

# Tax treaty shopping: Structural determinants of Foreign Direct Investment routed through the Netherlands

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## **Abstract:**

Many multinationals divert Foreign Direct Investment (FDI) through third countries that have a favourable tax treaty network, to avoid host country withholding taxes. This is referred to as tax treaty shopping. The Netherlands is the world's largest pass-through country; in 2009, multinationals held approximately €1,600 billion of FDI via the Netherlands. This paper uses microdata from Dutch Special Purpose Entities to analyse geographical patterns and structural determinants of FDI diversion. Regression analysis confirms that tax treaties are a key determinant of FDI routed through the Netherlands. The effect of tax treaties on FDI diversion partly arises from the reduction of dividend withholding tax rates, which provides strong evidence for tax treaty shopping.

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# **Tax treaty shopping: Structural determinants of Foreign Direct Investment routed through the Netherlands**

## **1 Introduction**

Tax treaty shopping is a particular form of tax avoidance by multinational corporations. It involves the diversion of Foreign Direct Investment (FDI) through a third country to achieve reduction of withholding taxes under favourable tax treaties (Kingson 1981). Most countries levy withholding taxes on outgoing dividends and interest payments to foreign affiliates. Tax treaties reduce or eliminate these withholding taxes on a bilateral basis, thus providing an advantage to foreign investors from the partner country. When multinationals engage in treaty shopping, they may obtain benefits that a host country would otherwise not provide to them.

This article investigates how tax treaties influence the diversion of FDI. It analyses geographical investments patterns of FDI diverted through the Netherlands, which accounts for a massive 13% of global inward FDI stock. The article contributes to existing literature by using a new method to analyse structural determinants of FDI diversion. It is also the first study that uses Dutch microdata to analyse investments between all countries worldwide routed through a specific third country. The results provide empirical evidence for tax treaty shopping via the Netherlands. This finding is highly relevant for international tax policies. Furthermore, it has major implications for further research on tax treaties and other research using bilateral FDI data.

The structure of this article is as follows. Section 2 provides some background on treaty shopping and discusses related research. Next, Section 3 shows the importance of the Netherlands as a pass-through country and explains the use of the Dutch microdata. Section 4 describes geographical patterns of FDI via the Netherlands and section 5 uses regression analysis to identify determinants of FDI diversion. Section 6 provides conclusions, policy implications and a brief discussion.

## 2 Background on treaty shopping and related research

In theory, the main purpose of tax treaties is to remove tax barriers to international economic activity. Tax treaties prevent double taxation by allocating taxing rights between the host country, where the income arises, and the home country, where the beneficiary of the income resides. This provides legal certainty to foreign investors. Withholding tax reductions limit the taxing rights of the host country and are a core element of tax treaties.

In practice, many countries have already adopted unilateral measures to prevent double taxation, such as a tax credit or exemption for income that has already been taxed abroad. Where such unilateral measures exist, tax treaties merely confirm these. Some argue that treaties may still signal that the host country is committed to international investment rules (Barthel et al. 2010a). This is especially relevant for developing countries. However, the reputation of a country's tax administration may be more important than the number of treaties in place and the value of legal certainty should not be exaggerated (Thuronyi 2010). Some treaties also serve specific purposes other than attracting FDI (Pistone 2010).

Even though tax treaties may not always add a lot to prevent double taxation, they do offer benefits to foreign investors. An example is a reduced withholding tax on dividends paid to a parent in a country that exempts these dividends from tax. In this case, the dividend withholding tax cannot be recovered by the company and the reduced rate is a real benefit. Indeed, the benefits of tax treaties are important enough to give rise to large-scale treaty shopping.

Tax treaties themselves do not provide a formal definition of treaty shopping. However, Article 22 of the 2006 US model treaty, on anti-treaty shopping provisions, provides a useful implicit description: '*residents of third countries [...] benefiting from what is intended to be a reciprocal agreement between two countries*'. For the purpose of this article, tax treaty shopping is defined more specifically as the diversion of FDI through an intermediate country to achieve reduction of withholding taxes under favourable tax treaties (Kingson 1981). To this effect, a tax treaty must exist between the host and intermediate country.<sup>1</sup> Diverted FDI is defined as FDI into an intermediate country that is then reinvested

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<sup>1</sup> In theory, this treaty should also specify more favourable conditions for payments from the host to the intermediate country than those existing for payments directly to the home country. However, in practice this is not a useful criterion, because diverted FDI may undergo transformations and a comparison may therefore involve different types of payments.

as FDI in another country, within the same multinational.<sup>2</sup> The investment may pass through various entities in the intermediate country and undergo transformations, for example from an intragroup loan into an equity investment. This definition excludes investments that entities in the intermediate country finance by issuing bonds or obtaining other external funding themselves.

