below the coefficient estimates. The intercept and the coefficients for the two sets of country dummy variables (bidding country and target country) are not reported.

Table 15: Regression (4)— Split in Tax Variable/ Extended Specification

Variable	Coefficient
	(Std. Err.)
τ_{ijt}^{regime}	-0.023**
	(0.004)
τ_{ijt}^{extra}	-0.016**
	(0.006)
$Distance_{ij}$	-0.973**
	(0.038)
GDP_{it}	0.614
	(0.650)
GDP_{jt}	2.463**
	(0.667)
$\tau_{it} - \tau_{jt}$	0.010**
	(0.002)
$\Delta(GDP/Capita)$	1.792*
	(0.712)
$\Delta(Stockmarket/GDP)$	0.123**
	(0.025)
$\Delta(Credit/GDP)$	0.057
	(0.044)
Border	0.159**
	(0.057)
Common Language	0.240**
	(0.055)
EU-Members	0.001
	(0.048)
Euro Area Members	0.034
	(0.057)
Standard Error	0.820**
	(0.010)
N	7700
Log-likelihood	-5084.508
F $_{(70,7629)}$	8585.797
Significance levels :	† : 10% ∗ : 5% ∗∗ : 1%

Dependent variable: MA_{ijt}, frequency of mergers and acquisitions in year t in which the bidder comes from country i and the the target comes from country j.
Estimation method: Tobit regression; lower censoring point: $\ln(1) - \lambda = -0.0001$.
The table reports the coefficients corresponding to the explanatory variables listed on the left-hand side. The standard errors are listed in parentheses below the coefficient estimates. The intercept and the coefficients for the two sets of country dummy variables (bidding country and target country) are not reported.

Table 16: Regression (5)— Geographic Robustness

Variable	Coefficient
	(Std. Err.)
τ_{ijt}^{double}	-0.022**
	(0.004)
$Distance_{ij}$	-0.709**
	(0.044)
GDP_{it}	2.352**
	(0.644)
GDP_{jt}	1.684**
	(0.645)
$\tau_{it} - \tau_{jt}$	0.014**
	(0.002)
$\Delta(GDP/Capita)$	-0.296
	(0.708)
Border	0.292**
	(0.065)
Common Language	0.231**
	(0.054)
EU-Members	0.050
	(0.051)
Euro Area Members	0.003
	(0.055)
Standard Error	0.852**
	(0.011)
N	6172
Log-likelihood	-4849.407
F $_{(48,6124)}$	7046.242
Significance levels :	† : 10% ∗ : 5% ∗∗ : 1%

Dependent variable: MA_{ijt}, frequency of mergers and acquisitions in year t in which the bidder comes from country i and the the target comes from country j.

Estimation method: Tobit regression; lower censoring point: $\ln(1) - \lambda = -0.0001$.

The table reports the coefficients corresponding to the explanatory variables listed on the left-hand side. The standard errors are listed in parentheses below the coefficient estimates. The intercept and the coefficients for the two sets of country dummy variables (bidding country and target country) are not reported.

Table 17: Regression (6)— Robustness with respect to sampling period

Variable	Coefficient
	(Std. Err.)
τ_{ijt}^{double}	-0.018**
	(0.004)
$Distance_{ij}$	-0.982**
	(0.037)
GDP_{it}	-0.249
	(0.658)
GDP_{jt}	2.729**
	(0.682)
$\tau_{it} - \tau_{jt}$	0.008**
	(0.002)
$\Delta(GDP/Capita)$	2.057**
	(0.731)
Border	0.196**
	(0.055)
Common Language	0.292**
	(0.054)
EU-Members	-0.040
	(0.047)
Euro Area Members	0.076
	(0.053)
Standard Error	0.805**
	(0.010)
N	8352
Log-likelihood	-5176.058
F $_{(67,8285)}$	9200.606
Significance levels :	† : 10% ∗ : 5% ∗∗ : 1%

Dependent variable: MA_{ijt}, frequency of mergers and acquisitions in year t in which the bidder comes from country i and the the target comes from country j.

Estimation method: Tobit regression; lower censoring point: $\ln(1) - \lambda = -0.0001$.

The table reports the coefficients corresponding to the explanatory variables listed on the left-hand side. The standard errors are listed in parentheses below the coefficient estimates. The intercept and the coefficients for the two sets of country dummy variables (bidding country and target country) are not reported.

