

# HEADQUARTER RELOCATIONS AND INTERNATIONAL TAXATION

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# Headquarter Relocations and International Taxation

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## **Abstract**

This paper examines the extent of international headquarter relocations worldwide. About 6 percent of all multinationals relocated their headquarter to another country in the 1997-2007 period. The paper presents empirical evidence on the role of tax in these relocation decisions. It considers a sample of 140 multinationals that relocated their headquarters over the past decade and compares them to a control group of 1943 multinationals that have not done so. It is found that the additional tax due in the home country upon repatriation of foreign profits has a positive effect on the probability of relocation. The empirical results suggest that an increase in the repatriation tax by 10 percentage points would raise the share of relocating multinationals by 2.2 percentage points, equivalent to an increase in the number of relocations by more than one third. Furthermore, the introduction of controlled foreign corporation legislation also has a positive effect on the number of relocations.

*Keywords:* international taxation, headquarter relocation, multinational, corporate inversion, controlled foreign corporation

*JEL classifications:* F23, H25, H32

# 1 Introduction

On 15 april 2008, the FTSE 100 pharmaceutical group Shire announced moving its headquarter from Basingstoke, U.K. to Dublin, Ireland. It came as a shock that such a prominent company of British origin would report the firm without much hesitation to become a foreign multinational and many people wondered if the country had lost its competitive edge in attracting business. These worries only increased as it turned out that the relocation of Shire was not a unique case. About a dozen companies followed suit in the course of the year. Many observers argued that the firms were attracted to Ireland by the lack of controlled foreign corporation (CFC) legislation, which is employed by other countries to counter abusive deferral or profit shifting by multinational groups. The U.K. authorities, on the other hand, had proposed more stringent CFC rules that would have resulted in taxation of large parts of worldwide passive income on accrual. The U.K. government quickly caved in and shelved the controversial parts of its tax reform.

These events illustrate the additional challenge that policy makers face if a multinational's domicile cannot be taken for granted. Not only do they have to take into account that multinationals can shift investment, jobs, and profits across borders, but they also have to consider that firms may vote with their feet and relocate headquarters if they are discontent with the policy package they are presented with. Hence, it becomes essential for effective policy formation to better understand the degree of headquarter mobility and the extent to which international tax policy affects headquarter relocation decisions.

The purpose of this paper is, first, to measure the mobility of multinational headquarters across borders, taking into account that corporate inversions — like Shire's headquarter relocation described above — are just a special case of cross-border mergers and acquisitions (M&As) in general. In our dataset, about 6 percent of multinationals relocated headquarters across borders in the 1997-2007 period.

We compare multinationals that relocated headquarters abroad to their immobile counterparts by means of binary regression techniques. We investigate to which extent the observed

relocations exhibit a tax avoidance motive. Two hypotheses are tested for in particular. First, headquarter relocations may serve to avoid CFC rules because they constrain a multinational's ability to defer taxes and shift profits within the group. The effect of CFC rules is identified by exploiting variation in the introduction dates of CFC legislation across countries. The empirical results support this first hypothesis as they indicate that the introduction of CFC legislation increases the probability of relocating headquarters.

Second, headquarter relocations may serve to avoid residual taxes. These are imposed on foreign profits by the multinational's home country in addition to the taxes that have already been paid in the country where the profits originally accrued. In order to identify the effect of residual taxes on headquarter relocation, two groups are distinguished: on the one hand, multinationals from countries that tax worldwide profits and provide credits for taxes paid abroad and, on the other hand, multinationals from countries that exempt foreign-source profits from taxation. The latter serve as a control group as they are not subject to residual taxation. For the former group, low tax burdens of foreign subsidiaries proxy for high residual taxation in the home country because the corresponding foreign tax credits fall short of the home country's tax claim on foreign profits. The empirical analysis finds that multinationals with low-taxed foreign subsidiaries are more likely to relocate their headquarters if they reside in countries with tax credit systems. This effect is absent for the control group of multinationals from exemption countries. These findings support the hypothesis that headquarter relocations are at least partly driven by the objective to avoid residual taxes.

The paper proceeds as follows: Section 2 frames the research question in the relevant previous literature. Section 3 reports the scope of multinational headquarter relocations and describes the dataset. Section 4 specifies the tax incentives that affect the choice of location for multinational headquarters. Section 5 develops the empirical approach; the empirical results are discussed in Section 6. Finally, Section 7 offers a conclusion.

## 2 Previous literature

Between 1999 and 2002, the U.S. experienced a wave of corporate inversions in which U.S. multinationals engaged in artificial M&A transactions with the sole purpose of relocating their headquarters abroad. In these transactions, a new foreign parent company is put on top of the multinational's corporate structure without a change in ultimate shareholders. The previous U.S. headquarter becomes a subsidiary. Other parts of the multinational may also come under direct control of the new parent firm. The new structure may enable the multinational to bypass residual taxation in the U.S. when repatriating foreign profits to the ultimate parent firm. Initially, the administration was not too worried about corporate inversions as it perceived the inverting firms as trying to create a level playing field with competitors from countries with a territorial tax system that exempt foreign profits from taxation. This point of view is exemplified by Boise and Koenig (2002).

Subsequently, however, concerns emerged that the inverting firms were rather trying to dodge the constraints of CFC legislation and interest allocation rules. Sheppard (2002) and Thompson (2002) represent this point of view, arguing that the true cause of inversions lies in the desire to evade CFC rules which result in non-deferral of taxes on foreign-source passive income and which hamper profit shifting from the U.S. (or other high tax locations) by means of interest stripping or royalty payments. Following a report by the Department of the Treasury (2002) and several House and Senate hearings, the U.S. has repeatedly enacted legislation with the purpose to inhibit these corporate inversions without impeding 'proper' cross-border mergers and acquisitions.<sup>1</sup> So far, this reaction appears to have prevented any further corporate inversions after 2002.

Desai and Hines (2002) empirically examine the role of taxation in 26 corporate inversions of U.S. multinationals in the 1982–2002 period. They show that the foreign subsidiaries of inverting firms typically face low tax rates which supports the hypothesis that inverting firms

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<sup>1</sup>See the Corporate Patriot Enforcement Act of 2002, H.R. 3884, 107th Cong.; the Save America's Jobs Act of 2002, H.R. 3922, 107th Cong.; the Uncle Sam Wants You Act of 2002, H.R. 4756, 107th Cong.; and the No Tax Breaks for Corporations Renouncing America Act of 2002, H.R. 4993, 107th Cong.; and the American Jobs Creation Act of 2004 (Harvard Law Review, 2005).

seek to avoid residual taxation in the U.S. Furthermore, they find larger firms and highly leveraged firms more likely to expatriate. The latter may be explained by U.S. firms having to partly allocate domestic expenses like interest charges against foreign income. Hence, these expenses become non-deductible. The deductability of interest payments as an incentive for headquarter relocation is further emphasized by Seida and Wempe (2004) who examine the financial consequences of 12 corporate inversions. They find that firms' effective tax rates decline substantially following inversion due to U.S. earnings strippings, in particular via intercompany debt.

The present paper contributes to this literature by broadening the focus from corporate inversions to multinational headquarter relocations in general. As the U.S. example illustrates, it may be feasible to prevent corporate inversions from occurring. However, the incentives for headquarter relocation still persist and their effects may spill over into general cross-border M&A transactions, which governments may be hesitant to interfere with. The question is whether the incentives that cause corporate inversions — either avoiding residual home country taxation or constraining CFC rules — are sufficiently strong to have an impact on headquarter relocations that take place via regular M&As.

A related question is addressed by Huizinga and Voget (2009): cross-border mergers create new frictions in the form of double taxation of dividend flows between the two merging entities. They show that cross-border M&As tend to take the form that minimizes the additional burden.<sup>2</sup> However, they do not address the question if a given multinational is more or less likely to engage in cross-border M&As due to its current corporate structure or location.