For the analysis of treaty shopping, it is important to distinguish conduit entities from so-called base companies and mixing companies. The last two are used by multinationals from home countries that tax the income of foreign subsidiaries, such as the US and UK. The tax on this income is usually offset by a tax credit equal to the tax already paid abroad and thus arises only if the foreign tax rate is lower. Furthermore, the tax is normally deferred until the income is repatriated in the form of dividends. If a multinational invests in foreign subsidiaries via a base company in an intermediate country, it can reinvest the income of subsidiaries via the base company and avoid the home country tax. The multinational can also use an intermediate holding to mix dividends from low-tax and high-tax countries. This allows the multinational to offset taxes paid in different countries against each other for the calculation of the foreign tax credit when the dividends are paid onwards to the ultimate parent, which may not be possible if the ultimate parent holds the subsidiaries directly (Dolan and Walsh Weil 1995).

Thus, dividend conduits aim to avoid withholding taxes levied by host countries, whereas base and mixing companies take withholding taxes into account as well but primarily aim to avoid home country taxes. Base companies do this by deferring dividend payments to the ultimate parent and mixing companies by mixing dividends from different sources. Base and mixing companies are established in countries that exempt foreign dividend income and that have a favourable treaty network. In practice, the three types are difficult to distinguish, because the holding structures are similar and large multinationals use a broad range of tax strategies that do not always match one of these basic types.

Tax treaty shopping has received substantial attention in legal analyses since the early 1980s. Many of these focus on the use of Dutch conduit entities and on the attempts of the US to limit tax avoidance via conduit structures. The Netherlands is generally regarded as by far the most popular location for conduit entities, mainly due to its extensive and favourable tax treaty network (Avi-Yonah 2009; Dolan and Walsh Weil 1995; Kingson 1981; Wacker 1993).

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<sup>2</sup> Between the ultimate home and host countries, FDI may be diverted several times. However, in each step, there are only three countries involved.

The Netherlands is historically a favoured location for base and mixing companies as well (Dolan and Walsh Weil 1995).

To date, there exist only a few empirical economic studies on treaty shopping. Collins and Shackelford (1997) examine the effect of withholding and home country taxes on crossborder payments between foreign affiliates of US multinationals. They find that internal dividend and interest flows are structured in such a way as to mitigate taxes and conclude that the results are consistent with treaty shopping. Desai et al. (2003) find that lower foreign tax rates cause US multinationals to hold a larger share of their investments through entities in third countries. This is consistent with the use of base companies. Weichenrieder and Mintz (2008) provide the only direct evidence of treaty shopping so far. They show that higher bilateral withholding taxes to and from Germany substantially increase the probability that inbound and outbound FDI is diverted via a third country.

Other studies have analysed the effect of tax treaties on bilateral FDI without accounting for the possibility of treaty shopping. All of these studies use gravity models with dummy variables for the existence of a tax treaties. From a public policy perspective, the main question behind these studies is whether host countries gain from concluding tax treaties due to higher inward FDI that more than compensates for the lower withholding tax rates. It is useful to briefly review how tax treaties affect FDI according to these studies.

A few studies use microdata or macrodata from a single host country. Louie and Rousslang (2008) find that tax treaties do not make investments in a country more attractive for US firms. By contrast, Davies et al. (2009) find that Swedish firms are more likely to establish a subsidiary in countries that have a tax treaty with Sweden. Early macrodata studies found that US outbound FDI does not increase because of tax treaties (Blonigen and Davies 2004) or renegotiations of existing treaties (Davies 2003). However, newer studies find some heterogeneous effects. Neumayer (2007) finds that tax treaties increase FDI to middle income countries, but not to low income countries. Millimet and Kumas (2009) find positive effects for country pairs that initially have relatively low bilateral investment and negative effects for country pairs that already have relatively high investment.

Some other studies use bilateral FDI data from the OECD or UNCTAD. These data sets cover a range of home as well as host countries, but data quality is generally poor (Zhan 2006), which may affect results. Broader data sets enable methods that control for endogenous factors. This is an important issue to the gravity models, because broad economic reforms of low and middle income countries that opened up to foreign investors may explain both the

increasing number of tax treaties and the rise in FDI (Barthel et al. 2010a). Blonigen and Davies (2008) and Egger et al. (2006) find negative effects of new tax treaties on FDI, whereas Coupé et al. (2008) find no significant effects. Barthel et al. (2010b), who use a dataset with extended coverage of developing countries, find positive effects, as does and Siegman (2007). Thus, results regarding the effect of tax treaties on bilateral FDI have been mixed.

Analogous to the research on tax treaties, various studies have analysed the effect of bilateral investment treaties on FDI. These studies are relevant here because investment treaties, which enhance protection of foreign investors against expropriation and unfavourable policy changes, can be another reason for FDI diversion. In contrast to tax treaties, most investment treaties are concluded with developing or emerging countries; there exist few investment treaties between developed countries. The Netherlands has a relatively large network of almost 100 investment treaties. Dutch investment treaties contain a very broad definition of investors that facilitates treaty shopping. As of June 2011, out of approximately 400 claims under investment treaties worldwide, at least 29 cases involved Dutch intermediate holdings with a foreign parent or controlling shareholder that sought protection through a Dutch investment treaty (Van Os and Knottnerus 2011).