Table 18: Regression (7) — Transaction values as dependent variable

Variable	Coefficient
	(Std. Err.)
τ_{ijt}^{double}	-0.139**
	(0.026)
$Distance_{ij}$	-4.709**
	(0.275)
GDP_{it}	5.679
	(4.035)
GDP_{jt}	14.558**
	(4.106)
$\tau_{it} - \tau_{jt}$	0.073**
	(0.015)
$\Delta(GDP/Capita)$	7.189
	(4.388)
Border	0.454
	(0.421)
Common Language	0.224
	(0.386)
EU-Members	0.171
	(0.338)
Euro Area Members	0.250
	(0.412)
Standard Error	5.627**
	(0.091)
N	8487
Log-likelihood	-9057.793
F $_{(67,8420)}$	6757.826
Significance levels :	† : 10% ∗ : 5% ∗∗ : 1%

Dependent variable: VMA_{ijt}, aggregated transaction value of mergers and acquisitions in year t in which the bidder comes from country i and the the target comes from country j.
Estimation method: Tobit regression; lower censoring point: $\ln(0.005) - \lambda = -4.61$.
The table reports the coefficients corresponding to the explanatory variables listed on the left-hand side. The standard errors are listed in parentheses below the coefficient estimates. The intercept and the coefficients for the two sets of country dummy variables (bidding country and target country) are not reported.

Table 19: Regression (8) — OLS estimates

Variable	Coefficient
	(Std. Err.)
τ_{ijt}^{double}	-0.013**
	(0.004)
$Distance_{ij}$	-0.692**
	(0.038)
GDP_{it}	1.171*
	(0.563)
GDP_{jt}	1.465*
	(0.579)
$\tau_{it} - \tau_{jt}$	0.005*
	(0.002)
$\Delta(GDP/Capita)$	0.470
	(0.619)
Border	0.115*
	(0.055)
Common Language	0.269**
	(0.049)
EU-Members	-0.028
	(0.047)
Euro Area Members	-0.006
	(0.052)
N	3781
R^2	0.607
$F_{(67,3713)}$	85.444

Significance levels :   † : 10%   ∗ : 5%   ∗∗ : 1%

Dependent variable: MA_{ijt}, frequency of mergers and acquisitions in year t in which the bidder comes from country i and the the target comes from country j.

Estimation method: Ordinary least squares on uncensored observations. The table reports the coefficients corresponding to the explanatory variables listed on the left-hand side. The standard errors are listed in parentheses below the coefficient estimates. The intercept and the coefficients for the two sets of country dummy variables (bidding country and target country) are not reported.

Table 20: Regression (9) — Robustness with respect to censoring

Variable	Coefficient
	(Std. Err.)
τ_{ijt}^{double}	-0.030**
	(0.004)
$Distance_{ij}$	-1.184**
	(0.047)
GDP_{it}	1.788**
	(0.691)
GDP_{jt}	2.957**
	(0.707)
$\tau_{it} - \tau_{jt}$	0.013**
	(0.003)
$\Delta(GDP/Capita)$	1.242†
	(0.749)
Border	0.141*
	(0.070)
Common Language	0.186**
	(0.067)
EU-Members	0.026
	(0.057)
Euro Area Members	-0.043
	(0.070)
Standard Error	1.123**
	(0.014)
N	9856
Log-likelihood	-7603.578
F $_{(67,9789)}$	9665.437

Significance levels :　　† : 10%　　∗ : 5%　　∗∗ : 1%

Dependent variable: MA_{ijt}, frequency of mergers and acquisitions in year t in which the bidder comes from country i and the the target comes from country j.

Estimation method: Tobit regression; lower censoring point: $\ln(1) - ln(2) = ln(0.5) = -0.693$.

The table reports the coefficients corresponding to the explanatory variables listed on the left-hand side. The standard errors are listed in parentheses below the coefficient estimates. The intercept and the coefficients for the two sets of country dummy variables (bidding country and target country) are not reported.

Table 21: Regression (10) — Poisson regression

Variable	Coefficient
	(Std. Err.)
τ_{ijt}^{double}	-0.022**
	(0.006)
$Distance_{ij}$	-0.881**
	(0.062)
GDP_{it}	3.329**
	(0.734)
GDP_{jt}	0.165
	(0.783)
$\tau_{it} - \tau_{jt}$	$0.005^{\dagger}$
	(0.003)
$\Delta(GDP/Capita)$	$-1.432^{\dagger}$
	(0.802)
Border	0.145*
	(0.069)
Common Language	0.616**
	(0.056)
EU-Members	-0.001
	(0.061)
Euro Area Members	$0.120^{\dagger}$
	(0.064)
N	9856
Log-likelihood	-14879.877
$\chi^2_{(67)}$	11626.29

Significance levels : $\dagger : 10\%$ $* : 5\%$ $** : 1\%$

Dependent variable: MA_{ijt}, frequency of mergers and acquisitions in year t in which the bidder comes from country i and the the target comes from country j.