Other studies, such as Holloway and Wheeler (1991), Shilton and Stanley (1999), Strauss-Kahn and Vives (2005), Lovely et al. (2005), and Davis and Henderson (2008), consider national (sub-) headquarter relocations or agglomerations. However, they focus exclusively on headquarter and subsidiary headquarter relocations on the national level, mostly in the U.S.

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<sup>2</sup>More specifically, a country's likelihood of hosting the headquarter following a merger between a domestic firm and a foreign firm decreases if the country imposes high double taxation on foreign source income. This firm-level observation is reflected in aggregate cross-border M&A numbers: Acquirers are less active in those foreign countries from which dividend repatriations would incur relatively high double taxes.

### 3 Survey of headquarter relocations and data description

The dataset for the empirical analysis is drawn from the database Orbis which contains extensive financial and ownership information for firms worldwide. The ownership information allows the linking of parent firms to domestic and foreign subsidiaries, which may be owned directly or through chains of ownership.<sup>3</sup> For the purpose of this study, a headquarter firm is defined as the residence of a firm for which the majority of shares are owned by individuals (and not by corporate entities).<sup>4</sup> These headquarter firms are relevant because it is the place where a group's profits leave the corporate sector and enter personal income as dividends are paid out. Headquarter firms are defined as multinational if they control at least one foreign subsidiary. Based on these definitions, columns (1), (2) and (3) in Table 1 report the number of firms, headquarter firms, and multinational headquarter firms per country registered by Orbis in the year 2005.<sup>5</sup> Only firms with total assets of at least 2 million Euro are taken into account.

Headquarters relocate to another country either if a headquarter firm sells its assets to a foreign company or alternatively if the firm's shareholders sell their shares to a foreign company in exchange for shares or in exchange for cash. Similar to the corporate inversions described previously, the multinational group is subsequently controlled by a foreign headquarter firm. Such cross-border M&A transactions are covered by the Zephyr database, which allows the tracking down of the multinationals whose headquarter relocated to another country. Column (4) in Table 1 reports the number of relocating multinational headquarters in the period between 1997 and 2007 that were registered by the M&A database Zephyr and that could be linked via company identifiers to financial information in the Orbis database. Comparing the number of relocating multinational headquarters to the immobile stock of multinationals

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<sup>3</sup>Only majority-owned subsidiaries are taken into account when constructing groups of firms. A subsidiary is majority-owned if the indirect share of ownership is greater than 50 percent.

<sup>4</sup>Orbis reports one residence per firm. Hence, it must be assumed that the place of incorporation and the tax residence coincide at that address.

<sup>5</sup>Only countries with at least one relocating multinational are listed. The balance sheet data extends only up to 2005, but 87 multinationals relocated between 2005 and 2007. In order to allow a comparison of relocating to immobile headquarters from the perspective of 2007, these multinationals are not listed in column (3) but in column (4) together with the multinationals that relocated prior to 2005.

(column 3 and 4 in Table 1) shows that from 1997 until 2007 about six percent of all multinationals relocate their headquarter to another country.<sup>6</sup> To give a more detailed perspective, Table 2 shows a cross table linking the country of origin and the country of destination for multinational headquarter relocations for the most relevant countries.

The 5768 firm groups that can be identified as multinationals in the Orbis database constitute the population for the empirical analysis. The necessary distinction between headquarter entities and foreign subsidiaries requires unconsolidated financial reporting and balance sheet plus earnings information for at least one foreign subsidiary. This reduces the sample size to 2083 multinationals, of which 140 relocate their headquarter to another country. The financial data for relocating firms are drawn from the financial report one year prior to the headquarter relocation.<sup>7</sup> For the control group of non-relocating firms, financial data are taken from a financial report drawn at random from the years 1996 – 2005.

The headquarter relocations registered by the Zephyr database generally encompass changes in the ultimate shareholder structure. That distinguishes these data from the corporate inversions considered by Desai and Hines (2002) or Seida and Wempe (2004) which are a special case of headquarter relocations because the acquiring foreign firm has in the end the same shareholders as the previous headquarter firm. Broadening the focus from corporate inversions to general cross-border M&As is desirable because the important question here is whether the tax-related incentives that have been found to motivate corporate inversions are also relevant for regular M&A transactions. The tax incentives that affect multinational headquarter location decisions are explained in more detail in the following section.

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<sup>6</sup>Unfortunately, we have no data on the growth of stock of multinational firms. A growing number of observations in the Orbis database over time may be attributed to a better data coverage or to a genuine growth in the stock of firms.

<sup>7</sup>The announcement date of the corresponding M&A transaction is taken to be the relevant date. Relocations announced in 2007 are associated with financial reports from 2005 as this is the last available year for financial reports in the data.

## 4 Headquarter location and international taxation

Suppose multinational  $i$  has its headquarter firm in home country  $h$  and a subsidiary firm in country  $f$ . In principle, the home country has the right to tax the multinational's overall income on a worldwide basis.<sup>8</sup> In practice, however, some countries only tax a multinational's domestically generated income on a territorial basis. The selection of the headquarter location thus affects whether the multinational's income generated outside the home country is potentially subject to additional taxation by the home country.

Income generated in subsidiary country  $f$  is first taxed in that country at an effective corporate tax rate  $\tau_i^f$ , leaving a share  $1 - \tau_i^f$  of this income to be reinvested or repatriated to the parent firm in the form of dividends. The effective tax rate  $\tau_i^f$  differs from the statutory corporate tax rate conditional on firm-specific circumstances like capital intensity.<sup>9</sup>

Home country  $h$  potentially taxes the headquarter firm's foreign dividend income at a corporate tax rate  $\tau^h$ . In practice, however, most countries provide some form of international double tax relief. If the home country operates a territorial or source-based tax system, it effectively exempts foreign-source income from taxation. In this instance, there is no double taxation. Alternatively, the home country operates a worldwide or residence-based system. In this instance, the home 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  $f$ . 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.<sup>10</sup>

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<sup>8</sup>Strictly speaking, the home country only has the right to tax entities within its borders: hence, the headquarter firm and national subsidiaries. However, under certain conditions provided by controlled foreign corporation rules, the home country can tax the headquarter directly for profits accumulated in foreign subsidiaries which are deemed to be under the control of the headquarter — even if the foreign profits have not been repatriated yet.

<sup>9</sup>The subsidiary country  $f$ , in addition, may apply a non-resident dividend withholding tax to dividends repatriated to country  $h$  at a rate  $\omega^{hf}$ . There are too many bilateral relationships in the current dataset to take withholding taxes into account. This should have only minor effects on the empirical results as most relationships are covered by double tax treaties which provide for very low or zero withholding tax rates for substantial shareholdings. See Huizinga and Voget (2009) for the applicable withholding taxes between 30 countries including the U.S., Japan and most European countries.

<sup>10</sup>See OECD (2005) for a recent version of the model tax convention.

The foreign tax credit reduces domestic taxes on foreign source income one-for-one with the taxes already paid abroad. Foreign tax credits in practice are limited to prevent the domestic tax liability on foreign source income from becoming negative. The multinational  $i$  is in an excess tax credit position and pays no additional tax in the home country if  $\tau_i^f \geq \tau^h$ . In all other cases, the double tax rate with respect to the foreign pretax profit equals  $\tau^h - \tau_i^f$ . With more than one foreign subsidiary, the multinational can be in an excess tax credit position with respect to some subsidiaries but not with respect to others. Generally, however, tax averaging across subsidiaries is implicitly or explicitly allowed for so that foreign subsidiaries' tax payments and profits are aggregated before tax credits are calculated.<sup>11</sup> In that case, the multinational does not pay any double tax if  $\bar{\tau}_i^f \geq \tau^h$ , where  $\bar{\tau}_i^f$  is the foreign subsidiaries' average effective tax rate of multinational  $i$ . In all other cases, the double tax rate equals  $\tau^h - \bar{\tau}_i^f$ . Hence, the double tax burden is firm-specific and inversely related to  $\bar{\tau}_i^f$ . This firm-specific variation is exploited in the empirical analysis to identify the effect of residual taxation.

