

International Taxation and the Direction and Volume of Cross-Border M&As

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ABSTRACT

We show that the parent-subsidiary structure of multinational firms created by cross-border mergers and acquisitions is affected by the prospect of international double taxation. Specifically, the likelihood of parent firm location in a country following a cross-border takeover is reduced by high international double taxation of foreign-source income. At the same time, countries with high international double taxation attract smaller numbers of parent firms. A unilateral elimination of worldwide taxation by the United States is simulated to increase the proportion of parent firms locating in the United States following cross-border mergers and acquisitions from 53% to 58%.

A MULTINATIONAL TYPICALLY has a parent firm in one country and subsidiaries in one or more foreign countries. In this setting, the location of the parent firm generally affects the taxes due in the parent country and all the other countries. Some parent countries tax the worldwide income of their resident multinationals, whereas other countries exempt the foreign-source income of their multinationals from domestic taxation. A multinational firm with a tax residence in a country that imposes worldwide taxation risks being subject to international double taxation on income generated outside the parent country. Multinationals thus stand to benefit from judiciously choosing the location of the parent firm so as to mitigate any international double taxation.

At the time of a cross-border takeover, the organizational structure of the resulting multinational firm is designed from scratch. Cross-border mergers and acquisitions (M&As) therefore offer a unique opportunity to study the impact of international taxation on the parent-subsidiary structure of multinational firms. This paper provides empirical evidence that international tax considerations have materially affected organizational outcomes of cross-border M&As.

The merger of Daimler in Germany with Chrysler in the United States in 1998 offers an example where the international tax system appears to have been a key consideration. This merger resulted in a multinational firm with a parent firm (Daimler) located in Germany and a subsidiary (Chrysler) located in the

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U.S. According to testimony given by Daimler-Chrysler's chief tax counsel before the U.S. Ways and Means Committee on June 30, 1999, the exemption from taxation by Germany of dividend income from abroad in contrast to the U.S. system of worldwide taxation was one of the main reasons for locating the parent firm of Daimler-Chrysler in Germany (Bogenschütz and Wright (2000)). Another interesting case is the formal merger of British Shell with Dutch Koninklijke Olie in 2005. Shell and Koninklijke Olie already joined forces in 1903, but had retained separate stock listings and separate tax residences in the United Kingdom and the Netherlands. After the formal merger in 2005 following criticism of its previous corporate structure, the new company became a tax resident of the Netherlands, even though the firm took the legal form of a British public limited company. Based on that decision, the Dutch exemption system applies to the firm's overall income rather than British worldwide taxation.

Our empirical work is the first to show that the international tax system systematically affects organizational structure following international M&As. We consider cross-border M&As involving any two countries among a set of European countries, Japan, and the United States in the 1985–2004 period. We collect extensive information on all these countries' tax systems and particularly on their taxation of foreign-source dividend income received by resident multinational firms. For each cross-border takeover, we construct two rates of international double taxation for the two possible outcomes regarding which of the two affected firms becomes the parent firm (rather than a foreign subsidiary). These double tax rates can be used to calculate international double tax liabilities incurred by the newly created multinational firm in the two possible scenarios as to parent firm location.

We find that international double tax liabilities in the realized parent-subsubsidiary scenario are substantially lower than in the counterfactual case where the structure is inverted. Specifically, the international double tax liability is calculated to be 0.62% of the combined firm's worldwide pre-tax income in the actual parent-subsubsidiary outcome, while it would be 2.11% of worldwide income in the alternative case. We proceed to estimate the impact of double taxation on the parent-subsubsidiary decision using a logit binary choice model. This estimation allows for the inclusion of a range of control variables, such as the relative size of the two merging firms, that affect the selection of the parent firm. International double taxation is found to have a highly significant impact on the parent-subsubsidiary structure. This result is robust to various changes in model specification and estimation technique.

Our logit estimation results can be used to simulate the impact of a change in the international tax system on the pattern of international parent firm selection. As an interesting possibility, we examine the case in which the U.S. unilaterally abolishes its system of worldwide taxation, thereby ceasing to subject the foreign-source income of its multinationals to international double taxation. Such a regime switch, recently proposed by the President's Advisory Panel on Federal Tax Reform (2005), is estimated to increase the proportion of cross-border takeovers resulting in a parent firm in the United States from 53.1% to 57.6%. For 2004 data, this corresponds to an 8.6 billion dollar

increase in the difference between outward and inward takeovers for the United States.¹

In this paper, we also estimate a gravity model of the number of M&As that yield a parent firm in a particular country. The gravity model framework captures the fact that international double taxation affects both the total number of M&As involving a country and the proportion of M&As resulting in a parent firm in that country. In a benchmark regression, we find a semi-elasticity of the number of M&As generating a parent firm in a country with respect to the double tax rate of -1.7 . This suggests that a one percentage point increase in the double tax rate facing U.S. parent firms in 2004 would decrease international acquisitions of U.S. firms by 1.9 billion U.S. dollars.²

The remainder of this paper is organized as follows. Section I reviews related studies on international taxation, foreign direct investment (FDI), and M&As. Section II describes the international tax system and presents our tax system data. Section III discusses the M&A data. Section IV presents the estimation results of the logit model of parent country selection, while Section V simulates the impact of the U.S. adopting the exemption system of international taxation on parent firm selection. Section VI presents estimation results for the gravity model of the number of M&As per parent country. Section VII offers a conclusion.

I. Related Studies

The value of M&As resulting in an acquisition abroad is counted as outward FDI of the acquiring country to the extent that the acquiring firm finances the transaction in its home financial market. Cross-border M&As tend to contribute importantly to overall FDI.³ Studies on taxation and FDI typically use aggregate national or bilateral FDI data and hence do not distinguish between the part of FDI due to M&As and other components of FDI. Among these studies, Grubert and Mutti (1991), Hines and Rice (1994), and Altshuler, Grubert, and Newlon (2001) find that a one-percentage point increase in the local tax rate reduces the FDI stock between 0.1% and 2.8%. Other studies, such as Hartman (1984), Boskin and Gale (1987), Newlon (1987), and Young (1988), use time-series data, yielding estimated tax elasticities of FDI of around -0.6 . All these studies focus only on local taxation and ignore international double taxation.

¹ In 2004, U.S. inward and outward M&As were valued at 81.9 and 110.0 U.S. dollars. The value of all M&As involving the United States was 191.9 billion U.S. dollars. The change in the U.S. net outflow of M&As is estimated to be 4.5% of this or 8.6 billion U.S. dollars. See Table B.4 of United Nations Conference on Trade and Development (2005).

² In 2004, U.S. outward M&As were valued at 110.0 billion U.S. dollars. The change in outward M&As is estimated to be 1.7% of this, or 1.9 billion U.S. dollars. See Table B.4 of United Nations Conference on Trade and Development (2005).

³ United Nations Conference on Trade and Development (2000, p. 10) discusses the differences between cross-border M&A and FDI data, and it concludes that the data suggest that M&As have contributed an increasing share of FDI flows to developed and developing countries alike.

Slemrod (1990) and Hines (1996) recognize the importance of international double taxation for inward U.S. FDI by distinguishing between investments from countries with and without worldwide taxation of corporate income. In the absence of worldwide taxation, the U.S. tax constitutes the overall tax on U.S.-source income. Indeed, Slemrod (1990) finds some time-series evidence that U.S. taxation more strongly affects investments from countries without worldwide taxation. Hines (1996) further investigates how investments by the two groups of countries across U.S. states vary with the state-level corporate income tax rate. Countries with worldwide taxation are shown to invest relatively more in U.S. states with high corporate income tax rates. This reflects the fact that multinationals located in countries with worldwide taxation would be able to obtain off-setting foreign tax credits for U.S. state taxes.

Two recent studies examine the impact of taxation on a multinational's structure using firm-level data. First, Desai and Hines (2002) examine the role of taxation in 26 cases of so-called inversions of U.S. multinationals in the 1982 to 2002 period. In these transactions, the international corporate structure is inverted in the sense that the U.S. parent becomes a subsidiary, and the earlier foreign subsidiary becomes the parent firm. These inversions serve to eliminate U.S. worldwide income taxation of all previous foreign subsidiaries. In fact, international double taxation is avoided (except for U.S. dividend withholding taxes) if the new parent resides in a country with an exemption system. Desai and Hines (2002) show that inverting firms typically face low foreign tax rates, confirming that inversions yield tax benefits. Despite these tax benefits, however, corporate inversions are relatively rare due to a certain inertia. International double taxation potentially has an economically more significant impact on the organizational structures of multinationals created through cross-border M&As as considered in this paper, as in these instances organizational structures are made from scratch. Second, Devereux and Griffith (1998) examine the impact of taxation on decisions of U.S. firms regarding whether and how to serve European markets—the U.S. firm can choose to establish production facilities in a European country or it can export to Europe. Taxation is found to affect the choice of European production locations, but not the choice of whether to produce in Europe at all. Devereux and Griffith (1998) use data on multinationals headquartered in the United States, hence taking a U.S. tax residence as given.

Several studies focus on non-tax determinants of the direction and volume of cross-border M&As. Rossi and Volpin (2004), for example, report a governance motive for cross-border takeovers. In particular, firms in countries with strong shareholder protection tend to acquire firms in countries with poor shareholder protection. This enables firms in countries with poor shareholder protection to “import” better protection, possibly resulting in lower cost of capital and higher firm valuation. In line with this finding, Bris and Cabolis (2008) find that an industry's market value increases when firms in that industry are acquired by foreign firms residing in countries with better shareholder protection and better accounting standards. In related work, Di Giovanni (2005) estimates a gravity model of international M&A activity focusing on the size of financial markets, using the corporate tax rate rather than a measure of international double taxation as a control variable.

II. The International Tax System

Two firms from different countries are assumed to merge into a single multinational firm. They have to choose one of the two countries as the country in which the parent firm resides. Let this country be denoted i , while the other country is denoted j . In addition, the multinational has to decide whether to operate a foreign subsidiary or a branch in country j . Both of these aspects of the multinational's organizational structure potentially have tax consequences. As a main principle, the parent country has the right to tax the multinational's overall income on a worldwide basis. In practice, however, some countries only tax a multinational's domestically generated income on a territorial basis. The selection of the parent country thus affects whether the multinational's income generated outside the parent country is potentially subject to additional taxation by the parent country. The choice between a foreign subsidiary or a foreign branch structure matters as well, as some parent countries tax foreign-source income in the form of dividends received from foreign subsidiaries differently from foreign active business income generated by foreign branches. In practice, most foreign establishments take the form of a subsidiary. Therefore, this section focuses on the international taxation applied to foreign dividend income. In the Internet Appendix to this paper, available at www.afajof.org, we discuss how international flows of active business income may be taxed differently.⁴

Income generated in subsidiary country j is first taxed in that country at a corporate tax rate τ_j , leaving a share $1 - \tau_j$ of this income to be reinvested or repatriated to the parent firm in the form of dividends. Table I provides information on top corporate tax rates for our sample of European countries, Japan, and the United States in 2004 as an index of the corporate tax burden. These tax rates include representative subnational state and city taxes.⁵ The subsidiary country j , in addition, may apply a nonresident dividend withholding tax to dividends repatriated to country i at a rate ω_{ij} . See the Internet Appendix for information on bilateral withholding taxes. Overall, the subsidiary country taxes the multinational's local income to be paid out as dividends at a rate $\tau_j + (1 - \tau_j)\omega_{ij}$.