Estimation method: Poisson regression

The table reports the coefficients corresponding to the explanatory variables listed on the left-hand side. The standard errors are listed in parentheses below the coefficient estimates. The intercept and the coefficients for the two sets of country dummy variables (bidding country and target country) are not reported.

Table 22: Regression (11)— Negative binomial regression

Variable	Coefficient
	(Std. Err.)
τ_{ijt}^{double}	-0.025**
	(0.004)
$Distance_{ij}$	-1.243**
	(0.049)
GDP_{it}	2.250**
	(0.638)
GDP_{jt}	2.232**
	(0.651)
$\tau_{it} - \tau_{jt}$	0.012**
	(0.003)
$\Delta(GDP/Capita)$	0.439
	(0.691)
Border	0.114†
	(0.063)
Common Language	0.256**
	(0.055)
EU-Members	-0.040
	(0.053)
Euro Area Members	0.048
	(0.057)
α	0.500**
	(0.020)
N	9856
Log-likelihood	-11729.261
$\chi^2_{(67)}$	12323.998
Significance levels :	† : 10% ∗ : 5% ∗∗ : 1%

Dependent variable: MA_{ijt}, frequency of mergers and acquisitions in year t in which the bidder comes from country i and the the target comes from country j.

Estimation method: Negative Binomial Regression.

The table reports the coefficients corresponding to the explanatory variables listed on the left-hand side. The standard errors are listed in parentheses below the coefficient estimates. The intercept and the coefficients for the two sets of country dummy variables (bidding country and target country) are not reported.

Table 23: Regression (12) — Extended panel specification

Variable	Coefficient
	(Std. Err.)
τ_{ijt}^{double}	-0.016**
	(0.003)
$Distance_{ij}$	-0.965**
	(0.035)
GDP_{it}	0.683
	(0.542)
GDP_{jt}	0.054
	(0.560)
$\tau_{it} - \tau_{jt}$	0.010**
	(0.002)
$\Delta(GDP/Capita)$	0.239
	(0.571)
Border	0.132*
	(0.052)
Common Language	0.215**
	(0.049)
EU-Members	-0.061
	(0.044)
Euro Area Members	0.090†
	(0.054)
Standard Error	0.813**
	(0.009)
N	9856
Log-likelihood	-5986.39
F $_{(84,9772)}$	10505.361
Significance levels :	$\dagger$: 10% $*$: 5% $**$: 1%

Dependent variable: MA_{ijt}, frequency of mergers and acquisitions in year t in which the bidder comes from country i and the the target comes from country j.

Estimation method: Tobit regression; lower censoring point: $\ln(1) - \lambda = -0.0001$.

The table reports the coefficients corresponding to the explanatory variables listed on the left-hand side. The standard errors are listed in parentheses below the coefficient estimates. The intercept, the coefficients for the time dummy variables and the coefficients for the two sets of country dummy variables (bidding country and target country) are not reported.

Table 24: Regression (13) — Random Effects Specification

Variable	Coefficient
	(Std. Err.)
τ_{ijt}^{double}	-0.028**
	(0.004)
$Distance_{ij}$	-0.765**
	(0.037)
GDP_{it}	0.614**
	(0.015)
GDP_{jt}	0.634**
	(0.016)
$\tau_{it} - \tau_{jt}$	0.011**
	(0.002)
$\Delta(GDP/Capita)$	0.468**
	(0.028)
Border	0.078
	(0.084)
Common Language	1.001**
	(0.069)
EU-Members	0.304**
	(0.046)
Euro Area Members	0.419**
	(0.048)
Intercept	-10.552**
	(0.302)
Rand.Eff. Error	0.879**
	(0.020)
Standard Error	0.784**
	(0.010)
N	9856
Log-likelihood	-6543.85
$\chi^2_{(10)}$	3925.133

Significance levels :   † : 10%   ∗ : 5%   ∗∗ : 1%

Dependent variable: MA_{ijt}, frequency of mergers and acquisitions in year t in which the bidder comes from country i and the the target comes from country j.