Research results on the effects of investment treaties are mixed. Some studies find a positive effect on FDI (Egger and Merlo 2007; Egger and Pfaffermayr 2004; Fortanier and Van Tulder 2007; Neumayer and Spess 2005; Siegmann 2007), but others find insignificant or mixed effects (Aisbett 2007; Hallward-Driemeier 2003; Salacuse and Sullivan 2005; Tobin and Rose-Ackerman 2005; Yackee 2006). Questionnaire responses from general counsels of Fortune 500 companies and political risk insurers indicate that investment treaties play only a marginal role in investment and insurance decisions. This suggests that the results of econometric studies may be spurious (Yackee 2010).

If tax or investment treaties do on balance increase bilateral FDI, this may to some extent result from treaty shopping (Thuronyi 2010). The diversion of inward FDI from non-treaty countries through treaty countries affects the apparent origin of investments. The UK Office for National Statistics calls this the '*Netherlands effect*', although it occurs for other countries as well (Wilkie 2010). FDI diversion leads to overestimation of the effect of a treaty on bilateral FDI originating from a partner country itself. Furthermore, after a host country concludes additional treaties, new investments might no longer be diverted. This reduces the apparent effect of older treaties and increases the apparent effect of new treaties. However,

changes in investment route do not affect total inward FDI from all countries combined. Only Neumayer (2007) has analysed the effect of both tax and investment treaties on total FDI into developing countries. He finds that tax treaties increase FDI to middle income countries, but not to low income countries. Most studies are not robust to treaty shopping, though, which makes empirical results on treaty shopping highly relevant.

On the basis of previous research, some potential determinants of FDI diversion can be identified. First, as normal FDI is largely explained by gravity factors, this may also apply to diverted FDI. To put it differently, FDI diversion through the Netherlands may partly follow the same pattern as normal FDI to and from the Netherlands, regardless of tax or investment incentives. Second, analogous to studies on normal FDI discussed above, one would expect that FDI diversion is higher via tax treaty routes. In addition, home country taxation of foreign income is likely to increase FDI diversion because of deferral and mixing strategies. These general tax determinants can all be captured with dummy variables. Alternatively, the potential benefits of various tax strategies can be modelled in more detail, taking into account the reduction of withholding tax rates by relevant tax treaties and the home and host country corporate tax rates for each country pair. The corresponding hypothesis is that higher potential tax benefits increase FDI diversion. Third, again analogous to previous research and similar to tax treaties, one would expect that FDI diversion is higher via investment treaty routes. Fourth, if host countries can commit themselves to international investment standards by signing many treaties, then one might expect that a high number of tax and investment treaties reduces the need for protection under a specific bilateral treaty and therefore reduces FDI diversion. These potential determinants will form the basis for the empirical analysis of treaty shopping later on in this article.

### **3 Special Purpose Entity (SPE) microdata and methodology<sup>3</sup>**

The Netherlands is the world's largest pass-through country for FDI. According to macro data from the Dutch central bank (DNB), at the end of 2009, FDI diverted through the Netherlands

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<sup>3</sup> Access to the anonymised data used for this research was obtained from De Nederlandsche Bank in cooperation with Statistics Netherlands, subject to DNB's disclosure policies, see <http://www.dnb.nl/en/statistics/statistische-microdata/index.jsp>. The interpretation of the data is solely the responsibility of the author.

amounted to approximately €1,600 billion.<sup>4</sup> This corresponds to 13% of global inward FDI stock. The Coordinated Direct Investment Survey of the International Monetary Fund (IMF) shows that this is equal in size to two thirds of US outward FDI stock including diverted investments. Moreover, apart from the US, it is larger than the total outward FDI stock including diverted investments of any other country. US microdata confirm that the Netherlands is the preferred conduit country for outward investments of US firms (Desai et al. 2003). In addition, German microdata show that the Netherlands ranks first in number of intermediate holdings, and second in value of pass-through investment stock, for FDI to and from Germany (Weichenrieder and Mintz 2008).

For a more detailed analysis of FDI diverted via the Netherlands, this article uses microdata from Dutch conduit entities. These entities are identified by the central bank and officially called Special Financial Institutions (SFIs). By definition, SFIs hold mainly financial or intangible assets and most or all of their assets and liabilities are foreign.<sup>5</sup> Usually they do not conduct real business activities. At the end of 2009, there were approximately 11,500 SFIs in the Netherlands (DNB 2009; 2010). The central bank collects detailed survey data on annual investment positions and monthly transactions of some 1,000 SFIs that account for approximately 90% of total SFI assets. Participation to the surveys is obligatory under Dutch law. The analysis mainly uses microdata from 2006 and 2007.

Some SFIs belong to the same multinational. Within these clusters of SFIs, balance sheets are consolidated as much as possible by netting out Dutch intragroup equity and loan positions. The dataset includes approximately 525 to 575 observations per months representing either a cluster of SFIs or an individual SFIs that does not belong to a cluster. This is after removing some 100 (clusters of) SFIs that hold portfolio investments only. For convenience reasons, each observation will be referred to as a Special Purpose Entity (SPE), in line with OECD terminology (OECD 2008).