Parent country i potentially taxes the foreign dividend income at a corporate tax rate τ_i . Let τ_{ij}^{double} be the resulting rate of double taxation defined as the tax rate to be paid by the multinational firm on income from country j in excess of the corporate income tax τ_j in subsidiary country j . This double tax rate depends on whether the multinational firm can defer parent country taxation until repatriation and on whether, at the time of taxation, the parent country provides any double tax relief from taxes paid in the subsidiary country. In the absence of any deferral and double tax relief, the double tax rate τ_{ij}^{double} equals $\tau_i + (1 - \tau_j)\omega_{ij}$, reflecting both the parent country corporate income tax and the subsidiary country withholding tax.

⁴ An Internet Appendix for this article is online in the "Supplements and Datasets" section at <http://www.afajof.org/supplements.asp>.

⁵ Special rates were applicable to listed firms in Greece until 2000 and to manufacturing firms in Ireland until 2002.

Table I
Tax Regimes across Countries in 2004

The first column lists top corporate income tax rates including representative state and municipal taxes where applicable with respect to retained earnings. The second column lists the countries' method of tax relief that applies to dividend income in the presence of a tax treaty. The last column provides the same information in the absence of a tax treaty. The parent firm is assumed to hold a majority in the dividend-paying subsidiary so that participation exemptions take effect. Three superscripts, a, b, and c, may further qualify the tax regime: a, only 95% of the dividend is exempted; b, only withholding taxes are credited but not the underlying corporate income tax; and c, only dividend income from EU sources is exempted. Other dividend income is taxed. Tax credits are provided for withholding taxes.

Country of Residence	Tax Rate (1)	Dividend Taxation	
		With Tax Treaty (2)	Without Tax Treaty (3)
Austria	34.0	Exemption	Exemption
Belgium	34.0	Exemption ^a	Exemption ^a
Bulgaria	19.5	Credit	Credit ^b
Croatia	20.0	Exemption	Exemption
Czech Republic	28.0	Credit	Deduction
Denmark	30.0	Exemption	Exemption
Estonia	0.0	Credit	Credit
Finland	29.0	Exemption	Credit ^b
France	35.4	Exemption ^a	Exemption ^a
Germany	38.3	Exemption ^a	Exemption ^a
Greece	35.0	Credit	Credit
Hungary	17.7	Exemption	Exemption
Iceland	18.0	Exemption	Exemption
Ireland	12.5	Credit	Credit
Italy	37.3	Exemption ^a	Exemption ^a
Japan	42.0	Credit	Credit
Latvia	15.0	Exemption	Exemption
Lithuania	15.0	Exemption	Exemption
Luxembourg	30.4	Exemption	Exemption
Netherlands	34.5	Exemption	Exemption
Norway	28.0	Exemption	Exemption
Poland	19.0	Credit	Credit
Portugal	27.5	Exemption ^c	Exemption ^c
Romania	25.0	Credit	Credit
Slovak Republic	19.0	Exemption	Exemption
Spain	35.0	Exemption	Credit
Sweden	28.0	Exemption	Exemption
Switzerland	24.0	Exemption	Exemption
United Kingdom	30.0	Credit	Credit
United States	40.0	Credit	Credit

In practice, most countries provide some form of international double tax relief. Some countries operate a territorial or source-based tax system, and effectively exempt foreign-source income from taxation. In this instance, the double tax rate τ_{ij}^{double} is given by $(1 - \tau_j)\omega_{ij}$ in the absence of deferral of

Table II
Expressions for the Double Tax Rate τ_{ij}^{double}

The variable τ_i is the corporate income tax rate in parent country i ; τ_j is the corporate income tax rate in subsidiary country j ; ω_{ij} is the withholding tax rate for dividends repatriated from a subsidiary in country j to a parent firm in country i . In the case of a direct foreign tax credit, foreign corporate income taxes are taken to be deductible expenses against taxable corporate income in the parent country.

Form of Double Tax Relief	Condition	Double Tax Rate τ_{ij}^{double}
None		$\tau_i + (1 - \tau_j)\omega_{ij}$
Indirect foreign tax credit	$\tau_j + (1 - \tau_j)\omega_{ij} \geq \tau_i$	$(1 - \tau_j)\omega_{ij}$
	$\tau_j + (1 - \tau_j)\omega_{ij} < \tau_i$	$\tau_i - \tau_j$
Direct foreign tax credit	$\omega_{ij} \geq \tau_i$	$(1 - \tau_j)\omega_{ij}$
	$\omega_{ij} < \tau_i$	$(1 - \tau_j)(\tau_i - \omega_{ij})$
Exemption		$(1 - \tau_j)\omega_{ij}$
Deduction		$(1 - \tau_j)[\omega_{ij} + (1 - \omega_{ij})\tau_i]$

parent country taxation. Alternatively, the parent country operates a world-wide or residence-based system. In this instance, the parent country taxes the worldwide income of its resident multinationals, but it may provide double tax relief in the form of a foreign tax credit for taxes already paid in subsidiary country j . The OECD model tax convention, which summarizes recommended practice, gives countries the option between an exemption and a foreign tax credit as the only two ways to relieve double taxation.⁶

The foreign tax credit reduces domestic taxes on foreign-source income one-for-one with the taxes already paid abroad. A foreign tax credit can be indirect in the sense that it applies to both the underlying corporate income tax and the dividend withholding tax. Alternatively, the foreign tax is said to be direct and applies only to the withholding tax. In either case, foreign tax credits in practice are limited to prevent the domestic tax liability on foreign-source income from becoming negative. With an indirect foreign tax credit provided, the multinational pays no tax in the parent country on account of the foreign tax credit limitation if $\tau_j + (1 - \tau_j)\omega_{ij} \geq \tau_i$. The double tax rate τ_{ij}^{double} then only reflects the withholding tax in the subsidiary country. Similarly, with a direct foreign tax credit provided, the multinational pays no tax in the parent country due to the foreign tax credit limit if $\omega_{ij} \geq \tau_i$. A few countries with worldwide taxation do not provide foreign tax credits, but instead allow foreign taxes to be deducted from the multinational's taxable income. For the various double tax relief conventions, Table II summarizes expressions for the double tax rate τ_{ij}^{double} that, in the case of a foreign tax credit, depend on whether the foreign tax credit limitation is binding.

Countries tend to vary their method of double tax relief, that is, through an exemption, credit, or deduction, based on whether they have concluded a

⁶ See OECD (2005) for the most recent version of the model tax convention.

tax treaty with the other country. Columns (2) and (3) of Table I show which double tax relief method countries apply to treaty signatory and non-signatory countries. The exemption method is seen to be the most common method of double tax relief on dividend income from foreign countries with and without a tax treaty, followed by foreign tax credits. Several countries, including Finland and Spain, exempt dividend income from a treaty country, while they apply a foreign tax credit to dividend income from a non-treaty country. In these instances, the existence of a tax treaty makes the method of double tax relief more generous. Among the European countries, most countries have concluded bilateral tax treaties, even if some Eastern European countries are still in the process of completing their treaty networks.⁷

Our sample consists of 30 countries. Thus, for each country we can calculate 29 double tax rates for dividends received (for outward FDI) and dividends paid (for inward FDI) using the statutory information on corporate tax rates, dividend withholding taxes, and international double tax relief conventions. These double tax rates per country provide information on whether a country can serve as a tax-advantaged location for parent firms (with low double taxation of dividends received) and a tax-advantaged location for subsidiary firms (with low double taxation of dividends paid out). Table III ranks our 30 countries on the basis of the average double taxation of dividends received, while it also provides information on the average double taxation of dividends paid out. These average double tax rates are equal-weighted across the 29 other countries.

At the top of Table III, we see that the Netherlands has an average double tax rate of dividends received of only 1.3%. The Netherlands has a territorial tax system so that this 1.3% is wholly due to nonresident dividend withholding taxes levied by subsidiary countries. Other countries at the top of the table, in particular, Denmark, Finland, and Sweden, similarly have a territorial tax system. An interesting case is Ireland, which also has a rather low average double tax on incoming dividends despite its system of worldwide taxation with foreign tax credits. Ireland had a low tax rate of 12.5% in 2004, which implies this country *de facto* exempts most foreign-source income. Japan and the United States also levy worldwide taxation with foreign tax credits, but these countries have relatively high corporate tax rates. This explains these countries' positions at or near the bottom of the table. On tax grounds, Japan and the United States thus are not good residences for the parent companies of multinational firms. From the table, we can see that the average rates of double taxation of incoming and outgoing dividends bear little relationship to each other. To illustrate, Greece and the United States are well placed to host foreign subsidiaries, even if their tax systems do not favor parent location.

III. M&A Data and International Double Taxation

From the Thomson Financial SDC database, we select all mergers and acquisitions involving any two countries in our sample of European countries,

⁷ See the Internet Appendix.

Table III
Country Ranking of Double Tax Rates on Dividends in 2004

The table is ordered in an ascending manner with respect to the average double tax rate $\bar{\tau}_i^{double}$ in the first column that applies to foreign-source dividend income repatriated to the country of residence listed on the left on January 1, 2004. Averages are taken across all potential source countries in the sample. Rates are reported in percentage points. Participation exemptions are taken into account in calculating the tax rates. The second and third columns report two components of the double tax. The variable $Core_i$ is the average double tax rate if withholding taxes are neglected. The variable Whi_i is the average double tax rate if withholding taxes were the only source of double taxation (equivalent to all countries exempting foreign-source income from taxation). Note that double tax relief for withholding taxes is generally provided so that $\bar{\tau}_i^{double}$ is generally less than the sum of $Core_i$ and Whi_i . The fourth column reports $\bar{\tau}_j^{double}$, which is the average double tax rate from the point of view of source countries. The countries listed on the left now represent the source country and tax rates apply to dividends *leaving* the country. The last two columns again report the two components of the double tax.

Country	Dividends Received			Dividends Paid		
	$\bar{\tau}_i^{double}$	$Core_i$	Whi_i	$\bar{\tau}_j^{double}$	$Core_j$	Whi_j
	(1)	(2)	(3)	(4)	(5)	(6)
Netherlands	1.3	0.0	1.3	1.3	0.6	0.9
Sweden	1.7	0.0	1.7	1.4	1.4	0.0
Finland	1.8	0.0	1.8	4.4	1.2	3.5
Denmark	2.1	0.0	2.1	2.9	1.1	1.8
Ireland	2.3	0.4	2.3	5.6	5.0	0.6
Luxembourg	2.8	0.0	2.8	1.0	1.0	0.0
Austria	2.9	0.0	2.9	4.1	0.6	3.8
France	3.0	1.3	1.7	2.0	0.5	1.7
Switzerland	3.0	0.0	3.0	5.8	2.8	4.1
Norway	3.3	0.0	3.3	4.1	2.0	2.6
Belgium	3.8	1.3	2.5	3.1	0.6	2.7
Italy	3.8	0.6	3.4	4.2	0.4	4.1
Germany	3.9	1.4	2.5	2.1	0.3	2.0
Spain	4.0	2.4	3.2	3.2	0.5	3.0
Croatia	4.5	0.0	4.5	8.1	4.2	6.1
Poland	4.5	1.2	4.1	6.9	3.2	5.1
Estonia	4.6	0.0	4.6	18.6	10.1	14.7
Lithuania	4.9	0.0	4.9	8.2	4.7	5.3
Hungary	5.2	0.0	5.2	9.1	3.5	6.8
Iceland	5.5	0.0	5.5	8.5	4.7	6.1
Slovak Republic	5.6	0.0	5.6	3.2	3.2	0.0
Latvia	5.9	0.0	5.9	9.0	5.4	5.7
United Kingdom	6.0	5.7	2.4	1.1	1.1	0.0
Romania	6.4	3.3	5.4	7.9	2.6	6.7
Bulgaria	6.9	3.1	5.5	9.1	3.8	7.4
Czech Republic	7.2	4.5	4.6	5.6	1.4	5.0
Portugal	7.8	5.5	4.2	5.7	1.4	4.9
Greece	9.8	9.2	4.4	0.5	0.5	0.0
United States	14.1	13.8	3.8	1.2	1.2	0.0
Japan	16.2	15.8	6.1	6.9	0.7	6.6
Total	5.2	2.3	3.7	5.2	2.3	3.7

Japan, and the United States from 1985 to 2004. The cross-border acquiring firm becomes the parent firm of the newly created multinational firm, while the target firm becomes a foreign subsidiary or branch.⁸ For tax purposes, the newly created multinational is resident in the acquiring or parent country. The database does not provide information on whether a subsidiary or a branch is created. As subsidiary structures are more common, we take these to be the benchmark case. In our empirical work, however, we consider the international taxation of branches as a robustness check. The acquiring firm, as reported by Thomson, becomes the immediate owner of the target firm. The database also provides information on the ultimate owner of the newly acquired firm. In some cases, the nationalities of the immediate and ultimate owners differ and the ultimate owner uses a holding company in another country to acquire the target. Corporate structures of this kind may aim to delay or avoid taxation by the ultimate parent country. In a robustness check, we exclude countries where multinationals commonly use organizational structures involving immediate owners in other countries.