Estimation method: Tobit regression with random country-pair effect; lower censoring point: $\ln(1) - \lambda = -0.0001$.

The table reports the coefficients corresponding to the explanatory variables listed on the left-hand side. The standard errors are listed in parentheses below the coefficient estimates.

Table 25: Summary Statistics (Direction of M&A)

Variable	Obs	Mean	Std. Dev.	Min	Max
$\Delta Size$	626	0.70	0.35	-1.00	1.00
$\Delta\theta^{double}$	626	-1.96	4.98	-30.00	27.50
$\Delta Liquidity$	484	-0.02	0.20	-0.91	0.54
$\Delta Leverage$	484	-0.02	0.46	-5.30	2.02
ΔROA	484	0.10	0.45	-3.23	4.09
$\Delta Investment$	283	-0.05	0.22	-1.09	0.80

Table notes: The reported summary statistics describe the case that all bidding firms are classified as firm a and all target firms are classified as firm b. The specific distribution of indices a and b over firms does not matter for the estimation results due to the symmetry of regressors, but the distribution of indices does, of course, matter for the value of summary statistics. For example, the variable means would switch signs when the indices a and b where exchanged for all firm pairs. Data source: Thomson Financial, SDC Database.

Table 26: Regression (1) — Smallest Specification

Variable	Coefficient
	(Std. Err.)
$\Delta Size$	5.914**
	(0.594)
$\Delta\theta^{double}$	-0.223**
	(0.065)
N	626
Log-likelihood	-82.057
Significance levels :	$\dagger : 10\%$ $* : 5\%$ $** : 1\%$

Dependent variable: Indicator variable I_{ab}, which equals one if firm a acquires firm b and is zero if firm b acquires firm a. (The specific distribution of indices a and b does not change the estimation results, because regressors are symmetric.)

Estimation method: Logit regression.

The table reports the coefficients corresponding to the explanatory variables listed on the left-hand side. The standard errors are listed in parentheses below the coefficient estimates. The coefficients for the country dummy variables are not reported.

Table 27: Regression (2) — Baseline Specification

Variable	Coefficient
	(Std. Err.)
$\Delta Size$	6.370**
	(0.752)
$\Delta\theta^{double}$	-0.340**
	(0.084)
$\Delta Liquidity$	3.480*
	(1.357)
$\Delta Leverage$	0.883
	(0.581)
ΔROA	-0.668
	(0.510)
N	484
Log-likelihood	-62
Significance levels :	$\dagger : 10\%$ $* : 5\%$ $** : 1\%$

Dependent variable: Indicator variable I_{ab}, which equals one if firm a acquires firm b and is zero if firm b acquires firm a. (The specific distribution of indices a and b does not change the estimation results, because regressors are symmetric.)

Estimation method: Logit regression.

The table reports the coefficients corresponding to the explanatory variables listed on the left-hand side. The standard errors are listed in parentheses below the coefficient estimates. The coefficients for the country dummy variables are not reported.

Table 28: Regression (3) — Extended Specification

Variable	Coefficient
	(Std. Err.)
$\Delta Size$	7.947**
	(1.432)
$\Delta \theta^{double}$	-0.607**
	(0.189)
$\Delta Liquidity$	6.817**
	(2.634)
$\Delta Leverage$	2.882*
	(1.229)
ΔROA	-0.481
	(0.990)
$\Delta Investment$	-6.425**
	(2.335)
N	283
Log-likelihood	-27.097
Significance levels :	$\dagger : 10\%$ $* : 5\%$ $** : 1\%$

Dependent variable: Indicator variable I_{ab}, which equals one if firm a acquires firm b and is zero if firm b acquires firm a. (The specific distribution of indices a and b does not change the estimation results, because regressors are symmetric.)

Estimation method: Logit regression.

The table reports the coefficients corresponding to the explanatory variables listed on the left-hand side. The standard errors are listed in parentheses below the coefficient estimates. The coefficients for the country dummy variables are not reported.

Table 29: Regression (4) — Probit, Small Specification

Variable	Coefficient
	(Std. Err.)
$\Delta Size$	3.032**
	(0.261)
$\Delta\theta^{double}$	-0.114**
	(0.035)
N	626
Log-likelihood	-83.707
Significance levels :	$\dagger : 10\%$ $* : 5\%$ $** : 1\%$

Dependent variable: Indicator variable I_{ab}, which equals one if firm a acquires firm b and is zero if firm b acquires firm a. (The specific distribution of indices a and b does not change the estimation results, because regressors are symmetric.)