The central bank microdata indicate the direct origin of investments, but not the origin of ultimate parents. Therefore data on ultimate parents were obtained from the REACH

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<sup>4</sup> Calculated as €1,918 bn of FDI assets of SFIs minus €327 bn of securities issued by SFIs to finance FDI; the latter follows from €435 bn of total securities issued by SFIs minus €108 of debt securities issued by SFIs to finance portfolio assets. This is consistent with the reported €1650 bn of FDI liabilities of SFIs. Source: DNB, <http://statistics.dnb.nl/index.cgi?lang=uk&todo=Balans>, tables 9.1, 12.10 and 12.14 (accessed 19 Sep 2011).

<sup>5</sup> For a cluster of SFIs that belong to the same firm, these criteria apply to the cluster as a whole.

database of Bureau van Dijk.<sup>6</sup> Ultimate parents are defined as companies indirectly owning the SPE, through shareholdings of more than 50% at each step in the ownership chain, that are not themselves known to be controlled by another entity (other than a state or natural person). Some SPEs are joint ventures, usually with two direct parents that each have a stake of 50%. A few other SPEs are officially Netherlands-based multinationals but do not carry out substantial domestic business. In both cases, the SPE does not have a foreign ultimate parent and the Netherlands is regarded as the home country.

The SPE data require some preliminary processing before they can be used for the analysis of geographical investment patterns. Approximately 50 SPEs, representing 10% of total assets, belong to a banking group. In international investment statistics, crossborder loans between SPEs and foreign banks are always regarded as external loans, even if the counterparty is an affiliated entity. Yet due to the nature of SPE operations, most of these loans are probably intragroup. All loans between banking group SPEs and foreign banks are therefore reclassified as intragroup loans. Furthermore, the dataset contains various SPEs of which the total assets are substantially larger than total liabilities plus equity. To make both sides of the balance sheet match, a liability item with unknown origin is created where necessary.

For each SPE, an origin and destination matrix is generated by proportionally attributing the various country group destinations to the country group origins. After that, all matrices are added up, resulting in a total matrix for all SPEs. The general methodology for constructing origin and destination matrices is described in detail in Annex 7 to the OECD Benchmark Definition on FDI (OECD 2008).<sup>7</sup>

## **4 Origins and destinations of Dutch SPE investments**

As a background to the analysis of geographical investment patterns, table 1 shows the main individual origin countries for all SPEs in the dataset. The top seven countries are the same

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<sup>6</sup> This is a commercial database that integrates data from national company registers.

<sup>7</sup> In some cases, negative asset or liability positions occur. These may reflect a negative valuation of investments on the assets side or negative net worth reported as negative equity on the liabilities side, for example. The matrix calculations include additional rules to prevent positive assets from being attributed to negative liabilities (as a negative proportion) and vice versa. The negative positions are relatively small, though, so in the end the attribution rules did not materially influence the results.

for direct as well as ultimate parents. Not surprisingly, these countries include the largest economies. They also include the Netherlands Antilles and Luxembourg, which have lower shares of ultimate parents than direct parents and are therefore important locations of intermediate holdings. The true number of ultimate parents in these two countries is probably even lower due to incomplete ownership data. It is remarkable that over 40% of US ultimate parents hold their Dutch SPEs indirectly via another country. The average proportion for the overall population is approximately 25%.

**Table 1** Geographical distribution of parent companies of Dutch SPEs

|                       | Direct parents | Ultimate parents |
|-----------------------|----------------|------------------|
| United States         | 10%            | 17%              |
| United Kingdom        | 13%            | 13%              |
| Netherlands Antilles  | 9%             | 7%               |
| Luxembourg            | 9%             | 6%               |
| France                | 5%             | 6%               |
| Germany               | 7%             | 5%               |
| Japan                 | 6%             | 5%               |
| Other countries       | 40%            | 41%              |
| <i>Number of SPEs</i> | 822            | 680              |

Note: the table includes all SPEs in any of the reporting populations from April 2003 to December 2007 for which ownership data were available.

For the analysis of geographical investment patterns, seven country groups are defined on the basis of economic, political and tax criteria. The classification also takes into account the amount of detail that is allowed by confidentiality requirements. A description of the different country groups, which are mutually exclusive, is presented below.

- (1) **Developing without treaty:** 38 low and 67 middle income countries that do not have a tax treaty with the Netherlands.
- (2) **Developing with treaty:** 11 low and 25 middle income countries (other than the major emerging economies) that have a tax treaty with the Netherlands. These include Bangladesh, Indonesia, and Malaysia in Asia; Malawi, Nigeria, and Zambia in Africa; Argentina, Surinam, and Venezuela in Latin America; and former Soviet republics such as Azerbaijan and Kazakhstan. Countries in this group are probably most vulnerable to treaty shopping, because they have limited capacity to implement anti-avoidance measures. They also have a relatively weak position in tax treaty negotiations (Pistone 2010), which are highly complex (Thuronyi 2010).