Table IV shows the number of acquiring firms and target firms in our sample per country. The table also reports the value of acquired firms and target firms per country if available. From the table, we see that Eastern European countries tend to be home to relatively many target firms. Japan and the United States instead are shown to attract relatively many acquiring firms despite these countries' high taxation of incoming dividends as seen in Table III.

Multinational firms are more likely to be concerned about the amounts of international double tax to be paid than about double tax rates per se. Hence, the selection of the parent firm in an international takeover can be expected to reflect the additional tax liability that is incurred one way versus the other. To reflect this, for each takeover we construct a double tax liability rate, denoted θ_{ij}^{double} , defined as the incurred double tax liability as a share of the combined firm's worldwide pre-tax income if firm a (from country i) takes over firm b (in country j) as follows:

$$\theta_{ab}^{double} = \begin{cases} 0 & \text{if } PI_b \leq 0 \\ \tau_{ij}^{double} \times \frac{PI_b}{PI_a + PI_b} & \text{if } PI_b > 0, PI_a > 0 \\ \tau_{ij}^{double} & \text{if } PI_b > 0, PI_a \leq 0 \end{cases}, \quad (1)$$

where PI_a and PI_b are the pre-tax incomes of the two firms before merging to proxy for expected future incomes, and τ_{ij}^{double} is the statutory double tax rate discussed in the previous section. In expression (1), there is no double taxation of the target's income if this income is negative. Furthermore, the expression avoids inflating the tax burden variable θ_{ab}^{double} beyond the statutory double

⁸ We do not have any information on pre-existing subsidiaries of the two merging firms. This implies that we cannot check whether the parent firm of the newly created multinational firm will be able to engage in worldwide tax averaging. This would potentially reduce the overall tax costs of repatriations. Further, we cannot analyze how pre-existing subsidiaries are rearranged in the new ownership structure.

Table IV
Outgoing versus Incoming Acquisitions

This table lists the number of acquiring firms (column (1)) and the number of target firms (column (2)) per country. Column (3) lists the deal value of foreign acquisitions and column (4) lists the deal value of acquisitions by foreign firms in millions of U.S. dollars. The sample includes all M&As between listed countries recorded in the Thomson database from 1985 through 2004.

Country	Number of Acquiring Firms (1)	Number of Target Firms (2)	Value of Acquisitions (Millions of U.S. Dollars) (3)	Value of Target Firms (Millions of U.S. Dollars) (4)
Austria	624	552	10,947	19,399
Belgium	940	995	63,923	62,269
Bulgaria	0	67	0	2,857
Croatia	6	39	120	1,538
Czech Republic	18	438	86	11,046
Denmark	852	761	25,097	27,646
Estonia	23	117	89	454
Finland	787	717	51,614	33,970
France	2,720	3,563	378,284	200,067
Germany	3,361	4,372	381,502	453,361
Greece	114	48	7,451	3,377
Hungary	46	428	888	7,069
Iceland	36	11	1,861	369
Ireland	792	409	28,207	22,084
Italy	882	1,610	70,579	83,971
Japan	1,073	398	82,879	41,202
Latvia	7	52	6	395
Lithuania	10	88	1	1,246
Luxembourg	205	127	20,105	19,759
Netherlands	2,173	1,728	203,345	172,100
Norway	554	639	19,455	34,786
Poland	27	570	403	13,831
Portugal	95	298	1,998	9,535
Romania	6	101	6	1,946
Slovak Republic	7	88	25	2,851
Spain	430	1,531	34,698	63,276
Sweden	1,682	1,299	96,144	128,616
Switzerland	1,310	1,105	173,394	57,662
United Kingdom	6,479	5,429	978,858	583,042
United States	8,142	5,821	535,888	1,108,131
Total	33,401	33,401	3,167,853	3,167,853

tax rate τ_{ij}^{double} if the acquiring firm's income is negative.⁹ Straightforwardly, θ_{ba}^{double} is the corresponding double tax liability rate if instead firm b takes over firm a .

To calculate θ_{ab}^{double} , we need information on the pre-tax incomes of both the acquiring and target firms. For 626 M&As, this information is provided by the

⁹ If $PI_a < 0$, we assume the parent firm can carry any losses forward or backward so that τ_{ij} is the applicable double tax burden.

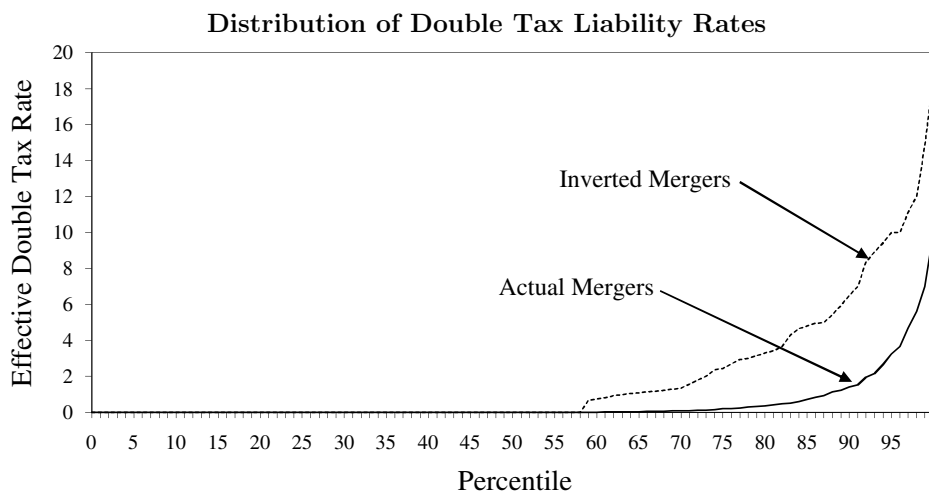


Figure 1. The solid line describes the distribution of double tax liability rates θ^{double} for actual mergers ordered from the lowest to the highest double tax liability rate. The dashed line describes the distribution of double tax liability rates θ^{double} if all mergers were inverted.

Thompson database. To expand our sample, we obtain additional information on pre-tax incomes for some firms from the Compustat Global and Compustat North America databases using CUSIP company identification codes. In this manner, we increase the sample of international M&As for which we can calculate two-way double tax liabilities to 917. Our data sources provide us with acquiring firm and target firm accounting data for only a subset of all cross-border M&As. These data sources, however, are global in coverage and data availability does not appear to be systematic so as to bias the subsequent empirical work.

For our sample of M&As, we calculate that the average double tax liability according to (1) is 0.62% of the merged firm's worldwide pre-tax income. This corresponds to an average annual absolute double tax liability of 4.4 million U.S. dollars per M&A. Interestingly, if the parent-subsidary structure were inverted, the double tax liability rate would increase to 2.11% of worldwide pre-tax income, which corresponds to an absolute annual double tax liability of 15.5 million U.S. dollars. These data suggest that the organizational structure of multinational firms following cross-border M&As is chosen with international double taxation in mind. Additional information on the distribution of actual double tax liability rates and the rates for inverted mergers is provided in Figure 1. The solid and dashed lines in the figure indicate the actual and counterfactual double tax liability rates by percentile, respectively. The figure confirms that the mean actual double tax liability rate is lower than the counterfactual. At the same time, the actual share of M&As subject to no double taxation is larger than in the inverted case.

IV. The Direction of M&As

In this section, we provide empirical evidence on how double taxation affects the direction of cross-border M&As given that we know that the transaction takes place. For this purpose, we estimate a logit binary choice model of selecting the acquiring and target firms.

A. Estimating Equation

Following Mitchell and Mulherin (1996), the binary choice model assumes that mergers reflect the synergies from combining two firms and that investors value the individual firms and the merger correctly. Let $V_{ab} = x'_{ab}\beta + \varepsilon_{ab}$ be the value of the merged company if firm a acquires firm b . In this expression, x_{ab} is a vector of independent variables, including the double tax liability θ_{ab}^{double} for the case in which firm a acquires firm b , while β is a vector of coefficients and ε_{ab} is an error term with a Weibull distribution. Similarly, let $V_{ba} = x'_{ba}\beta + \varepsilon_{ba}$ be the value of the newly created firm if firm b acquires firm a . The difference in the two firm values, $V_{ab} - V_{ba}$, is given by

$$V_{ab} - V_{ba} = (x_{ab} - x_{ba})'\beta + \varepsilon_{ab} - \varepsilon_{ba}, \quad (2)$$

where the error term $\varepsilon_{ab} - \varepsilon_{ba}$ follows a logistic distribution as seen in McFadden (1973). If $V_{ab} - V_{ba} > 0$, then firm a will be the acquirer. Hence, the probability of firm a taking over firm b is given by¹⁰

$$\text{Prob}(V_{ab} - V_{ba} > 0 | x_{ab}, x_{ba}) = \frac{\exp x'_{ab}\beta}{\exp x'_{ab}\beta + \exp x'_{ba}\beta}. \quad (3)$$

The coefficients β can be estimated by way of the logistic regression model

$$E[y_n | \Delta x_n] = \frac{\exp(\Delta x'_n \beta)}{1 + \exp(\Delta x'_n \beta)}, \quad (4)$$

where the dependent variable is $y_n = \begin{cases} 1 & \text{if } V_{ab} - V_{ba} > 0 \\ 0 & \text{if } V_{ab} - V_{ba} \leq 0 \end{cases}$,

$\Delta x_n = (x_{ab} - x_{ba})_n$, and n counts the mergers. The n cross-border takeovers are taken to involve a total of m countries.

For simplicity of exposition, let a be the observed acquirer and b be the target. In the vector Δx_n of regressors, we include $m - 1$ country dummy variables that capture the propensity of a particular country to be the acquirer country rather than the target country. This country dummy variable for, say, Austria can take on one of three values as follows: (i) it is set to one if firm a is Austrian, (ii) it is set to minus one if firm b is Austrian, and (iii) it is set to zero otherwise. In addition to these country fixed effect variables, the vector Δx_n includes the relative double tax burden variable, $\Delta \theta_{ab}^{double} = \theta_{ab}^{double} - \theta_{ba}^{double}$, and several firm-level and country-level controls.

¹⁰ The probability is conditional on there being a profitable opportunity for the two firms to merge. We expect this condition to be independent of $\text{Prob}(V_{ab} - V_{ba} > 0)$.