Table 3 reports statutory corporate income tax rates in 2005 and the method of double tax relief that home countries generally apply to dividend repatriations from countries with which a tax treaty has been concluded. Generally, countries do not vary the method of relief across countries with established tax treaties.<sup>12</sup> As a rough guide, smaller countries tend to exempt dividend repatriations whereas larger countries tend to provide foreign tax credits as double taxation relief. Furthermore, most European continental countries tend to exempt dividend repatriations.<sup>13</sup>

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<sup>11</sup>The U.S. used to hamper tax averaging somewhat by allocating foreign subsidiaries' income into nine different "baskets" conditional on certain income and subsidiary characteristics. Tax averaging only applied within each basket but not across baskets. (See Grubert et al. (2005) for more detail.) Since 2007, the number of baskets has been reduced to two — an active and a passive income basket — which decreases the risk of having excess tax credits in one of the baskets. The U.K. explicitly allowed on-shore pooling of dividend streams in 2001. Before, U.K. multinationals achieved tax averaging by pooling dividend streams abroad in so-called "mixer companies" before eventual repatriation to the U.K. Ireland has always allowed on-shore dividend pooling. Japan also allows tax averaging as it gives tax credits on an overall basis (in contrast to giving tax credits according to a country-by-country approach).

<sup>12</sup>Note that the method of double tax relief for dividends is not solely determined by the tax treaty itself. The domestic tax code may provide more generous double tax relief, although the domestic rules may be conditional on the existence of a double tax treaty. For example, Canada, Finland and Spain exempt foreign subsidiaries' dividends from taxation conditional on the existence of a tax treaty.

<sup>13</sup>Russia switched from providing foreign tax credits to exempting dividend repatriations in 2007.

Without special legislation, countries only tax domestic entities' income. Taxation of foreign subsidiaries' profits is deferred until they are repatriated to domestic entities. It is an empirical question by how much the option of deferral alleviates the burden of additional home country taxation. On the one hand, dividend repatriations increased eightfold when the U.S. temporarily exempted foreign-source dividends for 85 percent from taxation in the framework of the American Jobs Creation Act 2004. The large increase signals that the credit and deferral system represents a binding constraint for U.S. multinationals. On the other hand, Altshuler and Grubert (2002) argue that the burden of residual taxation of foreign-source dividends is rather small. (Eventually, the alleviating character of deferral should be captured in the empirical analysis by weaker coefficients than in the absence of deferral.)

Countries can restrict the potential abuse of deferral by enacting CFC rules. These provide conditions under which the parent firm is taxed on specific kinds of foreign subsidiaries' profits even when no repatriation takes place. Many countries that generally exempt foreign-source dividends from taxation have enacted CFC legislation as well. For these countries, CFC rules are naturally not meant to restrict deferral but they are supposed to protect the country's tax base against profit shifting. Under certain conditions, CFC legislation causes foreign subsidiary income to be taxed on accrual instead of being exempted as usual. In this manner, the CFC rules act as a backstop to imperfect transfer pricing regulations and thin capitalization rules.<sup>14</sup>

The typical CFC legislation is targeted at foreign subsidiaries' "tainted income": normally passive income such as dividends, income from interest or royalties, or capital gains. The definition of tainted income could be further restricted (by excluding certain categories of passive income) or extended (by including profits from intra-group transactions or profits that are not locally sourced).

The scope of CFC rules can also be restricted by specifying country- or subsidiary-specific conditions which must be satisfied before CFC rules apply. Table 4 summarizes these necessary conditions for existing CFC legislations. Every row in Table 4 represents one CFC rule

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<sup>14</sup>This aspect of CFC rules is, of course, not only appreciated by exemption countries but also by foreign tax credit countries.

and all listed conditions have to be satisfied before the CFC legislation triggers taxation of subsidiary profits at the parent firm level. Several countries appear more than once in Table 4 because they have more than one CFC rule operating simultaneously.

Column (1) indicates if a black- or whitelist is employed to identify low-tax jurisdictions.<sup>15</sup> Similarly, column (2) reports if there exists a minimum tax burden at which subsidiary income should be taxed. CFC rules do not apply if that standard is met. Such a minimum tax can be defined as an absolute threshold or relative to the home country's tax rate. Furthermore, tainted income may have to surpass thresholds relative to a subsidiary's profit or sales before CFC rules apply. These thresholds are reported in columns (3) and (4). Instead of specifying a specific threshold, CFC rules may test the general nature of a subsidiary's economic activity. In this case, CFC rules do not result in taxation if the subsidiary's "main" business is judged to be untainted. Column (5) indicates the existence of such a test. Besides the conditions listed in columns (1)–(5), a test of control also has to be satisfied before CFC rules take effect. This ensures that the parent firm indeed exerts sufficient control over the foreign subsidiary. If CFC rules take effect, the parent firm is often only taxed on the tainted share of subsidiary's profits and tax credits for foreign taxes paid are provided. In some cases, as indicated by column (6) of Table 4, the parent firm is taxed on the subsidiary's total profits — active income as well as passive income. Column (7) reports CFC rule characteristics which do not fit into the categories described above but have a strong impact on the scope or sensitivity of CFC rules. Finally, the description of CFC rules is completed by Table 5 which contains the complementary details.

Exit taxes are another class of taxes that matter for headquarter relocation decisions. First, there can be exit taxes at the level of the shareholder. Control over the multinational passes to the new headquarter firm as it acquires the previous parent firm. Existing shareholders exchange their shares in the multinational for shares in the new parent firm or for cash. The potential capital gains tax works as an exit tax which may prevent some headquarter

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<sup>15</sup>A greylist is comparable to a whitelist although it imposes additional conditions on the legal type of firm before subsidiaries are disregarded for CFC purposes.

relocations.<sup>16</sup> After the new parent firm is put on top of the ownership tree, the multinational may want to reorganize in order to bypass the former headquarter location when repatriating dividends to the new parent firm. If the capital gains taxes on such intra-group transfers of assets are not waived, they work as an exit tax that may prevent the headquarter relocation in the first place.<sup>17</sup> This exit tax is less effective if the repatriation of foreign profits can be accomplished via interest or royalty payments that bypass the former parent firm. A reorganization of subsidiary ownership is not necessary in this case. The following empirical analysis does not take exit taxes explicitly into account. Instead, they are controlled for by country-, year-, or country/year pair-specific effects.

## 5 Empirical specification

The previous discussion of international taxation has identified two particular incentives for which multinationals may want to relocate their headquarters across borders. First, multinationals have an incentive to avoid CFC rules that constrain their ability to defer taxes and shift profits within the group. Second, multinationals from tax credit countries have an incentive to avoid residual taxes on their foreign-source dividends. This section introduces the empirical specification that is used to test whether these two incentives are reflected in the decisions to relocate headquarters

The dependent variable  $y_i$  takes the value one if multinational  $i$  relocated its headquarter to another country between 1997 and 2007. Otherwise the value is zero. The summary statistics in Table 6 show that about 6.7 percent of the observations relocate headquarters.

The conditional probability of headquarter relocations is estimated by way of the following

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<sup>16</sup>Alternatively, the previous parent firm may sell its assets directly to the new parent firm, but capital gains taxes are then incurred at the corporate level.

<sup>17</sup>The following serves as a specific example of exit taxes at different levels. In 1996, the U.S. adjusted the Internal Revenue Code Sec. 367 so that U.S. shareholders have to recognize a capital gain on the transfer of shares to a foreign corporation if the transferors own more than 50 percent of the foreign corporation's stock after the transaction. A further exit tax was introduced by the American Jobs Creation Act of 2004, which provided that — following an acquisition of a U.S. firm — the foreign parent is treated as a domestic corporation if it is at least 80 percent owned by the former target firm's stockholders. This would cancel the tax benefits of inversions. If former target firm's stockholders own at least 60 percent but less than 80 percent of the foreign parent firm, taxes on intra-group transfers of assets to the foreign parent firm cannot be offset by foreign tax credits or net operating losses.

logistic regression model

$$Pr[y_i = 0|x_i] = \frac{\exp(x_i'\beta)}{1 + \exp(x_i'\beta)}, \quad (1)$$

where  $x_i$  is a vector of explanatory variables described in the following and  $\beta$  is the corresponding vector of coefficients, which is estimated by maximum likelihood.