- (3) **BRICSM**: The six major emerging economies Brazil, Russia, India, China, South Africa and Mexico. Each has a tax treaty with the Netherlands. In contrast to developing countries, they have the capacity to implement advanced domestic tax systems, including anti-avoidance measures, and are large and powerful enough to negotiate tax treaties with high income countries on an equal basis. Dutch SPE positions in all six countries are substantial.
- (4) **EU**: All EU-27 countries except Luxembourg, Belgium, Ireland, and the Netherlands itself. Within the EU, there is a high degree of economic integration, barriers to international investment are low, and no withholding taxes apply on crossborder transactions with affiliated entities.<sup>8</sup>
- (5) **Other high income**: 30 non-EU high income countries, including the US, Canada, Japan, Korea, Australia, New Zealand, Hong Kong, Singapore, Norway, Saudi Arabia and various minor countries, such as Brunei Darussalam and Equatorial Guinea. 17 of these have a tax treaty with the Netherlands. Hong Kong is the only high income territory outside the Dutch tax treaty network<sup>9</sup> where Dutch SPEs have substantial positions.
- (6) **Tax haven islands**: The eight tax havens that are no OECD members where liabilities of Dutch SPEs are largest. These are the Netherlands Antilles<sup>10</sup>, Aruba, Bermuda, British Virgin Islands, Cayman Islands, Guernsey, Jersey, and Puerto Rico. These are high income countries with some degree of autonomy, belonging to the Kingdom of the Netherlands, the UK, and the US. They all have zero corporate tax regimes.<sup>11</sup> Only the Netherlands Antilles and Aruba have tax treaties with the Netherlands.<sup>12</sup>

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<sup>8</sup> Except for transitory arrangements in some countries.

<sup>9</sup> The Netherlands and Hong Kong signed a tax treaty in 2010.

<sup>10</sup> In the period of analysis, the Netherlands Antilles was a largely autonomous jurisdiction consisting of Curaçao, where most financing companies are located, and four smaller islands. On 10 October 2010, the Netherlands Antilles were dissolved and Curaçao became a separate jurisdiction.

<sup>11</sup> Bermuda and the Cayman Islands do not levy corporate income tax. The Netherlands Antilles, Aruba, British Virgin Islands, Jersey and Guernsey exempt qualifying international financing companies (Curaçao has a grandfathering rule until end 2019, Jersey and Guernsey recently changed to a zero corporate tax rate for all

(7) **OECD tax havens:** Four OECD member countries that can also be regarded as tax havens for multinational corporations. They are Luxembourg, Ireland, Belgium and Switzerland. The precise nature of tax advantages differs per country. Until 2011, so-called 1929 Luxembourg Holding Companies were exempt from tax on income from foreign affiliates (Mutti and Grubert 2009). Ireland has a low corporate tax rate and US companies shift profits to Ireland by locating intellectual property there, for example through cost sharing agreements (Mutti and Grubert 2009). Belgium has a notional interest deduction scheme resulting in low tax rates for equity-funded corporations that provide loans to affiliates. In Switzerland, some cantons offer a low-tax environment. The main difference with tax haven islands is these four countries are independent OECD member states that have a high degree of economic integration with the Netherlands. Furthermore, they have not been treated as tax havens by the OECD Harmful Tax Practices project and they have many tax treaties.

Table 2 shows some tax system characteristics of the seven country groups. Developing countries in the first group on average have six tax treaties only. By contrast, those in the second group on average have 37 tax treaties, which is quite substantial. Treaty partners typically include other developing countries in the same region as well as OECD countries. Non-EU high income countries on average have a relatively low number of tax treaties, but this is because countries such as Equatorial Guinea, Gibraltar, and the Bahamas have no tax treaties at all. The data on average withholding taxes<sup>13</sup> (WHT) confirm that the standard rates for dividend (div.) and interest (int.) payments are substantially higher than the rates that apply for payments to the Netherlands.

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companies). Puerto Rico used to exempt US manufacturing companies (Grubert and Slemrod 1998); it phased out this regime by 2006 and introduced special tax allowances instead.

<sup>12</sup> The Netherlands-UK tax treaty does not cover the British territories and they are outside the EU. Similarly, the Netherlands-US treaty does not cover Puerto Rico. Curaçao inherited the Netherlands Antilles treaty.

<sup>13</sup> WHT data based on 170 countries for which data were available. Most countries and tax treaties define various rates. This study uses the maximum rate for large non-financial parent companies that hold a controlling stake in the host country entity, are not owned by a government, and are not subject to anti-avoidance provisions or based in a tax haven. Furthermore, for normal host countries, it disregards special rates for companies operating in a particular zone or industry. For tax haven host countries, in contrast, it uses the special rates for international financing companies, if applicable.