With a and b denoting the acquiring and target firms, it follows that the dependent variable vector y_n just contains 1's and hence displays no variation. A model with a constant dependent variable would, of course, obtain a perfect but trivial fit if it included a constant among the regressors. Our country fixed effect variables, however, are not constants and generally no linear combination of these variables exists that adds up to a constant vector. Thus, our model can be estimated in a nontrivial way. Estimation is by maximization of the joint log-likelihood function

$$\log L = \sum_{k=1}^n \left[y_k \log \frac{\exp(\Delta x'_k \beta)}{1 + \exp(\Delta x'_k \beta)} + (1 - y_k) \log \frac{\exp(-\Delta x'_k \beta)}{1 + \exp(-\Delta x'_k \beta)} \right]. \quad (5)$$

With a and b marking the acquiring and target firms, y_k equals one in (5) for all k and the second term within the square brackets vanishes.¹¹ Note that the convention of letting firm a always be the acquiring firm is arbitrary and does not affect the estimation results. To see this, let us invert the labeling for exactly one transaction so that for this transaction firm b becomes the acquiring firm and firm a is the target firm. Now the dependent variable vector y_n is no longer a unit vector, as it contains exactly one zero element. It is easily seen that inverting the labeling convention for one deal does not affect the expression for the log-likelihood in (5). Specifically, for this particular transaction k , y_k now equals zero (so that the second term between square brackets in (5) no longer drops out), while $\Delta x'_k$ becomes the negative value of what it was before (as $x_{ba} - x_{ab} = -(x_{ab} - x_{ba})$). Hence, the log-likelihood expression remains the same and the estimation yields the same coefficients β . Generally, we can, of course, take firm a to be the target firm in any number of observed M&As without affecting the estimation. We expect the estimation to yield a negative coefficient on $\Delta \theta_{ab}^{double}$, as double taxation by a country a makes parent firm location in that country less likely.

The relative double tax burden $\Delta \theta_{ab}^{double} = \theta_{ab}^{double} - \theta_{ba}^{double}$ is due immediately if subsidiary profits are repatriated to the parent country. Parent country taxation can generally be deferred if profits are not repatriated, but there are some exceptions.¹² Specifically, deferral is not available under some conditions in Japan, Portugal, Spain, the United Kingdom, and the United States. The United States, for instance, denies deferral of U.S. tax on foreign-source passive income if the subsidiary tax rate is less than 90% of the U.S. tax rate and the U.S. parent firm owns at least 10% of subsidiary shares. The United Kingdom similarly denies deferral of U.K. tax on foreign-source passive income under certain conditions. Japan, Portugal, and Spain disallow deferral of domestic tax

¹¹ Note that all regressors in Δx_n have to take on both negative and positive values for different observations k to ensure that normal maximum likelihood estimation yielding a finite likelihood is possible. This implies that each country should have at least one acquiring firm and one target firm in the sample. This condition is satisfied.

¹² Desai and Hines (2004, Figure 2) show that rates of profit repatriation of U.S. multinationals have declined substantially since 1982, increasing the scope for deferral. For established multinationals, Hines (1994) demonstrates that deferral importantly affects investment and profit shifting incentives.

on a broader definition of foreign profit under some circumstances. Detailed information on deferral rules in all five countries can be found in the Internet Appendix. On the basis of this information, we construct bilateral dummy variables D_{ab} and D_{ba} indicating whether parent country a allows deferral of taxation on income from country b , and vice versa.

Frequently, we do not have sufficient information to see whether non-deferral applies in a certain case. For instance, we do not know the mix of active and passive income of the target. We therefore have to make certain assumptions to be able to construct our deferral variables. Specifically, any necessary conditions regarding the type of income, the rate of profit distribution, and the ownership share of the parent that potentially trigger non-deferral are assumed to be met. With these assumptions, Japan, Portugal, Spain, United Kingdom, and the United States deny deferral if the subsidiary-country tax rate is rather low. Next, we construct the variable $\Delta\theta_{ab}^{double,d} = D_{ab}\theta_{ab}^{double} - D_{ba}\theta_{ba}^{double}$ as the part of the double tax liability θ_{ab}^{double} that can be deferred. Deferral makes parent country taxes less burdensome and thus we expect $\Delta\theta_{ab}^{double,d}$ to have a positive coefficient.

Among the firm-level controls in the set Δx_n , $\Delta Size$ is a measure of the relative size of the two firms involved in the takeover. It is defined as the difference between the two firms' assets divided by the sum of their assets (see the Appendix of the main text for variable definitions and data sources). We expect this variable to have a positive sign, as the larger firm is more likely to take over the smaller one. Next, $\Delta Liquidity$ is the difference between the ratios of liquid assets to total assets. The more liquid firm may find it relatively easy to take over the other firm, as it has relatively little need for costly external funds to finance the acquisition. Next, $\Delta Leverage$ measures the difference between the leverage ratios of the two merging firms. This variable could reflect relative borrowing capacity, for instance, on account of different costs of borrowing (Desai and Hines (2002) argue that low leverage may reflect high borrowing cost and thus low borrowing capacity). A positive sign on $\Delta Leverage$ would suggest that the more highly leveraged firm is more likely to be the acquirer. As an alternative measure of borrowing capacity, we also use $\Delta Fixedassets$, which is the difference between the two firms' ratios of fixed assets to total assets. Fixed assets may easily serve as collateral and hence may signal borrowing capacity (Rajan and Zingales (1995)). An acquiring firm may either wish to borrow against its own fixed assets or against the target's fixed assets, and hence the expected sign for the $\Delta Fixedassets$ variable is not clear. The variable ΔROA is the difference between the rates of return on assets. More profitable firms are expected to take over less profitable ones.

Parent firm location in a country will involve certain headquarter activities that are subject to the parent country's corporate tax rate. For this reason, parent firm location in the high-tax country may be less likely. However, parent firm location in the high-tax country may be more likely if a high taxation regime implies high public spending on, for instance, infrastructure that benefits parent firms. Thus, the difference between the two countries' tax rates,

represented by $\Delta Taxrate$, could take either sign. Next, we construct $\Delta Stockmarket$ as the difference between the two countries' stock market capitalizations divided by their summed capitalization. The acquiring firm may more easily raise equity capital in its domestic capital market and hence $\Delta Stockmarket$ is expected to have a positive sign. As in Di Giovanni (2005), the variable is lagged one period to account for possible endogeneity. Along similar lines, $\Delta Credit$ is the difference between the two countries' domestic credit to the private sector divided by their total credit provision, all lagged 1 year. The ease with which the acquiring firm may borrow in its own country or in the target country depends on the importance of bank information about the acquiring firm and the acquired assets. Thus, $\Delta Credit$ could take either sign. Further, $\Delta Exch.rate$ is symmetrically calculated as the difference between the annual percentage changes in the bilateral exchange rate lagged by 1 year. A positive value for $\Delta Exch.rate$ implies past exchange rate appreciation, which is expected to make foreign acquisitions more likely (Blonigen, (1997) and Di Giovanni, (2005)). In a robustness check, we further include $\Delta Pretaxinc$, which is the difference between the pre-tax incomes divided by their sum. This variable thus measures relative size by pre-tax income rather than assets. Again, we expect the larger firm to take over the smaller one. Finally, $\Delta Investment$ is the difference between the two firms' ratios of investment to assets. Firms with high investment rates may have profitable investment opportunities that to some extent are transferrable to target firms, which could explain a positive estimated coefficient. Table V provides summary statistics for all these variables. Note that the included country dummy variables serve to capture country-specific determinants of M&A activity such as the legal and regulatory framework and capital gains taxation. See Rossi and Volpin (2004), Dyck and Zingales (2004), La Porta et al. (2002), Comment and Schwert (1995), and Ayers, Lefanowicz, and Robinson (2003) for empirical evidence on these determinants of M&A outcomes.

B. Estimation Results

Table VI presents the results of regressions explaining the direction of M&As. In regression (1), the relative double tax burden variable $\Delta \theta^{double}$ enters with a coefficient of -0.358 that is statistically significant. This suggests that an increase in the double tax burden in one country by one percentage point reduces that country's probability of being the acquiring country by 9.0 percentage points in the case of a merger of equals. In comparison, the relative double tax burden from the acquirer's perspective is -1.5% on average as seen in Table V. International double taxation thus affects M&A outcomes in an economically significant way. Among the controls, the relative size variable enters with a positive and significant coefficient, suggesting that the larger firm is more likely to be the acquirer. More liquid assets and greater leverage appear to also make it more likely that a firm becomes the acquirer firm. The rate of return on assets variable takes a negative coefficient, but it is statistically insignificant. The relative tax rate takes a positive coefficient that is statistically insignificant.

Table V
Summary Statistics for Analysis of the Direction of M&As

The summary statistics describe the relative values of a variable for firms *a* and *b* for the case in which the acquiring firm is classified as firm *a* and the target firm is classified as firm *b*. This labeling matters for the value of these statistics. For example, the dependent variable *y* changes from a unit vector to a zero vector and the explanatory variable means switch signs if the labels *a* and *b* are switched for all firm pairs. *y* is a binary variable indicating whether firm *a* acquires firm *b* or vice versa. For other variable definitions and data sources, see the Appendix of the main text.

Variable	Obs	Mean	Std. Dev	Min	Max
<i>y</i>	917	1.00	0.00	1.00	1.00
$\Delta\theta^{double}$	917	-1.50	4.65	-30.00	27.50
$\Delta\theta^{double,d}$	582	-0.51	1.65	-16.30	5.80
$\Delta Size$	917	0.70	0.36	-0.99	0.99
$\Delta Liquidity$	582	0.00	0.20	-0.82	1.55
$\Delta Leverage$	582	-0.02	0.51	-5.36	3.18
$\Delta Fixedassets$	394	-0.16	0.19	-0.88	0.66
ΔROA	582	0.08	0.35	-1.18	3.01
$\Delta Taxrate$	582	0.42	10.09	-30.00	30.00
$\Delta Stockmarket$	582	-0.01	0.73	-0.99	0.99
$\Delta Credit$	582	-0.01	0.72	-0.99	0.99
$\Delta Exch.rate$	582	-0.02	0.18	-0.45	0.50
$\Delta Pretaxinc$	582	0.58	0.56	-1.00	1.00
$\Delta Investment$	346	0.05	0.22	-0.80	1.09

The relative stock market capitalization and credit provision variables enter with positive and negative coefficients, respectively, that are both insignificant. Finally, the exchange rate variable takes an unexpected negative, but insignificant, coefficient.

In regression (2) we add the $\Delta\theta^{double,d}$ variable, which reflects the part of $\Delta\theta^{double}$ that is potentially deferred. This variable enters with a negative coefficient, but it is statistically insignificant. This could indicate that the value of the deferral option is uncertain to merging firms or that deferral has little value, for instance, because it may lead to suboptimal reinvestment in the subsidiary country. Also, the deferral variable may measure the expected availability of deferral imperfectly.

The negative estimated coefficient on $\Delta\theta^{double}$ in regression (1) could merely reflect that firms with relatively high pre-tax incomes are likely to be acquiring firms for reasons other than international double taxation. To exclude this possibility, in regression (3) we include the relative pre-tax income variable as a separate control variable. This relative pre-tax income variable takes a positive coefficient, but it is insignificant. The relative double tax burden variable now enters with a coefficient of -0.263 that remains statistically significant.