The first variable of interest is the average effective tax rate of a multinational's foreign subsidiaries,  $\bar{\tau}_i^f$ , which is defined as the aggregate tax payments of foreign subsidiaries divided by the aggregate pretax profits of foreign subsidiaries.<sup>18</sup> As described in the previous section,  $\bar{\tau}_i^f$  is the appropriate measure in the presence of numerous foreign subsidiaries because tax averaging is generally allowed for in determining foreign tax credits. Low values of  $\bar{\tau}_i^f$  correspond to high residual taxes on foreign-source dividends for multinationals residing in tax credit countries. For this group, the coefficient of  $\bar{\tau}_i^f$  should exhibit a negative coefficient if the incentive to avoid residual taxes contributes towards headquarter relocations. No such effect is expected for multinationals from exemption countries. In order to allow for different coefficients between the two groups, the variable  $\bar{\tau}_i^f$  is interacted with the dummy variables  $E_i$  and  $C_i$  which are binary variables that indicate if a multinational resides in an exemption ( $E_i = 1$ ) or credit country ( $C_i = 1$ ). Including multinationals from exemption countries as a control group serves to validate whether  $\bar{\tau}_i^f$  is indeed a proxy for residual taxation of repatriated profits. In this case, the variable should only affect the treatment group of multinationals from credit countries and not the control group of multinationals from exemption countries. However, if the effect of  $\bar{\tau}_i^f$  is similar for both groups, it captures some other firm-specific effect which is not related to residual taxation of foreign profits.

The imputed tax rate  $\bar{t}_i^f$  becomes infeasible if the numerator of the tax rate is negative, or the denominator of the tax rate is non-positive, or if the implied tax rate is above 100 percent. In these cases,  $\bar{t}_i^f$  is set to zero and three dummy variables are introduced to distinguish the cause of the problem. The variable  $NegTax_i$  takes the value one if the sum of the foreign

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<sup>18</sup>The accounting measure of taxation serves as a proxy for taxes actually paid for which information is lacking.

subsidiaries' tax payments is negative. The variable  $NegProfit_i$  takes the value one if the sum of the foreign subsidiaries' pretax profits is negative. The variable  $Xrate_i$  equals one if the implied tax rate is above 100 percent.

The second variable of interest is the binary variable  $CFC_i$  which indicates the presence of CFC legislation in a multinational's home country. The variable is equal for all multinationals from the same country and year. As explained previously, CFC rules may enforce taxation of foreign profits on accrual or constrain a multinational in its profit shifting activities. Hence, the variable  $CFC_i$  should exhibit a positive coefficient if the incentive to avoid CFC rules is reflected in the decision to relocate headquarters abroad.

Furthermore, all specifications include the following control variables.  $Size_i$  is the logarithm of the multinational's total turnover and controls for firm size. In the study by Desai and Hines (2002) firm size had a positive effect on the likelihood to relocate headquarters.  $Leverage_i$  is the ratio of long term debt to total assets. In Desai and Hines's study, high leverage had a positive effect on relocations which they attributed to U.S. multinationals having to allocate their interest costs partly against foreign source profits. The variable  $EoA_i$  represents earnings over total assets and controls for a multinational's profitability. Including this variable ensures that the imputed tax rates do not accidentally proxy for profitability as profitable firms tend to exhibit higher imputed tax rates. Finally,  $Hightech_i$  is a dummy variable indicating that a firm's core business is categorized as knowledge-intensive or high technology industry according to OECD and Eurostat classifications. Controlling for this variable ensures that the potential relationship between headquarter mobility and taxation of foreign profits is not simply caused by firms in the high-tech sector. These firms may exhibit a different degree of mobility as well as lower taxes on foreign profits due to the prominent role of intangible assets.<sup>19</sup> Table 6 contains the summary statistics for the whole sample, Table 7 splits the summary statistics with respect to relocating and non-relocating multinationals. The description of the variables and data sources can be found in Table 8.

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<sup>19</sup>For example, Grubert (2003) finds that income derived from R&D based intangibles accounts for about half of the income shifted from high-tax to low-tax countries.

## 6 Empirical results

Regression (1) in Table 9 does not distinguish between multinationals from credit and exemption countries. The variable  $\bar{t}_i^f$ , which measures the average effective tax rate of foreign subsidiaries, has only an insignificant effect on the probability to relocate headquarters.

Regression (2) allows for a different effect of that variable conditional on the multinational residing in a credit or exemption country. The results show that lower average effective tax rates of foreign subsidiaries increase the likelihood of headquarter relocation for multinationals from tax credit countries. For this group, the coefficient with respect to the average effective foreign tax rate ( $C_i \times \bar{t}_i^f$ ) has a value of -3.99 significant at the one percent level. This corresponds to a marginal effect of -0.22 such that a one percentage point decrease in effective foreign subsidiary tax rates increases the likelihood of headquarter relocation by 0.22 percentage points.<sup>20</sup> The corresponding increase in the number of relocating headquarters is 3.3 percent. For multinationals headquartered in countries exempting dividend repatriations from taxation ( $E_i \times \bar{t}_i^f$ ), the coefficient is insignificant. A Wald test indicates that the coefficients are different between the two groups at the one percent level. These findings support the hypothesis that headquarter relocations are at least partly driven by the objective to avoid residual taxes.

Turning to the control variables, the variable  $NegTax_i$ , which indicates a negative amount of aggregate foreign subsidiaries taxes, seems to have a weakly positive effect on headquarter relocation. However, this effect is not robust across different specifications. The significant coefficient of the dummy variable  $NegProfit_i$  indicates that an aggregate loss making position of foreign subsidiaries decreases the probability of headquarter relocation. This may reflect that the firm is at a stage at which the headquarter location is of secondary importance. For example, the losses of foreign subsidiaries could be due to start-up investments. Interestingly, the variable  $Hightech_i$  has a significantly negative effect on the probability of headquarter relocation. This may reflect that collocation of headquarters and highly specific labor skills

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<sup>20</sup>The regression model is non-linear, so marginal effects vary across observations. The marginal effect is reported at the sample average of the control variables.

are important in the production process of these firms. The remaining control variables of regression (2) have insignificant coefficients.

Regression (3) introduces the second variable of interest: the variable  $CFC_i$  indicates the presence of controlled foreign corporation rules in the country and year that observation  $i$  relates to. The corresponding coefficient is positive but appears to be insignificant.

In order to exclude that the results are biased by unobserved country-specific effects, regression (4) includes a set of country dummy variables. As mentioned earlier, the indicator for negative aggregate tax payments,  $NegTax_i$ , loses significance. On the other hand, firm size now exhibits a positive effect significant at the 10 percent level. Larger firms are more likely to relocate their headquarters abroad which is in line with evidence given by Desai and Hines (2002). The effect of controlling for country-specific effects on the coefficient of  $CFC_i$  is profound: it increases strongly in size and significance. Hence, the introduction of CFC rules increases the likelihood of headquarter relocation. The coefficients of  $C_i \times \bar{t}_i^f$  and  $E_i \times \bar{t}_i^f$  remain unaffected by the introduction of country dummy variables. These results consistently indicate that multinationals with low-taxed foreign subsidiaries are more likely to relocate their headquarters if they reside in countries with tax credit systems. This effect is absent for the control group of multinationals from exemption countries.

All following regressions take country-specific effects into account. Regression (5) in Table 10 employs total assets instead of turnover as a measure for firm size. However, the coefficient of  $Assets_i$  is insignificant. In all other respects, the results remain very similar. Regression (6) includes the explanatory variable  $Hometax_i$ , which is the home country's statutory corporate income tax rate. Its coefficient is insignificant and the other estimates remain unaffected.