**Table 2** Tax system characteristics and inward FDI positions (in € bn)

| Country group                       | Number of tax treaties | <i>Country average (unweighted)</i> |                |                      |                | <i>Total for country group</i> |                           |                      |
|-------------------------------------|------------------------|-------------------------------------|----------------|----------------------|----------------|--------------------------------|---------------------------|----------------------|
|                                     |                        | div. WHT (no treaty)                | div. WHT to NL | int. WHT (no treaty) | int. WHT to NL | Total inward FDI               | Inward FDI via Dutch SPEs | Share via Dutch SPEs |
| (1) Developing without treaty       | 6                      | 11%                                 | 11%            | 14%                  | 14%            | 309                            | 19                        | 6%                   |
| (2) Developing with treaty          | 37                     | 11%                                 | 5%             | 14%                  | 7%             | 582                            | 53                        | 9%                   |
| (3) BRICSM                          | 63                     | 4%                                  | 3%             | 16%                  | 9%             | 929                            | 54                        | 6%                   |
| (4) EU <sup>a) b)</sup>             | 64                     | 12%                                 | 0%             | 11%                  | 2%             | 3,420                          | 710                       | 21%                  |
| (5) Other high income <sup>a)</sup> | 27                     | 12%                                 | 4%             | 11%                  | 7%             | 3,322                          | 243                       | 7%                   |
| (6) Tax haven islands               | 1                      | 3%                                  | 3%             | 6%                   | 6%             | 91 <sup>e)</sup>               | 103                       | n.a. <sup>e)</sup>   |
| (7) OECD tax havens                 | 66                     | 24%                                 | 0%             | 9%                   | 0%             | 831 <sup>d)</sup>              | 351                       | 42% <sup>e)</sup>    |
| All countries <sup>b)</sup>         | 23                     | 11%                                 | 7%             | 13%                  | 10%            | 9,481                          | 1,533                     | 16%                  |

Notes: Tax treaty and withholding tax data as of end 2007, average of end-2006 and end-2007 for total inward FDI, and SPE positions as of 30 June 2007; a) excluding tax havens; b) excluding the Netherlands; c) total inward FDI is excluding Jersey, Guernsey, and Puerto Rico because data are unavailable; d) €1,501 bn if Luxembourg SPEs are included; e) 23% if Luxembourg SPEs are included.

The last columns show total inward FDI stocks for each country group and investments held via Dutch SPEs.<sup>14</sup> In absolute terms, the EU is by far the largest destination of FDI via Dutch SPEs. However, Dutch SPE investments in developing countries are also substantial, over €70 billion in total. These investments account for 9 per cent of all inward FDI for the group of Dutch treaty partners and 6 per cent for the group of other developing countries. The relatively small difference between these shares is remarkable, because the tax advantages that can be obtained in the absence of a tax treaty are more limited. SPE investments in the first country group may still benefit from relatively generous unilateral tax relief provisions or protection under investment treaties, though. Investments in the BRICSM countries are not so large, given the size of these economies. Probably this is due to the well-known use of other, destination-specific conduit countries, notably Hong Kong for China and Mauritius for India. Dutch SPE investments in Hong Kong, included in the fifth country group, may involve substantial underlying assets in China.

Table 3 presents an origin and destination matrix for Dutch SPEs as of 30 June 2007. The destination dimension of the matrix includes FDI assets only and distinguishes the seven country groups mentioned above. The origin dimension includes all types of capital, thus also

<sup>14</sup> In this table and in the origin-destination matrices, capital provided by a Dutch SPE to its parent is counted as a positive investment, because this provides a more useful description of total SPE positions.

securities, liabilities to domestic non-SPE affiliates, and obligations to non-affiliated companies. On the origin side, all developing and emerging economies are combined into a single group for confidentiality reasons. Furthermore, there are two additional categories: the Netherlands itself, in case of domestic non-SPE affiliates or securities issued in the Netherlands; and capital of unknown origin, as explained in the previous section. Various cells have been merged, as confidentiality requirements would not allow to present all individual cells.

**Table 3** Investment positions of Dutch SPEs, by direct origin and destination (in €bn)

|                    |                               | Direct origin of capital |           |            |            |            |            |          | Total      |
|--------------------|-------------------------------|--------------------------|-----------|------------|------------|------------|------------|----------|------------|
|                    |                               | (1)-(3)                  | (4)       | (5)        | (6)        | (7)        | NL         | Un-known |            |
| <b>Destination</b> | (1) Developing without treaty | 32                       | 11        |            | 4          | 3          |            | 85       | <b>19</b>  |
|                    | (2) Developing with treaty    |                          | 32        |            |            | 7          | 1          |          | <b>53</b>  |
|                    | (3) BRICSM                    |                          | 23        | 4          | 17         |            |            |          | <b>54</b>  |
|                    | (4) EU                        |                          | 386       | 77         | 28         | 151        | 36         |          | <b>710</b> |
|                    | (5) Other high income         |                          | 142       |            | 86         |            |            |          | <b>243</b> |
|                    | (6) Tax haven islands         |                          | 180       |            | 231        |            |            |          | <b>103</b> |
|                    | (7) OECD tax havens           |                          |           |            |            |            |            |          | <b>351</b> |
|                    | <b>Total</b>                  |                          | <b>32</b> | <b>636</b> | <b>220</b> | <b>120</b> | <b>344</b> |          | <b>96</b>  |

Measured by the size of SPE liabilities, the EU is by far the largest origin of investments routed via the Netherlands. OECD member tax havens are also a large source of SPE funding, partly because of debt securities issued by SPEs that are listed in Luxembourg and Switzerland. Developing and emerging economies are often net capital importers and a relatively minor origin of Dutch SPE liabilities. SPE liabilities to and direct investments in non-EU countries that do not have a tax treaty with the Netherlands are only 5-10 per cent of the total. The main origins and destinations of this kind are British tax haven islands, Puerto Rico, Hong Kong, and some developing countries.