Regression (4) includes the relative investment variable as a control variable. This reduces the sample size from 582 to 346 observations due to missing investment cash flow data. The relative investment variable is estimated to have a positive and significant coefficient. This could reflect that firms with

Table VI
Estimation Results for the Direction of M&As

The dependent variable y equals one if firm a acquires firm b and zero if firm b acquires firm a . All regressions are logit regressions except the probit regression (6) and the two-step instrumental variable probit regression (10). Regression (7) assumes that target firms are integrated as foreign branches instead of as subsidiaries. Regression (8) excludes deals with ultimate acquirers in four countries that use holding companies relatively intensively. Regression (9) is a conditional logit regression. The likelihood is maximized conditional on the number of acquiring and target firms per bilateral relationship. Regression (10) is a two-step instrumental variable probit regression, where the variables $\Delta\theta^{double}$ and $\Delta Taxrate$ are instrumented by their 1- and 2-year lagged values. Country fixed effects are not reported. The Wald test of exogeneity has as null hypothesis that the variables $\Delta\theta^{double}$ and $\Delta Taxrate$ are exogenous. With a χ^2 statistic of 0.79 and a p -value of 0.67, this hypothesis cannot be rejected. The test of the overidentifying restrictions has an Amemiya-Lee-Newey minimum χ^2 statistic of 3.11 and a p -value of 0.21. The hypothesis that the instruments are valid cannot be rejected. The row labeled Corr. Class. reports the proportion of mergers the direction of which is predicted correctly if 0.5 is chosen as the probability cutoff value. Standard errors are provided in parentheses. Stars indicate the significance level: *, 5%; **, 1%. For variable definitions and data sources, see the Appendix.

	(1) Benchmark	(2) Deferral	(3) Pretax Income	(4) Investment	(5) Fixed Assets
$\Delta\theta^{double}$	-0.358** (0.086)	-0.357** (0.090)	-0.263* (0.119)	-0.501** (0.165)	-0.498** (0.180)
$\Delta\theta^{double,d}$		-0.011 (0.254)			
$\Delta Size$	5.698** (0.587)	5.696** (0.589)	5.453** (0.611)	7.412** (1.231)	10.397** (1.902)
$\Delta Liquidity$	3.160* (1.253)	3.154* (1.259)	2.950* (1.276)	6.726** (2.414)	3.252 (1.752)
$\Delta Leverage$	0.852* (0.431)	0.850* (0.432)	0.825 (0.428)	2.168 (1.135)	
$\Delta Fixedassets$					-1.335 (2.524)
ΔROA	-0.360 (0.778)	-0.359 (0.778)	-0.583 (0.746)	-0.449 (1.374)	-0.286 (1.766)
$\Delta Taxrate$	0.091 (0.056)	0.090 (0.056)	0.069 (0.060)	0.192 (0.108)	0.328** (0.118)
$\Delta Stockmarket$	1.420 (2.737)	1.403 (2.769)	0.943 (2.769)	-1.685 (5.573)	4.089 (5.034)
$\Delta Credit$	-5.243 (3.143)	-5.217 (3.205)	-4.942 (3.169)	-3.041 (6.191)	-12.645* (5.807)
$\Delta Exch. rate$	-1.659 (1.328)	-1.650 (1.346)	-1.827 (1.337)	-1.694 (2.162)	-4.694 (2.534)
$\Delta Pretaxinc$			0.617 (0.555)		
$\Delta Investment$				6.646** (2.286)	
N	582	582	582	346	394
Log-likelihood	-77.4	-77.4	-76.7	-32.6	-28.0
Corr. Class.	95.4%	95.4%	95.2%	97.1%	97.2%

(continued)

Table VI—Continued

	(6) Probit	(7) Branch	(8) Holding Company	(9) Conditional	(10) IV
$\Delta\theta^{double}$	-0.186** (0.044)	-0.355** (0.088)	-0.340** (0.088)	-0.322** (0.099)	-0.190** (0.047)
$\Delta Size$	2.978** (0.265)	5.730** (0.592)	5.399** (0.667)	5.380** (0.706)	2.893** (0.273)
$\Delta Liquidity$	1.545* (0.625)	3.189* (1.245)	2.899* (1.379)	3.616** (1.342)	1.510* (0.637)
$\Delta Leverage$	0.372 (0.235)	0.877* (0.426)	0.902* (0.427)	0.782 (0.479)	0.376 (0.219)
ΔROA	-0.259 (0.400)	-0.321 (0.780)	-0.268 (0.851)	-0.598 (0.778)	-0.294 (0.380)
$\Delta Taxrate$	0.046 (0.029)	0.100 (0.056)	0.089 (0.069)	0.220** (0.083)	0.048 (0.036)
$\Delta Stockmarket$	0.762 (1.423)	1.167 (2.730)	3.025 (3.427)	-3.448 (4.757)	0.729 (1.446)
$\Delta Credit$	-2.939 (1.676)	-5.069 (3.134)	-6.221 (3.975)	-29.024** (8.708)	-2.731 (1.666)
$\Delta Exch. rate$	-1.138 (0.678)	-1.793 (1.324)	-1.879 (1.558)	-0.324 (1.594)	-0.991 (0.713)
Wald test:					0.79/0.67
Overid test:					3.11/0.21
<i>N</i>	582	582	417	518	574
Log-likelihood	-78.6	-77.7	-58.0	-46.1	n.a.
Corr. Class.	95.2%	95.2%	94.7%	n.a.	n.a.

high investment levels have profitable investment opportunities that can be transferred to target firms. The relative double tax burden variable takes a somewhat more negative coefficient of -0.501 that remains statistically significant. In regression (5) we replace the relative leverage variable by the relative fixed assets variable as an index of borrowing capacity. The negative estimated coefficient on the latter variable suggests that firms with relatively large fixed assets make good targets, but the estimate is statistically insignificant.

Regression (6) applies the probit model rather than the logit model to specification (1). This yields an estimated coefficient on the relative double tax burden variable of -0.186 that is statistically significant. This estimate implies that an increase in the double tax burden of one percentage point in a country reduces the probability of that country being the acquirer by 7.4% for the case of a merger of equals. Thus, the calculated marginal effect of a change in double taxation is slightly less than that for the logit model.

So far, we have assumed that a merger results in a multinational firm with a foreign subsidiary. Alternatively, the multinational firm could opt for a branch structure. As discussed in Section II, the international taxation of the income of foreign subsidiaries and foreign branches generally differ. As a robustness check, we construct the relative double tax burden variable $\Delta\theta^{double}$ on the

assumption that foreign establishments take the form of branches. The estimated coefficient on the relative double tax variable for the branch case in regression (7) is very similar at -0.355 , and it remains statistically significant.

Two firms engaging in a cross-border merger can opt for a simple parent-subsidiary structure or, instead, for a more complex structure involving a holding company in a third country. Our data source provides information on the nationalities of the immediate and ultimate acquirers and thus we can check whether international holding companies are prevalent in our sample. For the 582 transactions in the benchmark regression, these two nationalities differ in 12 cases. These 12 transactions involve five countries of ultimate ownership: France, Italy, Luxembourg, the Netherlands, and the United Kingdom. In the case of France, 2 out of 36 ultimate owners in France use immediate owners in other countries. For Italy, Luxembourg, the Netherlands, and the United Kingdom, the corresponding figures are 5 out of 28, 1 out of 3, 3 out of 39, and 1 out of 89, respectively. Regression (8) excludes transactions with ultimate owners or targets in France, Italy, Luxembourg, or the Netherlands, as ultimate owners in these countries use holding companies in other countries in our sample relatively intensively. The estimated coefficient on the relative double tax burden is similar at -0.340 and is statistically significant.

Next, regression (9) applies a conditional logit model to specification (1). Specifically, the estimation is conditioned on information about the proportion of firms that establish a parent firm in one of two countries for any pair of countries.¹³ The estimated parameter for the relative double tax parameter is very similar at -0.322 and is statistically significant.

Finally, we consider the possibility that corporate taxation is endogenous to the direction of M&As. To see how endogeneity may arise, we can interpret international double taxation as a user fee for using a country as the parent country. Such a fee may be justified by, say, a country's superior legal and accounting environment or, alternatively, the smooth operation of its labor market. An increase in the demand for a country's services as the parent country may endogenously give rise to an increase in the user fee, that is, a higher rate of double taxation applied to resident parent firms. Such a positive response of international double taxation to the location of parent firms in a country could give rise to a positively biased estimated coefficient on $\Delta\theta^{double}$. To adjust for potential endogeneity, we apply a two-step instrumental variable probit, where $\Delta\theta^{double}$ and $\Delta Taxrate$ are instrumented by their 1- and 2-year lagged values.¹⁴ The relative tax burden variable now takes a coefficient of -0.190 as reported in regression (10), which is very similar to the estimate of -0.186 in the probit regression (6). A Wald test of the hypothesis that $\Delta\theta^{double}$ and $\Delta Taxrate$

¹³ For mergers between countries i and j (with $i < j$), we define all observations with headquarters locating in country i as "successes" ($y_n = 1$) and all observations with headquarters locating in country j as "failures" ($y_n = 0$). Conditioning the likelihood on the country-pair-specific number of successes and failures results in Chamberlain's (1980) fixed effects logit estimator, which allows for the presence of fixed effects on the level of bilateral country relationships. See also Greene (2008, pp. 800–805) for a good description of the fixed effects logit estimator.

¹⁴ For further details on the instrumental variable estimation, see the Internet Appendix.

are exogenous cannot be rejected. A test of the overidentifying restrictions indicates that the hypothesis that the instruments are valid cannot be rejected either. Overall, the results in this section show that the direction of international M&As is affected by the prospect of international double taxation and that the estimated effect is economically significant. This finding is robust to a variety of changes in model specification and estimation technique.

V. Simulation of International Tax System Change by the United States

Our empirical results suggest that countries can attract additional parent companies by lowering international double taxation, either through lower tax rates or more generous double tax relief. For the U.S. case, the President's Advisory Panel on Federal Tax Reform (2005) has recently advocated abolishing the U.S. system of worldwide taxation in favor of an exemption system. The American Jobs Creation Act of 2004 already temporarily allowed U.S. multinationals to repatriate profits subject to a flat tax rate of 5.25% from October 2004 until the end of 2005. In response, the foreign subsidiaries of U.S. multinationals increased their repatriations sixfold from 34 billion U.S. dollars in 2004 to 217 billion dollars in 2005. This shows that the current system of worldwide taxation in the United States has a material impact on the behavior of U.S. multinationals. In this section, we present simulations of how an abolition of worldwide taxation by the U.S. would affect the propensity of newly created multinational companies in our sample to establish a parent firm in the United States. The international tax systems of other countries are assumed to remain unchanged. In our simulations, we use the estimated coefficients of regression (1) in Table VI.

Column (1) of Table VII gives the proportion of multinational firms resulting from M&As involving the United States that establishes a parent firm in country i . This proportion equals the average predicted probability P_i of parent firm location in country i . Note that 53.1% of the deals actually resulted in a parent firm in the United States. Column (2) gives the change in this proportion, or dP_i , that is simulated to occur after the U.S. switches to an exemption system, while column (3) provides the corresponding relative change in the propensity to choose a U.S. parent, or dP_i/P_i . In columns (2) and (3), estimated changes in the probability of establishing a U.S. parent are zero for Belgium, Germany, Italy, Japan, and Spain, as these countries' tax rates are so high in the sample that the U.S. imposes no double tax on foreign-source income from these countries. All other "partner" countries see their chances of becoming the parent country decrease. For Ireland, the probability of obtaining the parent firm falls rather dramatically from 38.2% to 3.6%. This reflects the fact that U.S. multinationals operating in Ireland are subject to considerable U.S. tax due to the low Irish tax rate of 12.5%. The United States itself experiences an increase in the probability of becoming the parent country from 53.1% to 57.6%.

Columns (4) to (6) provide information about how the U.S. abolition of worldwide taxation affects country i 's chances of hosting the parent firm following

Table VII
Simulation of Exemption System in the United States

This table reports the change in the proportion of acquiring firms per country if the United States were to switch from applying worldwide taxation to exempting foreign income taxation. The variable P_i is the original proportion of acquiring firms reported in percent and dP_i is the corresponding change in the proportion reported in percent. The variable $\frac{dP_i}{P_i}$ is the implied relative change in the proportion. Marginal effects are calculated using regression (1) in Table VI and taking the observations' explanatory variable values into account. The first three columns relate exclusively to mergers involving the United States. Austria, Greece, and Portugal have no values reported because these countries do not have any U.S.-related merger in the sample. The last three columns relate to all mergers in the sample.