In regression (7), the dependent variable is defined such that only headquarter relocations to exemption countries are considered relevant. (Hence,  $y_i$  only takes the value one if multinational  $i$  relocated its headquarter to an exemption country. Otherwise,  $y_i = 0$ .) Then the coefficient of  $C_i \times \bar{t}_i^f$  has a value of -7.65 and is lower than before. The stronger effect suggests that the negative relationship between  $C_i \times \bar{t}_i^f$  and the probability of headquarter relocation indeed reflects the incentive to avoid residual taxation of low-taxed foreign profits

as it is especially driven by relocations to exemption countries. The effect of CFC rules on headquarter relocation, however, is not driven by relocations to exemption countries. The coefficient of  $CFC_i$  is insignificant. This may reflect that tax credit countries are suitable destinations for avoiding stringent CFC legislation. Lang et al. (2004) argue that exemption countries put more importance on CFC rules as they have a larger need to protect their tax base.<sup>21</sup>

Another concern may be that the results are due to multinational headquarters being attracted to exemption countries for other reasons that correlate with exemption systems — for example, low corporate income tax rates. Hence, the dependent variable in regression (8) is defined such that only relocations to exemption countries with a tax rate not below 30 percent are considered relevant. In all other cases,  $y_i$  takes the value zero. The estimation results are similar to regression (7).

Regression (9) and (10) test the sensitivity of estimates with respect to assumptions about the distribution of error terms. Regression (9) assumes that the regression’s error term is normally distributed such that the conditional probability of relocating headquarters is given by a probit regression. The results are very similar to the logit regression (4). The small proportion of relocating headquarters with respect to immobile headquarters may be of concern. Hence, regression (10) takes the skewed dependent variable into account by assuming an extreme value distribution for the error term. The conditional inverse probability of relocating headquarters abroad is then given by

$$\Pr(y_i = 0 \mid x_i) = 1 - \exp^{-\exp(x_i\beta)}. \quad (2)$$

The results are not sensitive to distributional assumptions. The marginal effects estimated by regression (9) and (10) are very similar to regression (4).

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<sup>21</sup>The wave of corporate inversions in 2008 mentioned in the introduction supports this argument. The inverting firms were attracted to Ireland for its lack of CFC rules. Furthermore, the U.K.’s failed proposal to introduce more stringent CFC rules was caused by the increased desire to protect its tax base as it planned to switch from a tax credit to an exemption system.

The following regressions allow for different kinds of specific effects than country-specific ones. Regression (11) in Table 11 adds year dummy variables to the specification. The use of country dummy and year dummy variables should not raise any identification issues — such as the incidental parameters problem described by Neymann and Scott (1948) or Lancaster (2000) — because the sample size is determined by the number of firms.

Regressions (12) to (14) are conditional logit regressions which allow controlling for a larger number of fixed effects. In regression (12), the maximum likelihood is conditioned on the country-specific proportion of relocating firms.<sup>22</sup> This accounts for country-specific effects without employing dummy variables. In a similar way, regression (13) controls for country/industry-pair specific effects, where industries are defined by the sectors of the International Standard Industrial Classification (United Nations, 2002). Finally, regression (14) controls for any country/year-pair specific effect. As the variable  $CFC_i$  does not vary across firms from the same country/year-pair, it is completely captured by the specific effects and cannot be analyzed.

The estimation results of regression (11) to (14) are very similar to the benchmark regression (4). The estimates are robust to controlling for unobservable effects beyond country-specific effects. In particular,  $C_i \times \bar{t}_i^f$  has a significantly negative effect whereas  $E_i \times \bar{t}_i^f$  remains insignificant. Low-taxed foreign subsidiaries increase the likelihood of relocating headquarters only for multinationals from tax credit countries. Hence, headquarter relocations are motivated — at least partly — by the objective to avoid residual taxes on foreign profits. The variable  $CFC_i$  consistently has a significantly positive effect on the probability of headquarter relocation. The presence of CFC legislation appears to have a deterring effect on multinational headquarters.

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<sup>22</sup>Conditioning the likelihood on the country-specific number of successes and failures results in Chamberlain's (1980) fixed-effects logit estimator.

## 7 Conclusion

Within the last decade, six percent of the multinationals in our sample have relocated their headquarter to another country. With such a turnover, countries have an incentive to present themselves as attractive headquarter locations given that hosting headquarters has certain positive externalities like an increased demand for skilled labor, a larger tax base, or even a better representation of the country's interest in the decision making of the multinational firm. Enacting CFC legislation or imposing double taxation on repatriated profits, however, makes a country less attractive as a headquarter location. The empirical results in this paper show that the introduction of CFC rules increases the likelihood of multinational headquarter relocations. Furthermore, multinationals residing in countries with tax credit systems are more likely to relocate their headquarter if they derive profits from lowly taxed foreign subsidiaries. This reflects their incentive to avoid residual taxation of foreign profits in the home country. A one percentage point decrease in foreign effective tax rates increases the likelihood of relocation by 0.22 percentage points. By way of illustration, the U.S. federal corporate income tax rate has been at 35 percent since 1986. Meanwhile, the OECD average of statutory corporate income tax rates has decreased from 37 percent in 1996 to 27 percent in 2008. A 10 percentage points decrease in the foreign subsidiaries' tax burden of a U.S. multinational would imply a 2.2 percentage points increase in its probability of relocating headquarters abroad within the next decade. Compared to an average likelihood of 6 percent, that is an increase of more than one third.

The most visible expression of the incentive to relocate headquarters are corporate inversions as those that occurred in the U.S. between 1999 and 2002 or those that have taken place in the U.K. since 2008. The U.S. successfully stopped any further inversions by introducing more stringent exit taxes and a strong preference for national firms in government procurement. The U.K. is in a less fortunate situation, because — due to the constraints of European Community law — national exit taxes must not infringe upon the freedom of establishment, one of the general principles in the EU Internal Market.<sup>23</sup> As a consequence, the U.K. cannot

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<sup>23</sup>The freedom of establishment is set out in Article 43 of the Treaty establishing the European Community.

discriminate against relocating firms. Any tax that could serve as a barrier to exit would have to apply to the whole set of firms, which may not be desirable. Even if a country manages to inhibit corporate inversions, the incentives for headquarter relocations spill over into general cross-border mergers and acquisitions, where they work at the margin: a more favorable headquarter location can facilitate an acquisition which would not have gone through otherwise and vice versa.

The sensitivity of multinational headquarter location to taxes has several policy implications:<sup>24</sup> in order to attract headquarters, more countries may switch to an exemption system in international taxation or, alternatively, they may lower their corporate tax rates to such an extent that multinationals are always in an excess tax credit position. This has a similar effect to exempting dividend repatriations. In that respect, it is not surprising that Japan and the U.K. have recently decided to largely exempt foreign subsidiaries' dividends starting 2009 and that the U.S. has repeatedly initiated tax vacations for dividend repatriations like the American Jobs Creation Act 2004.<sup>25</sup>

Similarly, our results highlight the cost of tightening their CFC rules. In 2007, the U.K. proposed a change in CFC rules that would have taxed large parts of worldwide passive income upon accrual. However, in June 2008, it chose to back down hoping that would stop U.K. multinationals from relocating their headquarters to Ireland (Kennedy and Rossiter, 2008). In the U.S., President Obama has announced a reform of deferral rules which would increase taxes on overseas profits. The corporate sector is lobbying strongly to block these proposals (McKinnon, 2009). If the White House prevails, it would definitely buckle the trend that corporate taxation has exhibited in most countries over the past decade.

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The Commission of the European Communities (2006) discusses the implied constraints on exit taxation.

<sup>24</sup>The mobility of headquarters also raises intriguing questions with respect to existing concepts of optimal international taxation. For example, the landmark contributions by Richman (1963) and Feldstein and Hartman (1979) develop their insights on the assumption that the firm's origin is fixed. Also most work surveyed by Gordon and Hines (2002) takes the firm's home country as given.