Approximately a quarter of the SPE investments are intra-EU. This is remarkable because inside the EU there are no withholding taxes that SPE structures may help to avoid. Furthermore, a substantial share of investments is routed from tax havens via Dutch SPEs into

other tax havens. This suggests that some Dutch SPEs are part of SPE chains and complex structures with other purposes than tax treaty shopping, such as avoidance of capital gains taxes on the sale of assets or hiding of ultimate ownership. Most of the capital invested via Dutch SPEs in low and middle income countries originates from the EU and other high income countries. The capital from tax havens is much smaller, but still over €10 billion. These tax haven liabilities indicate that Dutch SPEs facilitate significant investments that have potentially unfavourable tax consequences in low and middle income countries beyond the reduction of withholding taxes, especially in countries that have a tax treaty with the Netherlands.

Table 4 presents a different origin and destination matrix that shows the ultimate ownership of SPE investments. In this matrix, all SPE assets are attributed to the origin of the ultimate parent instead of the origins of direct counterparties. On several points, the origin of ultimate parents differs markedly from the direct origin of SPE capital.

**Table 4** Investment positions of Dutch SPEs, by origin of ultimate parent and destination (in €bn)

|                    |                               | Origin of ultimate parent |           |            |            |           |            |          | total      |
|--------------------|-------------------------------|---------------------------|-----------|------------|------------|-----------|------------|----------|------------|
|                    |                               | (1)-(3)                   | (4)       | (5)        | (6)        | (7)       | NL         | Un-known |            |
| <b>Destination</b> | (1) Developing without treaty | 60                        | 47        |            | 5          |           |            | 200      | <b>19</b>  |
|                    | (2) Developing with treaty    |                           |           |            |            |           |            |          | <b>53</b>  |
|                    | (3) BRICSM                    |                           | 30        | 4          | 69         |           |            |          | <b>54</b>  |
|                    | (4) EU                        |                           | 490       | 94         |            |           |            |          | <b>710</b> |
|                    | (5) Other high income         |                           | 213       |            | 20         |           |            |          | <b>243</b> |
|                    | (6) Tax haven islands         |                           | 186       |            | 116        |           |            |          | <b>103</b> |
|                    | (7) OECD tax havens           |                           |           |            |            |           |            |          | <b>351</b> |
|                    | <b>total</b>                  |                           | <b>60</b> | <b>770</b> | <b>293</b> | <b>11</b> | <b>130</b> |          | <b>69</b>  |

Investments of unknown origin are much higher, because ultimate parents could not always be identified. This problem occurs most often in the case of direct parents in tax havens, which tend to be highly secretive. Tax haven islands are a minor ultimate origin, because most SPE liabilities in these countries are to affiliated financing entities and ultimate parents that could be identified are usually located elsewhere. Ultimate parent positions from

OECD tax havens are also much smaller than direct counterparty positions, partly because of ownership chains and partly because of debt securities listed in these countries. Other country groups have larger share in ultimate ownership of SPEs than in the direct origin of SPE capital. Focussing on entities whose ultimate parents could be identified, the EU and other high income countries (other than tax havens) are the ultimate home countries for approximately 80% of all direct investment by Dutch SPEs.

## 5 Empirical analysis of treaty shopping

The previous section showed that the main direct origins and destinations of SPE investments are countries that have a tax treaty with the Netherlands. However, these countries include the largest origins and destinations of all global FDI, so the origin and destination matrix alone does not provide evidence of treaty shopping. This section does provide direct evidence by identifying structural determinantes of FDI diversion. Using regression analysis, at the level of country pairs, it tests which variables influence the proportion of bilateral FDI stock that is diverted through the Netherlands.<sup>15</sup>

Table 5 provides descriptive statistics for the regression variables. By default, the regressions use data from 2007. The dependent variable, the share of FDI from an origin country to a destination country diverted via the Netherlands, is calculated as follows. First, diverted FDI is obtained from an origin and destination matrix with FDI assets and liabilities that distinguishes all individual countries and territories. This matrix excludes assets financed with external debt or other non-FDI funding. Next, the diverted FDI stock is divided by the sum of the diverted and the non-diverted bilateral FDI stock. The latter is obtained from the OECD Statistics database, using inward FDI data if available. Observations with the same home and host country are excluded.