Country	U.S. Related M&As Only			All M&As		
	(1) P_i	(2) dP_i	(3) $\frac{dP_i}{P_i}$	(4) P_i	(5) dP_i	(6) $\frac{dP_i}{P_i}$
Austria				44.4	0.00	0.00
Belgium	94.5	0.00	0.00	66.7	0.00	0.00
Denmark	54.0	-10.16	-0.19	57.9	-5.88	-0.10
Finland	72.5	-14.77	-0.20	71.4	-5.63	-0.08
France	48.8	-0.21	0.00	48.7	-0.10	0.00
Germany	46.6	0.00	0.00	51.9	0.00	0.00
Greece				33.3	0.00	0.00
Ireland	38.2	-34.61	-0.91	66.7	-13.19	-0.20
Italy	69.7	0.00	0.00	66.7	0.00	0.00
Japan	51.7	0.00	0.00	50.0	0.00	0.00
Luxembourg	36.4	-1.10	-0.03	60.0	-0.66	-0.01
Netherlands	72.1	-0.48	-0.01	65.5	-0.24	0.00
Norway	32.3	-0.81	-0.03	20.0	-0.27	-0.01
Portugal				50.0	0.00	0.00
Spain	59.0	0.00	0.00	42.9	0.00	0.00
Sweden	58.4	-5.35	-0.09	54.5	-2.43	-0.04
Switzerland	71.9	-5.58	-0.08	71.0	-2.34	-0.03
United Kingdom	35.8	-6.02	-0.17	33.8	-4.35	-0.13
United States	53.1	4.50	0.08	53.1	4.50	0.08
Total	50.0	0.00	0.00	50.0	0.00	-0.01

cross-border deals involving any country (and not just the U.S.). These columns report how deals involving the United States are affected, as before, and also a country's proportion of deals with the United States. The probability of a parent firm in Ireland is now reduced by about 13 percentage points, which reflects that about a third of the deals involving Irish firms are with a U.S. partner. All the same, the redistribution of parent firm activity toward the United States from Ireland and several other countries remains substantial.

VI. The Gravity Model and the Number of M&As

Previous sections analyze the direction of individual cross-border mergers using firm-level data. In this section, we take a macroeconomic perspective. Specifically, we consider how international double taxation affects parent firm

location at a bilateral, national level taking a gravity model approach. Several previous studies use the gravity model to explain international investment outcomes. Portes and Rey (2005), for instance, estimate a gravity equation for trade in financial assets, while Wei (2000), Evenett (2003), and Buch, Kleinert, and Toubal (2004) use the gravity model to explain FDI flows. In a recent study, Di Giovanni (2005) applies the gravity model to the volume of cross-border mergers and acquisitions.

A. Estimating Equation

We apply the gravity model to estimate the impact of international double taxation on bilateral aggregate numbers of inward and outward M&As. Aggregate numbers of this kind reflect the direction of M&As between any two countries, as considered before, and in addition the total number of M&As between the two countries. In practice, there are no M&As for some country pairs. To capture this fact, we estimate a Tobit censored regression model of the following kind:

$$MA_{ijt} \begin{cases} = 0 & \text{if } MA_{ijt}^* < 0 \\ = \exp(MA_{ijt}^*) & \text{if } MA_{ijt}^* \geq 0 \end{cases}, \quad (6)$$

where MA_{ijt} is the number of M&As at time t , with i and j denoting the acquiring and target countries, and where MA_{ijt}^* is an index function given by

$$MA_{ijt}^* = \beta_0 + \beta' x_{ijt} + \epsilon_{ijt}. \quad (7)$$

In (6), x_{ijt} is a set of explanatory variables, β_0 and β are parameters to be estimated, and ϵ_{ijt} is a normally distributed error term. The main variable of interest as part of x_{ijt} is the double tax rate τ_{ijt}^{double} . Higher double taxation imposed by country i on the foreign-source income of local parent firms is expected to lead to fewer M&As where this country is the acquiring country. Next, $D_{ij}\tau_{ijt}^{double}$ is the interaction of a dummy variable D_{ij} signaling deferral of country i 's taxation of income from country j and the double tax rate τ_{ijt}^{double} . International double taxation is expected to affect aggregate M&As less negatively if it can be deferred. We also include the acquiring and target country tax rates τ_{it} and τ_{jt} . Taxation in both countries may discourage the formation of multinationals operating in the two countries. Among the non-tax controls, we include standard gravity model variables such as the bilateral distance, $Dist_{ij}$, and the two countries' GDPs, GDP_{it} and GDP_{jt} . These variables, as are the other controls apart from the categorical variables, are in logarithm. Additional explanatory variables are the parent and subsidiary countries' per capita GDP, denoted $GDPpercap_{it}$ and $GDPpercap_{jt}$. Multinational firms often have parent firms in rich countries, which suggests a positive effect for $GDPpercap_{it}$. At the same time, multinational firms may wish to acquire targets in low-wage countries to have access to cheap labor or in high-wage countries to have access to skilled labor and interesting product markets. Hence, the impact of target country per capita GDP, $GDPpercap_{jt}$, can possibly have either sign.

Table VIII
Summary Statistics for the Gravity Model

The summary statistics relate to the variables used in the estimation of the gravity model of M&As. For variable definitions and data sources, see the Appendix.

Variable	Obs	Mean	Std. Dev	Min	Max
MA_{ijt}	8,042	3.51	13.14	0.00	364.00
τ_{ijt}^{double}	8,042	5.35	6.29	0.00	42.00
$D_{ij} \tau_{ijt}^{double}$	8,042	4.98	6.12	0.00	40.40
τ_{it}	8,042	35.38	9.36	0.00	61.80
τ_{jt}	8,042	35.70	8.87	0.00	65.00
$Distance_{ij}$	8,042	6.93	0.91	4.37	8.82
GDP_{it}	8,042	12.25	1.88	8.45	16.03
GDP_{jt}	8,042	12.18	1.92	8.31	16.03
$GDP_{percap_{it}}$	8,042	9.73	0.94	7.29	10.99
$GDP_{percap_{jt}}$	8,042	9.73	0.97	7.24	10.99
$(Stocks/GDP)_{it-1}$	8,042	-1.08	1.19	-6.43	1.70
$(Credit/GDP)_{it-1}$	8,042	-0.40	0.73	-2.64	0.71
$\Delta Exch.rate_{ijt-1}$	8,042	0.00	0.16	-1.45	1.45
$Tariffs_{jt}$	8,042	1.58	0.79	-4.09	3.10
$Controls_{jt}$	8,042	3.08	2.49	0.00	10.00
$Border_{ij}$	8,042	0.10	0.30	0.00	1.00
$Language_{ij}$	8,042	0.05	0.22	0.00	1.00
EU_{ijt}	8,042	0.28	0.45	0.00	1.00
$Legalquality_{jt}$	8,042	7.86	1.19	4.50	9.60

Next, parent country financial development variables such as stock market valuation over GDP, $(Stocks/GDP)_{it-1}$, and credit provision to the private sector over GDP, $(Credit/GDP)_{it-1}$, are expected to have a positive impact on acquisitions. Following Di Giovanni (2005), we lag these financial depth variables by one period to avoid endogeneity. The rate of appreciation of country i 's bilateral real exchange rate with respect to country j , $\Delta Exch.rate_{ijt-1}$, is expected to promote acquisitions in country j as this country's assets have become cheaper. The mean tariff rate in the target country, $Tariffs_{jt}$, could similarly have a positive impact on acquisitions in that country if multinationals wish to "jump" a country's tariffs. An index counting the types of capital controls in the target country, $Controls_{jt}$, may negatively impact acquisitions, as they may prevent foreign investors from acquiring local companies. The variables $Border_{ij}$ and $Language_{ij}$ denote a common border and language and they are both expected to have a positive impact on bilateral acquisitions. The EU_{ijt} variable denotes joint membership in the EU, which is also expected to foster acquisitions. Next, $Legalquality_{jt}$ measures the quality of the legal structure and the security of property rights in the target country. We expect this variable to have a positive impact on acquisitions in the target country, as it signals some protection from expropriation and other unreasonable treatment. Table VIII provides summary statistics for all these variables. Finally, the regressions contain dummy variables for acquiring and target countries and for time.

B. Estimation Results

Table IX reports regressions explaining the logarithm of the bilateral number of M&As, MA_{ijt} , resulting in parent and subsidiary firms in countries i and j , respectively. Regression (1) shows a significant coefficient of -0.017 on the double tax rate variable τ_{ijt}^{double} . This estimate suggests that an increase in the double tax rate by one percentage point reduces the number of foreign acquisitions by 1.7%.¹⁵ The acquiring and target country tax rates, τ_{it} and τ_{jt} , both take negative coefficients, but only the latter coefficient is statistically significant. The various control variables enter the regression largely as expected. Distance has a negative impact on the number of cross-border acquisitions. The GDPs of the acquiring and target countries enter with positive coefficients that are not statistically significant in this regression, which includes country dummy variables. Stock market capitalization in the acquiring country has a positive and statistically significant impact on the number of acquisitions, as does the target country tariff variable. A shared border and a common language also are positively and significantly related to the number of acquisitions.

In regression (2) we include the double tax rate interacted with a deferral dummy. This variable takes a positive coefficient, but is statistically insignificant. This may reflect that the deferral option is not very valuable to merging firms, or alternatively that our deferral variable measures the expected availability of deferral imprecisely.

In regression (3), we include the legal quality variable.¹⁶ The regression shows that target country legal quality is significantly positively related to the number of acquisitions with no change in the estimated coefficient on the double tax variable. Regression (4) uses a τ_{ijt}^{double} variable constructed on the assumption that the newly created multinationals have an international branch rather than subsidiary structure. The estimated coefficient on the double tax variable is little changed. Regression (5) replaces the number of M&A deals by the value of these deals. The estimated coefficients on the double tax variable are now estimated to be -0.052 , which is more negative than in regression (1), suggesting that larger deals are relatively more affected by international double taxation.

Next, we present several regressions that indicate the extent to which the results are robust to changes in the estimation approach. First, regression (6) is estimated by OLS using only uncensored observations with a positive number of M&As. Disregarding censored observations should result in an attenuation of coefficients; indeed, the estimated coefficient on the double tax rate variable now is less negative at -0.009 , but it remains significant. Second, regression (7) assumes that the dependent variable y_n is Poisson distributed such that

¹⁵ This is less than the 9.0% change reported in Section IV.B, but it should be kept in mind that the 9.0% applies to the specific case of a merger of equals. Note that the estimate of 1.7% is an upper bound given the Tobit specification.

¹⁶ The legal quality variable is not part of the benchmark regression because this variable is computed differently before 1995. Furthermore, values between 1985 and 1990 and between 1990 and 1995 have been interpolated.