<sup>25</sup>Furthermore, the U.S. has reduced the number of foreign tax credit baskets from 9 to 2 which facilitates the averaging of income streams from high and low tax locations.

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**Table 1: Multinationals and headquarter relocations**

Country	Firms	Independent firms	Multinationals	Headquarter relocations
	(1)	(2)	(3)	(4)
Australia	2374	1251	76	7
Austria	3305	593	52	2
Belgium	30433	4483	294	21
Bermuda	657	387	63	6
Brazil	778	114	6	2
Canada	1630	866	100	10
Chile	481	88	2	1
Cyprus	184	18	3	1
Czech Republic	8176	312	3	4
Denmark	22729	6309	213	18
Estonia	1651	255	6	1
Finland	8283	933	99	9
France	90783	11427	367	24
Germany	25396	4773	322	30
Hong Kong	346	172	26	2
India	5140	588	47	5
Ireland	16505	3577	84	10
Israel	184	113	28	2
Italy	121006	9390	300	16
Japan	95379	3073	446	3
Lithuania	1243	363	2	2
Luxembourg	1271	171	21	2
Netherlands	52007	1299	290	30
Norway	18778	5193	94	17
Poland	10724	1469	10	1
Russia	36686	14669	10	1
Singapore	2594	609	37	1
South Africa	336	146	27	2
Spain	92611	17729	197	10
Sweden	21975	4834	413	20
Switzerland	1607	449	117	11
United Kingdom	139132	31974	508	43
United States	21023	5506	1158	33
Total	835407	133133	5421	347

Notes: The first column reports the total number of firms registered in the Orbis database in 2005. The second column reports the number of headquarter firms which are mainly owned by individuals. The third column reports the number of multinational headquarter firms (with at least one foreign subsidiary). Only firms with total assets of at least 2 million Euro are taken into account. The fourth column reports the number of multinationals for which the headquarter relocated to another country as it was acquired by a foreign entity between 1997 and 2007, where the multinational was registered in the Zephyr database as well as in the Orbis database.

**Table 2: Cross-country headquarter relocations**

Relocating from	Code	Relocating to																	Total		
		AU	AT	BE	CA	DK	FI	FR	DE	IE	IT	JP	LU	NL	NO	ES	SE	CH		GB	US
Australia	AU	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	1	2	5
Austria	AT	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	2
Belgium	BE	1	0	0	0	0	0	3	1	0	0	0	4	0	0	0	0	1	2	5	20
Canada	CA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	7
Denmark	DK	0	0	0	0	0	1	1	1	0	1	0	1	1	0	1	0	3	6	16	16
Finland	FI	0	0	0	0	0	0	0	0	1	0	0	0	1	0	4	1	0	2	9	9
France	FR	0	1	0	2	0	1	0	3	0	2	0	4	0	2	0	1	4	3	23	23
Germany	DE	0	2	1	1	2	1	4	0	1	3	0	2	0	1	1	1	3	6	30	30
Ireland	IE	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	4	4	9	9
Italy	IT	0	0	1	0	0	0	3	0	0	0	0	0	0	0	0	1	4	1	12	12
Japan	JP	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	2	2
Luxembourg	LU	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
Netherlands	NL	0	2	1	0	1	0	6	4	0	1	0	0	0	2	0	0	1	10	28	28
Norway	NO	0	0	1	0	2	3	1	0	0	1	0	1	0	0	1	0	4	1	15	15
Spain	ES	0	0	0	0	0	0	5	0	0	0	0	1	0	0	0	0	1	1	8	8
Sweden	SE	0	0	0	1	2	0	0	1	1	0	0	2	2	0	0	1	4	5	19	19
Switzerland	CH	0	0	0	0	0	1	2	1	0	0	0	0	0	0	1	0	0	2	7	7
United Kingdom	GB	1	0	1	0	0	0	5	5	2	1	1	1	0	2	1	1	0	16	37	37
United States	US	1	0	0	4	1	1	5	4	0	0	0	3	0	0	0	2	6	0	27	27
Total		3	5	7	8	9	8	35	26	5	12	2	2	17	5	7	9	10	37	71	278

Notes: The table reports the number of multinationals registered in the Zephyr as well as in the Orbis database which relocated their headquarter from the country listed on the left to the country listed on the top between 1997 and 2007. Only the most relevant countries are mentioned in this table.

**Table 3: Methods of double tax relief and CIT rates**

Country	Double tax relief (1)	Corporate income tax (2)
Australia	Exemption	30.0
Austria	Exemption	25.0
Belgium	Exemption	34.0
Bermuda	Exemption	0.0
Brazil	Credit	34.0
Canada	Exemption	34.1
Chile	Credit	17.0
Cyprus	Exemption	10.0
Czech Republic	Exemption	26.0
Denmark	Exemption	28.0
Estonia	Credit	24.0
Finland	Exemption	26.0
France	Exemption	33.8
Germany	Exemption	36.4
Hong Kong	Exemption	17.5
India	Credit	36.6
Ireland	Credit	12.5
Israel	Credit	34.0
Italy	Exemption	37.3
Japan	Credit	42.1
Lithuania	Exemption	15.0
Luxembourg	Exemption	30.4
Netherlands	Exemption	31.5
Norway	Exemption	28.0
Poland	Credit	19.0
Russia	Credit	24.0
Singapore	Exemption	20.0
South Africa	Exemption	29.0
Spain	Exemption	35.3
Sweden	Exemption	28.0
Switzerland	Exemption	30.0
United Kingdom	Credit	30.0
United States	Credit	39.4

Notes: The first column reports the standard method of double tax relief for dividends from significant participations in presence of a tax treaty. “Credit” indicates that the country provides an ordinary indirect tax credit. Hence, underlying foreign corporate income taxes are taken into account and excess credits are not paid out. “Exemption” indicates that the country exempts at least 95 percent of dividend repatriations from taxation. The second columns reports the statutory corporate income tax rate on domestic income in 2005. An average rate is reported if the rate varies locally within a country. Source: Chennells and Griffith (1997), Eurostat (2004), and IBFD (2008).

**Table 4: CFC rules in 2008**

Country	Year of introduction	Necessary conditions				All income attributed	Important remarks
		Country list	Tax threshold	Tainted income threshold	Economic activity		
		(1)	(2)	(3)	(4)	(6)	(7)
Argentina	1999	blacklist		50%			
Australia	1990	greylist			5%		Passive income reclassified as active income if derived from active business subsidiaries.
Canada	1976						
Denmark	1995			50%			
Finland	1995		60%		1	1	
France	1980	whitelist	50%	20%			
Germany	1972		25				Dividends and capital gains are not attributed to the parent.
Indonesia	1995	blacklist		50%		1	Dividends from subsidiaries in >20% tax countries are not included.
Israel	2002		20				
Italy	2002	blacklist			1	1	
Japan	1978		25		1		
Korea	1997		15		1	1	No tax credit is applied.
Korea 2	1997		15		1	1	No tax credit is applied.
Lithuania	2002	whitelist	75%				
Lithuania 2	2002	whitelist	75%	10%		1	Tainted income: only sales and service income out of residence.
Mexico	1997		75%			1	
New Zealand	1988	greylist				1	
Norway	1992	whitelist	67%			1	
Norway 2	1992		67%			1	
Norway 3	1992	blacklist			1	1	
Portugal	1995		60%	25%		1	
Portugal 2	1995			25%		1	
South Africa	1997	blacklist					
Spain	1995		75%	15%	4%		Dividends and capital gains from active business are not tainted.
Spain 2	1995	blacklist				1	
Sweden	2004	whitelist	55%			1	
United Kingdom	1984	whitelist	75%			1	At least 90% of income must be locally sourced for white list to apply.
United States	1962		90%				Since 1997, check-the-box regulation, which can enable passive income to appear active.