Estimation method: Probit regression.

The table reports the coefficients corresponding to the explanatory variables listed on the left-hand side. The standard errors are listed in parentheses below the coefficient estimates. The coefficients for the country dummy variables are not reported.

Table 30: Regression (5) — Probit, Baseline Specification

Variable	Coefficient
	(Std. Err.)
$\Delta Size$	3.268**
	(0.332)
$\Delta\theta^{double}$	-0.170**
	(0.044)
$\Delta Liquidity$	1.850**
	(0.692)
$\Delta Leverage$	0.441
	(0.311)
ΔROA	-0.298
	(0.286)
N	484
Log-likelihood	-63.586
Significance levels :	$\dagger : 10\%$ $* : 5\%$ $** : 1\%$

Dependent variable: Indicator variable I_{ab}, which equals one if firm a acquires firm b and is zero if firm b acquires firm a. (The specific distribution of indices a and b does not change the estimation results, because regressors are symmetric.)

Estimation method: Probit regression.

The table reports the coefficients corresponding to the explanatory variables listed on the left-hand side. The standard errors are listed in parentheses below the coefficient estimates. The coefficients for the country dummy variables are not reported.

Table 31: Regression (6) — Probit, Extended Specification

Variable	Coefficient
	(Std. Err.)
$\Delta Size$	4.304**
	(0.697)
$\Delta\theta^{double}$	-0.329**
	(0.096)
$\Delta Liquidity$	3.657**
	(1.326)
$\Delta Leverage$	1.459*
	(0.647)
ΔROA	-0.316
	(0.529)
$\Delta Investment$	-3.295**
	(1.171)
N	283
Log-likelihood	-27.167
Significance levels :	$\dagger$: 10% $*$: 5% $**$: 1%

Dependent variable: Indicator variable I_{ab}, which equals one if firm a acquires firm b and is zero if firm b acquires firm a. (The specific distribution of indices a and b does not change the estimation results, because regressors are symmetric.)

Estimation method: Probit regression.

The table reports the coefficients corresponding to the explanatory variables listed on the left-hand side. The standard errors are listed in parentheses below the coefficient estimates. The coefficients for the country dummy variables are not reported.

Table 32: Regression (7) — Specification with Macro-variables

Variable	Coefficient
	(Std. Err.)
$\Delta Size$	8.283**
	(1.424)
$\Delta\theta^{double}$	-0.573**
	(0.167)
$\Delta Liquidity$	4.707*
	(1.924)
$\Delta Leverage$	0.609
	(0.917)
ΔROA	0.075
	(1.310)
$\Delta\tau$	0.368**
	(0.139)
$\Delta(Stockmarket/GDP)$	-0.040
	(0.031)
$\Delta(Credit/GDP)$	-0.033
	(0.027)
$\Delta(GDP/Capita)$	0.001
	(0.001)
$\Delta Countrysize$	-0.956
	(4.648)
N	373
Log-likelihood	-32.206

Significance levels :   † : 10%   ∗ : 5%   ∗∗ : 1%

Dependent variable: Indicator variable I_{ab}, which equals one if firm a acquires firm b and is zero if firm b acquires firm a. (The specific distribution of indices a and b does not change the estimation results, because regressors are symmetric.)

Estimation method: Logit regression.

The table reports the coefficients corresponding to the explanatory variables listed on the left-hand side. The standard errors are listed in parentheses below the coefficient estimates. The coefficients for the country dummy variables are not reported.

Table 33: Regression (8) — Specification with significant Macro-variables

Variable	Coefficient
	(Std. Err.)
$\Delta Size$	7.315**
	(0.942)
$\Delta\theta^{double}$	-0.430**
	(0.109)
$\Delta Liquidity$	3.341*
	(1.398)
$\Delta Leverage$	0.581
	(0.634)
ΔROA	-0.994†
	(0.564)
$\Delta\tau$	0.350**
	(0.091)
N	484
Log-likelihood	-52.635
Significance levels :	$\dagger : 10\%$ $* : 5\%$ $** : 1\%$

Dependent variable: Indicator variable I_{ab}, which equals one if firm a acquires firm b and is zero if firm b acquires firm a. (The specific distribution of indices a and b does not change the estimation results, because regressors are symmetric.)

Estimation method: Logit regression.

The table reports the coefficients corresponding to the explanatory variables listed on the left-hand side. The standard errors are listed in parentheses below the coefficient estimates. The coefficients for the country dummy variables are not reported.