Table IX
Estimation Results for the Gravity Model of M&As

Unless indicated otherwise, these are Tobit regressions and the dependent variable is the logarithm of the frequency of mergers and acquisitions in year t , in which the acquirer comes from country i and the target comes from country j . Zero observations are taken into account as censored observations. Regression (4) assumes that target firms are integrated as foreign branches. Regression (5) uses the logarithm of the deal values of M&As as the dependent variable. Regression (6) is an OLS regression using the uncensored observations (i.e., those with a positive number of M&As). Regression (7) is a Poisson regression using the number of M&As as the dependent variable. Regression (8) is a negative binomial regression using the number of M&As as the dependent variable. Regression (9) is a two-step instrumental variable Tobit regression, where τ_{ijt}^{double} , τ_{it} , and τ_{jt} are instrumented by their 1- and 2-year lagged values. Country and time fixed effects are not reported. The Wald test of exogeneity has as null hypothesis that the variables τ_{ijt}^{double} , τ_{it} , and τ_{jt} are exogenous. With a χ^2 statistic of 0.53 and p -value of 0.91, this hypothesis cannot be rejected. The test of the overidentifying restrictions has an Amemiya-Lee-Newey minimum χ^2 statistic of 6.08 and a p -value of 0.11. The hypothesis that the instruments are valid cannot be rejected. Standard errors are provided in parentheses. Stars indicate the significance level: *, 5%; **, 1%. For variable definitions and data sources, see the Appendix.

	(1) Benchmark	(2) Deferral	(3) Legal Quality	(4) Branches
τ_{ijt}^{double}	-0.017** (0.004)	-0.024** (0.006)	-0.017** (0.004)	-0.018** (0.004)
$D_{ij}\tau_{ijt}^{double}$		0.008 (0.006)		
τ_{it}	-0.003 (0.003)	-0.003 (0.003)	-0.003 (0.003)	0.001 (0.003)
τ_{jt}	-0.019** (0.003)	-0.019** (0.003)	-0.018** (0.003)	-0.019** (0.003)
$Distance_{ij}$	-0.967** (0.037)	-0.964** (0.037)	-0.970** (0.037)	-0.955** (0.036)
GDP_{it}	0.553 (0.957)	0.732 (0.966)	0.564 (0.957)	0.553 (0.920)
GDP_{jt}	1.394 (0.874)	1.370 (0.873)	1.142 (0.880)	0.801 (0.857)
$GDPpercap_{it}$	1.236 (1.084)	1.043 (1.092)	1.205 (1.083)	1.236 (1.037)
$GDPpercap_{jt}$	-1.209 (0.935)	-1.170 (0.935)	-0.916 (0.943)	-0.595 (0.915)
$(Stocks/GDP)_{it-1}$	0.239** (0.040)	0.236** (0.040)	0.240** (0.040)	0.236** (0.039)
$(Credit/GDP)_{it-1}$	0.151* (0.061)	0.153* (0.061)	0.151* (0.061)	0.163** (0.061)
$\Delta Exch.rate_{ijt-1}$	0.131 (0.094)	0.136 (0.094)	0.134 (0.094)	0.152 (0.090)
$Tariffs_{jt}$	0.197** (0.059)	0.193** (0.059)	0.209** (0.059)	0.179** (0.058)
$Controls_{jt}$	-0.010 (0.012)	-0.010 (0.012)	-0.010 (0.012)	-0.004 (0.011)
$Border_{ij}$	0.154** (0.055)	0.159** (0.055)	0.151** (0.055)	0.176** (0.054)
$Language_{ij}$	0.230** (0.053)	0.231** (0.053)	0.230** (0.053)	0.246** (0.052)

(continued)

Table IX—Continued

	(1) Benchmark	(2) Deferral	(3) Legal Quality	(4) Branches	
EU_{ijt}	−0.049 (0.047)	−0.038 (0.047)	−0.056 (0.047)	0.007 (0.045)	
$Legalquality_{jt}$			0.102* (0.045)		
N	8,042	8,042	8,042	8,845	
Log-likelihood	−5,110.6	−5,109.6	−5,108.0	−5411.7	
	(5) Deal Values	(6) OLS	(7) Poisson	(8) Negative Binomial	(9) IV
τ_{ijt}^{double}	−0.052** (0.016)	−0.009* (0.004)	−0.018** (0.005)	−0.025** (0.005)	−0.018** (0.004)
τ_{it}	0.002 (0.014)	−0.001 (0.003)	−0.009* (0.004)	−0.005 (0.004)	−0.006 (0.005)
τ_{jt}	−0.074** (0.013)	−0.011** (0.003)	−0.017** (0.004)	−0.025** (0.004)	−0.023** (0.005)
$Distance_{ij}$	−2.647** (0.153)	−0.718** (0.038)	−0.881** (0.052)	−1.181** (0.048)	−0.942** (0.038)
GDP_{it}	1.932 (3.950)	1.440 (1.069)	2.143* (0.937)	1.365 (1.066)	1.034 (1.014)
GDP_{jt}	8.365* (3.659)	2.299* (1.011)	0.379 (1.145)	1.821 (1.032)	2.714** (0.952)
$GDPpercap_{it}$	2.502 (4.546)	−0.530 (1.204)	0.067 (1.075)	0.798 (1.226)	0.649 (1.165)
$GDPpercap_{jt}$	−8.493* (3.983)	−2.618* (1.070)	0.557 (1.267)	−1.341 (1.125)	−2.981** (1.042)
$(Stocks/GDP)_{it-1}$	0.639** (0.174)	0.243** (0.046)	0.664** (0.074)	0.454** (0.055)	0.282** (0.043)
$(Credit/GDP)_{it-1}$	0.338 (0.269)	0.102 (0.062)	0.230* (0.091)	0.208** (0.081)	0.162* (0.063)
$\Delta Exch.rate_{ijt-1}$	0.375 (0.385)	0.104 (0.109)	0.114 (0.139)	0.160 (0.118)	0.082 (0.155)
$Tariffs_{jt}$	0.639* (0.259)	0.129* (0.062)	0.173 (0.088)	0.223** (0.080)	0.141* (0.063)
$Controls_{jt}$	−0.089 (0.050)	0.010 (0.011)	0.001 (0.013)	−0.014 (0.013)	−0.008 (0.012)
$Border_{ij}$	0.157 (0.236)	0.104 (0.055)	0.147* (0.058)	0.139* (0.061)	0.180** (0.057)
$Language_{ij}$	0.289 (0.218)	0.255** (0.057)	0.612** (0.048)	0.271** (0.054)	0.213** (0.053)
EU_{ijt}	−0.175 (0.198)	−0.096* (0.049)	−0.106 (0.060)	−0.122* (0.053)	−0.059 (0.048)
Wald test:					0.53/0.91
Overid. test:					6.08/0.11
N	6,873	3,339	8,042	8,042	7,100
Log-likelihood/ R^2	−6,253.9	0.656	−1,1691.8	−9,969.3	n.a.

$\text{Prob}(Y_n = y_n) = \frac{\exp^{-\lambda_n} \lambda_n^{y_n}}{y_n!}$ for $y_n = 0, 1, 2, \dots$ with $\ln(\lambda_n) = \beta'x_n$. Again, the estimated coefficient on the double tax variable is negative at -0.018 and statistically significant. Regression (8) generalizes the previous one by assuming that the dependent variable is distributed according to the negative binomial distribution and obtains similar results.

As discussed in Section IV.B, there is a possibility that tax policy is endogenous to the international pattern of M&As. In fact, changes in this pattern may prompt countries to change their tax policies to affect the number of M&As they are involved in as acquiring or target countries. Hence, $\tau_{ijt}^{\text{double}}$, τ_{it} , and τ_{jt} are potentially endogenous to the number of observed M&As. To adjust for this, we instrument these variables by their 1- and 2-year lagged values in a two-step instrumental variable Tobit regression.¹⁷ Standard errors are adjusted for variation from the first-step regression. The double tax variable now takes a statistically significant coefficient of -0.018 in regression (9). A Wald test of the hypothesis that $\tau_{ijt}^{\text{double}}$, τ_{it} , and τ_{jt} are exogenous cannot be rejected. Similarly, a test of the hypothesis that the instruments are valid cannot be rejected. Overall, this section's results show that international double taxation has a significant impact on parent firm location at the aggregate, national level. These results are robust to various changes in model specification and estimation technique.

VII. Conclusion

This paper shows that the international tax system affects the organizational outcomes of cross-border takeovers. Countries that impose high levels of international double taxation are less likely to attract the parent companies of newly created multinational firms. The organizational structure of multinational firms, of course, has important non-tax as well as tax implications. Specifically, the international organization of the firm implies cross-border relationships of ownership and control that are bound to affect the internal operation of the firm and the dealings of the firm with the affected national economies, for instance, in the form of employment. The sensitivity of organizational outcomes of cross-border takeovers to international double taxation suggests that this taxation may carry significant economic costs in distorting international relationships of ownership and control.

International double taxation comes in the form of nonresident dividend withholding taxes and parent country corporate income taxation of repatriated dividends. To reduce the potential for international double taxation to distort organizational structures, both forms of international double taxation should be lowered or eliminated. Nonresident dividend withholding taxes are already quite low for most countries in our sample due to the EU Parent-Subsidiary Directive. This directive, adopted in 1990, eliminates the taxation of intra-EU, intra-company dividend flows. Parent country corporate taxation of foreign-source income, however, is still substantial in the EU and elsewhere. The United

¹⁷ For further details on the instrumental variable estimation, see the Internet Appendix.

States, for example, maintains a system of worldwide taxation applied to the foreign-source income of U.S. multinationals. Recently, the President's Advisory Panel of Federal Tax Reform (2005) has advocated the elimination of worldwide taxation by the United States. Simulations presented in this paper suggest that the impact of such policy reform on the international patterns of parent country selection could be economically significant. We estimate that the proportion of U.S.-related cross-border takeovers resulting in an American parent company would increase from 53% to 58%. This figure is calculated based on the premise that systems of international taxation in other countries remain unchanged. A more general abandonment of worldwide taxation would, of course, give rise to a smaller redistribution of parent companies toward the United States, even if it would further reduce the potential for the international tax system to distort the parent company location choice.

Appendix: Variable Definitions and Data Sources

Variable	Description and Data Source
$\Delta\theta^{double}$	Difference between firms' double tax burden rates in percent after acquiring the other firm. The double tax burden is the additional double tax liability divided by the two firms' combined pre-tax income. The variable is measured in percentage points. Sources for corporate income tax rates: Chennells and Griffith (1997), Eurostat (2004), and KPMG International Tax and Legal Center (2003). Sources for tax regimes, tax treaties, and withholding taxes: Coopers & Lybrand (1998) and IBFD (2005a, 2005b, 2005c, 2005d). Previous issues of these publications were consulted as well. Sources for financial information: Thomson Financial's SDC Database, Compustat Global, and Compustat North America.
$\Delta\theta^{double,d}$	The part of $\Delta\theta^{double}$ that can be deferred in the case of non-repatriation of subsidiary profits. Sources as for the variable $\Delta\theta^{double}$ above.
$\Delta Size$	Difference in firms' assets divided by the sum of the merging firms' total assets in millions of U.S. dollars. Sources: Thomson Financial's SDC Database, Compustat Global, and Compustat North America.
$\Delta Liquidity$	Difference in firms' liquidity ratios (liquid assets/total assets). Sources: Thomson Financial's SDC Database, Compustat Global, and Compustat North America.
$\Delta Leverage$	Difference in firms' leverage ratios (total liabilities/total assets). Sources: Thomson Financial's SDC Database, Compustat Global, and Compustat North America.
$\Delta Fixedassets$	Difference in the firms' ratios of fixed assets over total assets. Sources: Thomson Financial's SDC Database, Compustat Global, and Compustat North America.
ΔROA	Difference in firms' profitability (net income / total assets). Sources: Thomson Financial's SDC Database, Compustat Global, and Compustat North America.
$\Delta Taxrate$	Difference in corporate income tax rates of the two countries. Sources: Chennells and Griffith (1997), Eurostat (2004), and KPMG International Tax and Legal Center (2003).
$\Delta Stockmarket$	Difference in stock market capitalizations of the two countries relative to the sum of the countries' stock market capitalizations lagged by 1 year. Source: World Development Indicators 2004, Worldbank (2004).