**Table 5: Comments to CFC rules in 2008**

Country	Comment
Argentina	Only subsidiaries from low-tax jurisdictions can be CFCs. Sources for the definition of low-tax jurisdiction are difficult to find.
Canada	Passive income reclassified as active income if derived from active business subsidiaries.
Estonia	CFC rules exist but are not relevant for corporate owners.
Denmark	Another necessary condition is that financial assets constitute at least 10% of the subsidiary's total assets.
Finland	The economic activity test is satisfied if the subsidiary mainly engages in production or rendering domestic services.
France	The white list is not created by legislation but implicitly defined by existing tax treaty provisions that may overrule France's CFC legislation.
France	Domestic losses can be offset against CFC profits.
Germany	Dividends and capital gains are not attributed to the parent.
Germany	Domestic losses can be offset against CFC profits.
Germany	Certain industries like banking are exempted from CFC rules.
Hungary	CFC rules existed from 1997 until 2001 after which they were transformed in anti-avoidance rules without income attribution.
Israel	CFC rules do not apply if at least 30 percent of the CFC's shares are traded on a public exchange.
Italy	The economic activity test can only be satisfied by an advance ruling from the authorities. The test is satisfied if the CFC predominantly carries on an actual industrial or commercial activity in the state or territory in which it is located. It is also satisfied if it can be proven that the participation in the CFC does not achieve the localization of income in tax haven countries or territories.
Japan	The economic activity test is failed if foreign operations dominate the subsidiaries business. For some firms (wholesale, securities, banking, etc.) the test is failed if intra-group transactions dominate.
Japan	The 25 percent tax rate threshold relates to the statutory tax rate.
Korea	The economic activity test is failed if the CFC is engaged in wholesale, finance, insurance, real estate, rental, business services, etc. The test is also failed where more than 50% of a CFC's turnover is from related parties, or where more than 50% of turnover is from the holding of stocks or bonds, the exploitation of intellectual property rights, the leasing of ships, aircraft and equipment, asset management, etc.
Lithuania	There is an additional condition: CFC income should represent at least 5% of the parent's income.
Spain	Consolidation of all CFCs is allowed to satisfy the tainted income thresholds.
Spain	The part of CFC income (from black listed countries) proven to be active income is not attributed to the parent.
Spain	There exists a third CFC rule that counts income from services for related parties as tainted income. The de minimis rule is then 50% of CFC profits. Otherwise like standard CFC rule.
Sweden	There existed a CFC rule from 1990 on but it applied only to direct subsidiaries of Swedish firms. This was changed in 2004.
United Kingdom	There is a motive test and an exempt activity test that have to be failed for CFC rules to apply. Furthermore, CFC rules do not apply if at least 90 percent of profit is distributed or if at least 35 percent of the CFC's shares are traded on a public exchange.
United Kingdom	Income from capital gains is treated according to another set of rules.

**Table 6: Summary statistics**

Variable	Obs	Mean	Std. dev.	Min	Max
$y_i$	2083	0.067	0.250	0.000	1.000
$\bar{t}_i^f$	2083	0.206	0.203	0.000	1.000
$C_i$	2083	0.178	0.383	0.000	1.000
$E_i$	2083	0.822	0.383	0.000	1.000
$CFC$	2083	0.674	0.469	0.000	1.000
$NegTax_i$	2083	0.086	0.280	0.000	1.000
$NegProfit_i$	2083	0.254	0.436	0.000	1.000
$Xrate_i$	2083	0.028	0.166	0.000	1.000
$Size_i$	2083	12.067	2.186	0.000	19.134
$Assets_i$	2083	12.452	2.405	5.231	21.393
$Leverage_i$	2083	0.082	0.118	0.000	0.995
$EoA_i$	2083	0.040	0.091	-0.711	1.336
$Hightech_i$	2083	0.646	0.478	0.000	1.000

Notes: For detailed variable descriptions and data sources, see Table 8.

**Table 7: Relocation versus control group summary statistics**

Variable	Control	Relo- cating	Total sample
$\bar{t}_i^f$	0.206	0.207	0.206
$C_i$	0.182	0.129	0.178
$E_i$	0.818	0.871	0.822
$CFC$	0.671	0.714	0.674
$NegTax_i$	0.084	0.107	0.086
$NegProfit_i$	0.261	0.164	0.254
$Xrate_i$	0.028	0.036	0.028
$Size_i$	12.054	12.243	12.067
$Assets_i$	12.440	12.612	12.452
$Leverage_i$	0.082	0.080	0.082
$EoA_i$	0.039	0.048	0.040
$Hightech_i$	0.657	0.493	0.646
Sample size	1943	140	2083

Notes: For detailed variable descriptions and data sources, see Table 8.

**Table 8: Description of variables**

Variable	Description and data source
$y_i$	The dependent variable takes the value one if multinational $i$ relocates its headquarter to another country between 1997 and 2007. Otherwise the value is zero. Entering the sample is conditional on availability of financial data. Source of financial data: Orbis database. Source of relocation data: Zephyr database.
$\bar{t}_i^f$	Sum of multinational $i$ 's foreign subsidiaries' tax payments divided by the sum of its foreign subsidiaries' pre-tax profits. The value is set to zero if numerator or denominator are negative or if the implied tax rate is above 100 percent. Source: Orbis database.
$C_i$	Dummy variable which takes the value one if multinational $i$ 's home country generally provides foreign tax credits for dividend repatriations. Otherwise the value is zero. Source: Coopers & Lybrand (1998), IBFD (2008). Previous issues of these publications were consulted as well.
$E_i$	Dummy variable which takes the value one if multinational $i$ 's home country generally exempts at least 95 percent of dividend repatriations from taxation. Otherwise the value is zero. Source: Coopers & Lybrand (1998), IBFD (2008). Previous issues of these publications were consulted as well.
$CFC_i$	Dummy variable which takes the value one if the resident country of the multinational's ultimate parent firm has controlled foreign corporation rules in year $t$ . Otherwise the value is zero. Source: Sandler (1998), Lang et al. (2004), IBFD (2008).
$NegTax_i$	Dummy variable which takes the value one if the sum of multinational $i$ 's foreign subsidiaries' tax payments are negative. Otherwise the value is zero. Source: Orbis database.
$NegProfit_i$	Dummy variable which takes the value one if the sum of multinational $i$ 's foreign subsidiaries' pre-tax profits are negative. Otherwise the value is zero. Source: Orbis database.
$Xrate_i$	Dummy variable which takes the value one if the implied average effective tax rate of multinational $i$ 's foreign subsidiaries' is above 100 percent. Source: Orbis database.
$Size_i$	Logarithm of multinational $i$ 's total turnover in thousands of U.S. dollar. Based on the sum of unconsolidated parent firm's and all available subsidiaries' turnover. Source: Orbis database.
$Assets_i$	Logarithm of multinational $i$ 's total assets in thousands of U.S. dollar. Based on the sum of unconsolidated parent firm's and all available subsidiaries' total assets. Source: Orbis database.
$Leverage_i$	Ratio of multinational $i$ 's long term debt over total assets. Based on the sum of unconsolidated parent firm's and all available subsidiaries' debt figures and total assets. Source: Orbis database.
$EoA_i$	Profitability measure: Ratio of multinational $i$ 's earnings before interest and taxes over total assets. Based on the sum of unconsolidated parent firm's and all available subsidiaries' earning figures and total assets. Source: Orbis database.
$Hightech_i$	Dummy variable which takes the value one if multinational $i$ 's NACE (Rev 3.1) core code is categorized as knowledge-intensive or high technology industry according to OECD and Eurostat classifications (OECD, 2008; Eurostat, 2008). Otherwise the value is zero. Source: Orbis database.
$Hometax_i$	Top statutory corporate income tax of multinational $i$ 's home country. An average rate is used if the rate varies locally within a country. Source: Chennells and Griffith (1997), Eurostat (2004), IBFD (2008).