(continued)

Appendix—Continued

Variable	Description and Data Source
$\Delta Credit$	Difference in domestic credit to the private sector of the two countries divided by the summed volume of credit provision lagged by 1 year. Source: World Development Indicators 2004, Worldbank (2004).
$\Delta Exch. rate$	Difference in the two countries' changes of the real bilateral exchange rate in percentage points lagged by 1 year. Source: International Financial Statistics 2007, IMF (2007).
$\Delta Pretaxinc$	Difference in firms' pre-tax incomes divided by the sum of pre-tax income in millions of U.S. dollars, where nonpositive values of pre-tax income are replaced by 0.001 to avoid low values in the denominator. Sources: Thomson Financial's SDC Database, Compustat Global, and Compustat North America.
$\Delta Investment$	Difference in firms' investment activities as measured by the (negative) ratio of net cash flow from investment activities to total assets. A negative cash flow indicates a positive investment activity. Sources: Thomson Financial's SDC Database, Compustat Global, and Compustat North America.
MA_{ijt}	Frequency of cross-border mergers and acquisitions in the year t , in which the acquiring firm is located in country i and the target firm is located in country j . A transaction is included if the bidding firm acquires a controlling stake in the target firm. Source: Thomson Financial's SDC Database.
τ_{ijt}^{double}	Double tax rate for dividend income repatriated from country j to country i in year t . This rate includes the burden of withholding taxes. Sources as for the variable $\Delta \theta^{double}$ above.
D_{ij}	Dummy variable indicating potential deferral granted by acquiring country i of taxes on subsidiary's profits in country j . Data are for 2004. Sources as for the variable $\Delta \theta^{double}$ above.
τ_{it}	Corporate income tax rate in the acquiring country i . Sources as for the variable $\Delta \theta^{double}$ above.
τ_{jt}	Corporate income tax rate in the target country j . Sources as for the variable $\Delta \theta^{double}$ above.
$Distance_{ij}$	Distance in miles between the capital of acquiring firms' country i and the capital of target firms' country j (logarithm). Source: Rose (2000).
GDP_{it}	Gross domestic product of the acquiring country in constant 1995 U.S. dollars (logarithm). Source: World Development Indicators 2004, Worldbank (2004).
GDP_{jt}	Gross domestic product of the target country in constant 1995 U.S. dollars (logarithm). Source: World Development Indicators 2004, Worldbank (2004).
$GDPpercap_{it}$	Income per capita of the acquiring country (logarithm). Source: World Development Indicators 2004, Worldbank (2004).
$GDPpercap_{jt}$	Income per capita of the target country (logarithm). Source: World Development Indicators 2004, Worldbank (2004).
$(Stocks/GDP)_{it-1}$	Ratio of stock market capitalization to GDP of the acquiring country (logarithm). Source: World Development Indicators 2004, Worldbank (2004).
$(Credit/GDP)_{it-1}$	Ratio of domestic credit to the private sector to GDP of the acquiring country (logarithm). Source: World Development Indicators 2004, Worldbank (2004).

(continued)

Appendix—Continued

Variable	Description and Data Source
$\Delta Exch.rate_{ijt-1}$	Change in the logarithm of the real bilateral exchange rate between countries i and j between year $t - 1$ and year $t - 2$. Source: International Financial Statistics 2007, IMF (2007).
$Tariffs_{jt}$	Mean tariff rate of target country (logarithm). Source: Gwartney and Lawson (2005).
$Controls_{jt}$	Index of the number of capital controls in the target country based on 13 types of capital controls reported by the IMF. The original index is inverted such that a higher index corresponds to more capital controls. Source: Gwartney and Lawson (2005).
$Border_{ij}$	Dummy variable indicating whether acquiring country i and target country j have a common land border. Source: Rose (2000).
$Language_{ij}$	Dummy variable indicating whether acquiring country i and target country j share a common language. Source: Rose (2000).
EU_{ijt}	Dummy variable indicating whether acquiring country i and target country j were both members of the European Union in year t . Source: Rose (2000).
$Legalquality_{jt}$	Indicator for the quality of legal structure and the security of property rights in the target country. The definition of the variable was broadened in 1995. Values between 1985 and 1990 and between 1990 and 1995 have been interpolated. Source: Gwartney and Lawson (2005).

REFERENCES

- Altshuler, Rosanne, Harry Grubert, and T. Scott Newlon, 2001, Has U.S. investment abroad become more sensitive to tax rates? In James R. Hines, Jr., ed.: *International Taxation and Multinational Activity* (University of Chicago Press, Chicago).
- Ayers, Benjamin C., Craig E. Lefanowicz, and John R. Robinson, 2003, Shareholder taxes in acquisition premiums: The effect of capital gains taxation, *Journal of Finance* 58, 2783–2801.
- Blonigen, Bruce A., 1997, Firm-specific assets and the link between exchange rates and foreign direct investment, *American Economic Review* 87, 447–465.
- Bogenschütz, Eugen, and Kelly Wright, 2000, Daimler-Chrysler merger, *International Tax Review*, February issue.
- Boskin, Michael J., and William G. Gale, 1987, New results on the effects of tax policy on the international location of investment, in Martin Feldstein, ed.: *The Effects of Taxation on Capital Accumulation* (University of Chicago Press, Chicago).
- Bris, Arturo, and Christos Cabolis, 2008, The value of investor protection: Firm evidence from cross-border mergers, *Review of Financial Studies* 21, 605–648.
- Buch, Claudia M., Jorn Kleinert, and Farid Toubal, 2004, The distance puzzle: On the interpretation of the distance coefficient in gravity equations, *Economics Letters* 83, 293–298.
- Chamberlain, Gary, 1980, Analysis of covariance with qualitative data, *Review of Economic Studies* 47, 225–238.
- Chennells, Lucy, and Rachel Griffith, 1997, *Taxing Profits in a Changing World* (The Institute for Fiscal Studies, London).
- Comment, Robert, and G. William Schwert, 1995, Poison or placebo? Evidence on the deterrence and wealth effects of modern antitakeover measures, *Journal of Financial Economics* 39, 3–43.
- Coopers & Lybrand, 1998, *International Tax Summaries: A Guide to Planning and Decisions (1985–1998)* (John Wiley & Sons, Chichester).
- Desai, Mihir A., and James R. Hines, Jr., 2002, Expectations and expatriations: Tracing the causes and consequences of corporate inversions, *National Tax Journal* 55, 409–440.
- Desai, Mihir A., and James R. Hines, Jr., 2004, Old rules and new realities: Corporate tax policy in a global setting, *National Tax Journal* 55, 937–960.

- Devereux, Michael P., and Rachel Griffith, 1998, Taxes and the location of production: Evidence from a panel of U.S. multinationals, *Journal of Public Economics* 68, 335–367.
- Di Giovanni, Julian, 2005, What drives capital flows? The case of cross-border M&A activity and financial deepening, *Journal of International Economics* 65, 127–149.
- Dyck, Alexander, and Luigi Zingales, 2004, Private benefits of control: An international comparison, *Journal of Finance* 59, 537–600.
- Eurostat, 2004, *Structures of the Taxation Systems in the European Union* (Office for Official Publications of the European Communities, Luxembourg).
- Evenett, Simon J., 2003, Do all networks facilitate international commerce? U.S. law firms and the international market for corporate control, *Journal of the Japanese and International Economies* 17, 520–537.
- Greene, William H., 2008, *Econometric Analysis* (Prentice-Hall, Upper Saddle River, NJ).
- Grubert, Harry, and John H. Mutti, 1991, Taxes, tariffs and transfer pricing in multinational company decision making, *Review of Economics and Statistics* 73, 285–293.
- Gwartney, James D., and Robert A. Lawson, 2005, *Economic Freedom of the World: 2005 Annual Report* (The Fraser Institute, Vancouver).
- Hartman, David G., 1984, Tax policy and foreign direct investment in the United States, *National Tax Journal* 37, 475–487.
- Hines, Jr., James R., 1994, Credit and deferral as international investment incentives, *Journal of Public Economics* 55, 323–347.
- Hines, Jr., James R., 1996, Altered states: Taxes and the location of foreign direct investment in America, *American Economic Review* 86, 1076–1094.
- Hines, Jr., James R., and Eric M. Rice, 1994, Fiscal paradise: Foreign tax havens and American business, *Quarterly Journal of Economics* 109, 149–182.
- International Bureau of Fiscal Documentation (IBFD), 2005a, *Corporate Investment Income* (IBFD Publications, Amsterdam).
- International Bureau of Fiscal Documentation (IBFD), 2005b, *Corporate Taxation in Europe* (IBFD Publications, Amsterdam).
- International Bureau of Fiscal Documentation (IBFD), 2005c, *IBFD Tax Treaties Database* (IBFD Publications, Amsterdam).
- International Bureau of Fiscal Documentation (IBFD), 2005d, *Taxation & Investment in Central and Eastern European Countries* (IBFD Publications, Amsterdam).
- International Monetary Fund (IMF), 2007, *International Financial Statistics* (IMF, Washington, DC).
- KPMG International Tax and Legal Center, 2003, *KPMG's Corporate Tax Rate Survey 1998–2003* (KPMG International).
- La Porta, Rafael, Florencio Lopez de Silanes, Andrei Shleifer, and Robert W. Vishny, 2002, Investor protection and corporate valuation, *Journal of Finance* 57, 1147–1170.
- McFadden, Daniel, 1973, Conditional logit analysis of qualitative choice behavior, in Paul Zarembka, ed.: *Frontiers in Econometrics* (Academic Press, New York).
- Mitchell, Mark L., and J. Harold Mulherin, 1996, The impact of industry shocks on takeover and restructuring activity, *Journal of Financial Economics* 41, 193–230.
- Newlon, T. Scott, 1987, Tax policy and the multinational firm's financial policy and investment decisions, Ph.D. dissertation, Princeton University.
- Organisation for Economic Co-operation and Development (OECD), 2005, *Model Tax Convention on Income and on Capital* (OECD, Paris).
- Portes, Richard, and Helene Rey, 2005, The determinants of cross-border equity flows, *Journal of International Economics* 65, 269–296.
- President's Advisory Panel on Federal Tax Reform, 2005, *Simple, Fair & Pro-Growth: Proposals to Fix America's Tax System* (U.S. Government Printing Office, Washington, DC).
- Rajan, Raghuram G., and Luigi Zingales, 1995, What do we know about capital structure? Some evidence from international data, *Journal of Finance* 50, 1421–1460.
- Rose, Andrew K., 2000, One money, one market: Estimating the effect of common currencies on trade, *Economic Policy* 15, 8–45.

- Rossi, Stefano, and Paolo F. Volpin, 2004, Cross-country determinants of mergers and acquisitions, *Journal of Financial Economics* 74, 277–304.
- Slemrod, Joel, 1990, Tax effects on foreign direct investment in the United States: Evidence from a cross-country comparison, in Assaf Razin, and Joel Slemrod, eds.: *Taxation in the Global Economy* (University of Chicago Press, Chicago).
- United Nations Conference on Trade and Development, 2000, *World Investment Report 2000: Cross-border Acquisitions and Development* (United Nations, New York and Geneva).
- United Nations Conference on Trade and Development, 2005, *World Investment Report 2005: Transnational Corporations and the Internationalization of R&D* (United Nations, New York and Geneva).
- Wei, Shang-Jin, 2000, How taxing is corruption on international investors? *Review of Economics and Statistics* 82, 1–11.
- Worldbank, 2004, *World Development Indicators* (Worldbank, Washington, DC).
- Young, Kan H., 1988, The effects of taxes and rates of return on foreign direct investment in the United States, *National Tax Journal* 41, 109–121.