**Table 9: Estimation results**

	(1)	(2)	(3)	(4)
	No split	Split	CFC rules	Country- effect
$\bar{t}_i^f$	-0.667 (0.563)			
$C_i \times \bar{t}_i^f$		-3.999*** (1.468)	-4.218*** (1.483)	-3.758** (1.809)
$E_i \times \bar{t}_i^f$		-0.422 (0.555)	-0.432 (0.557)	-0.523 (0.612)
$CFC_i$			0.323 (0.198)	0.978** (0.426)
$NegTax_i$	0.614* (0.324)	0.587* (0.323)	0.592* (0.324)	0.528 (0.359)
$NegProfit_i$	-0.945*** (0.291)	-0.980*** (0.289)	-0.992*** (0.289)	-1.032*** (0.311)
$Xrate_i$	-0.049 (0.506)	-0.102 (0.505)	-0.110 (0.506)	-0.095 (0.528)
$Size_i$	0.040 (0.041)	0.055 (0.042)	0.047 (0.042)	0.087* (0.046)
$Leverage_i$	-0.383 (0.807)	-0.180 (0.810)	-0.162 (0.806)	-0.128 (0.874)
$EoA_i$	0.134 (0.990)	0.093 (1.005)	0.143 (1.017)	0.332 (0.970)
$Hightech_i$	-0.721*** (0.178)	-0.729*** (0.179)	-0.746*** (0.179)	-0.810*** (0.192)
Intercept	-2.394*** (0.545)	-2.546*** (0.555)	-2.649*** (0.557)	
N	2083	2083	2083	2016
Log-likelihood	-498.2	-493.3	-492.0	-445.7
$\chi^2$	30.01	39.68	42.44	99.42

Notes: The dependent variable  $y_i$  takes the value one if multinational  $i$  has relocated its headquarter to another country between 1997 and 2007. Otherwise  $y_i$  equals zero. Regressions (1)–(4) are logit regression. Regression (4) includes a set of country dummy variables. All results are estimated by the maximum likelihood method. For detailed variable descriptions and data sources, see Table 8. The  $\chi^2$  statistic is related to testing for all coefficients being equal to zero. The corresponding degrees of freedom are equal to the number of regressors in the specification. Standard errors are provided in parentheses. Stars indicate the significance level: \* : 10%, \*\* : 5%, \*\*\* : 1%.

**Table 10: Estimation results — continued**

	(5)	(6)	(7)	(8)	(9)	(10)
	Total assets	Home-taxrate	Only to exemption	High-tax exemption	Probit	Extreme value
$C_i \times \bar{t}_i^f$	-3.595** (1.814)	-3.758** (1.808)	-7.650** (3.263)	-8.963** (4.179)	-2.195** (0.933)	-1.888*** (0.725)
$E_i \times \bar{t}_i^f$	-0.513 (0.612)	-0.521 (0.612)	-0.033 (0.729)	-0.244 (0.848)	-0.338 (0.299)	-0.297 (0.217)
$CFC_i$	0.990** (0.426)	0.985** (0.430)	0.434 (0.691)	-0.991 (1.137)	0.452** (0.201)	0.311** (0.143)
$NegTax_i$	0.517 (0.358)	0.529 (0.359)	0.808* (0.451)	0.839* (0.488)	0.229 (0.179)	0.140 (0.131)
$NegProfit_i$	-1.034*** (0.311)	-1.031*** (0.311)	-1.163*** (0.412)	-0.877** (0.441)	-0.525*** (0.150)	-0.390*** (0.106)
$Xrate_i$	-0.070 (0.528)	-0.092 (0.529)	-1.283 (1.055)	-0.918 (1.063)	-0.071 (0.270)	-0.074 (0.204)
$Size_i$		0.088* (0.047)	0.155*** (0.060)	0.191*** (0.068)	0.043* (0.023)	0.031* (0.017)
$Assets_i$	0.057 (0.040)					
$Leverage_i$	-0.118 (0.862)	-0.125 (0.874)	-0.987 (1.302)	-0.263 (1.399)	-0.106 (0.444)	-0.122 (0.333)
$EoA_i$	0.505 (0.973)	0.319 (0.975)	0.849 (1.122)	1.140 (1.207)	0.085 (0.486)	-0.003 (0.345)
$Hightech_i$	-0.832*** (0.194)	-0.810*** (0.192)	-1.037*** (0.251)	-0.846*** (0.289)	-0.391*** (0.096)	-0.279*** (0.071)
$Hometax_i$		0.314 (2.398)				
N	2016	2016	2008	2003	2016	2016
Log-likelihood	-446.5	-445.6	-290.1	-232.7	-445.7	-445.7
$\chi^2$	97.79	99.44	92.25	73.73	99.40	99.34

Notes: The dependent variable  $y_i$  takes the value one if multinational  $i$  has relocated its headquarter to another country between 1997 and 2007. Otherwise  $y_i$  equals zero. In regression (7),  $y_i$  only takes the value one if multinational  $i$  relocated its headquarter to an exemption country. In regression (8),  $y_i$  only takes the value one if multinational  $i$  relocated its headquarter to an exemption country with a corporate income tax rate not below 30 percent. Regressions (5)–(8) are logit regression. Regression (9) is a probit regression. Regression (10) is a binary regression based on the extreme value distribution. All regressions include a set of country dummy variables and results are estimated by the maximum likelihood method. For detailed variable descriptions and data sources, see Table 8. The  $\chi^2$  statistic is related to testing for all coefficients being equal to zero. The corresponding degrees of freedom are equal to the number of regressors in the specification. Standard errors are provided in parentheses. Stars indicate the significance level: \* : 10%, \*\* : 5%, \*\*\* : 1%.

**Table 11: Estimation results — continued**

	(11)	(12)	(13)	(14)
	Country plus year effect	Cond. logit country	Cond. logit country/industry	Cond. logit country/year
$C_i \times \bar{t}_i^f$	-3.708** (1.851)	-3.613** (1.765)	-3.731** (1.884)	-3.945** (1.877)
$E_i \times \bar{t}_i^f$	-0.545 (0.616)	-0.511 (0.608)	-0.617 (0.641)	-0.596 (0.641)
$CFC_i$	0.933** (0.470)	0.974** (0.425)	1.018** (0.448)	
$NegTax_i$	0.552 (0.360)	0.507 (0.355)	0.611 (0.388)	0.332 (0.387)
$NegProfit_i$	-1.042*** (0.313)	-1.013*** (0.308)	-1.220*** (0.336)	-1.033*** (0.327)
$Xrate_i$	-0.135 (0.532)	-0.101 (0.522)	-0.160 (0.542)	-0.325 (0.540)
$Size_i$	0.087* (0.046)	0.086* (0.046)	0.043 (0.051)	0.083* (0.050)
$Leverage_i$	-0.187 (0.880)	-0.175 (0.854)	-0.130 (1.050)	-0.509 (1.004)
$EoA_i$	0.254 (0.982)	0.326 (0.952)	-1.107 (1.247)	0.087 (1.003)
$Hightech_i$	-0.829*** (0.193)	-0.800*** (0.191)	-0.882*** (0.294)	-0.791*** (0.197)
N	2016	2016	1682	1409
Log-likelihood	-443.5	-416.6	-323.5	-298.8
$\chi^2$	103.8	42.66	33.78	32.56

Notes: The dependent variable  $y_i$  takes the value one if multinational  $i$  has relocated its headquarter to another country between 1997 and 2007. Otherwise  $y_i$  equals zero. Regression (11) includes a set of country dummy and a set of year dummy variables. Country and year fixed effects are not reported. Regression (12)–(14) are conditional logit regressions. In regression (12), the likelihood is maximized conditional on the number of relocating and immobile multinational headquarters per country. Similarly, in regressions (13) and (14) the conditioning takes place at the country-industry level and at the country-year level respectively. For detailed variable descriptions and data sources, see Table 8. The  $\chi^2$  statistic is related to testing for all coefficients being equal to zero. The corresponding degrees of freedom are equal to the number of regressors in the specification. Standard errors are provided in parentheses. Stars indicate the significance level: \* : 10%, \*\* : 5%, \*\*\* : 1%.

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