It can be expected that the marginal effect of treaty shopping benefits on the share of diverted investments is decreasing. The reason is that most large multinationals, which account for a substantial share of total FDI, may divert investments even if this leads to only a small reduction in effective tax rates, because they can obtain large absolute gains. Some large multinationals may face specific barriers, though, such as historical internal ownership structures or minority shareholders that make it costly to restructure existing operations.

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<sup>15</sup> The analysis excludes country pairs with tax haven host countries because the focus is on tax avoidance in

Others may have a preference for less complex holding structures or may simply be more focussed on maximizing operational rather than fiscal performance. Therefore some multinationals may only divert investments if treaty shopping reduces effective tax rates by a much larger amount. To model decreasing marginal effects, most regressions use the square root of the diverted share as the dependent variable. This simple transformation substantially enhances the model fit.

On the basis of existing literature, various potential determinants of FDI diversion were identified: gravity variables, tax variables, investment treaty variables, and variables reflecting the general treatment of foreign investors. The analysis includes two gravity variables. The first one serves to measure the effect that firms from a home country with relatively large investments in the Netherlands are also more likely to invest via the Netherlands, regardless of treaty benefits. To this end, the gravity variable is calculated as the ratio of non-diverted home country FDI into the Netherlands to total home country outward FDI stock. The other gravity variable serves to measure similar host country effects and is calculated as the ratio of non-diverted FDI from the Netherlands as a proportion of total host country inward FDI stock.<sup>16</sup> By default, data on total inward and outward FDI stocks are taken from UNCTAD statistics. However, for a few countries, UNCTAD severely underestimates total FDI stocks, so the sum of bilateral FDI stocks reported by OECD partner countries is used instead.<sup>17</sup>

The analysis uses two types of tax variables: general tax system indicators and more detailed measures modelling the potential benefits of specific tax strategies. The general indicators involve dummy variables only. First, for pairs of countries that both have a tax treaty with the Netherlands, a Dutch tax treaties dummy takes the value one. The dummy reflects potential tax treaty benefits and one would therefore expect a positive effect on FDI diversion. Second, a direct tax treaty dummy takes the value one for country pairs that have a tax treaty with each other. If two countries are EU members, this is regarded as equivalent to having a tax treaty between them. This dummy signals that potential benefits of diversion are typically lower because the direct tax treaty also reduces withholding taxes, although not

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normal host countries.

<sup>16</sup> Most regressions use the square roots of these shares to match the transformation of the dependent variable.

<sup>17</sup> Examples are total outward FDI stocks of Bermuda and the Netherlands Antilles as of end-2007, for which UNCTAD reports €0.1 billion and €0.7 billion, respectively, whereas the sum of bilateral inward FDI stocks reported by OECD partner countries is €14 billion and €68 billion, respectively.

necessarily by the same amount. One would therefore expect a negative effect on FDI diversion. A third dummy takes the value one if the home country does not exempt foreign income for at least 95%. This non-exemption dummy is a rough indicator for potential deferral and mixing benefits, which might lead to higher FDI diversion.

**Table 5** Descriptive statistics for regression variables

| Variable                                   | Mean | Sd <sup>a)</sup> | Min.  | Max.  | Unit of measurement                                       | Underlying sources                   |
|--|------|------------------|-------|-------|---|--------------------------------------|
| <i>Dependent variable</i>                  |      |                  |       |       |   |                                      |
| Diverted FDI share                         | 0.11 | 0.23             | 0.000 | 1.000 | Ratio of FDI stocks                                       | DNB, OECD                            |
| Diverted FDI share (root)                  | 0.20 | 0.26             | 0.000 | 1.000 | (Ratio of FDI stocks) <sup>½</sup>                        | DNB, OECD                            |
| <i>Gravity variables</i>                   |      |                  |       |       |   |                                      |
| Home gravity variable (root)               | 0.17 | 0.12             | 0.000 | 0.997 | (Ratio of FDI stocks) <sup>½</sup>                        | OECD, UNCTAD                         |
| Host gravity variable (root)               | 0.18 | 0.09             | 0.000 | 0.498 | (Ratio of FDI stocks) <sup>½</sup>                        | OECD, UNCTAD                         |
| <i>General tax variables</i>               |      |                  |       |       |   |                                      |
| Dutch tax treaties dummy                   | 0.80 | 0.41             | 0     | 1     | Dummy   | Dutch government                     |
| Direct tax treaty dummy                    | 0.72 | 0.45             | 0     | 1     | Dummy   | IBFD                                 |
| Non-exemption dummy                        | 0.52 | 0.50             | 0     | 1     | Dummy   | E&Y, Deloitte, PwC, national sources |
| Developing host x Dutch tax treaties       | 0.15 | 0.36             | 0     | 1     | <i>See interacted variables</i>                           |                                      |
| Developing host x direct tax treaty        | 0.17 | 0.37             | 0     | 1     | <i>See interacted variables</i>                           |                                      |
| <i>Strategy-specific tax variables</i>     |      |                  |       |       |   |                                      |
| Dividend conduit benefit                   | 0    | 5                | -25   | 20    | %-point change in tax on distributed profit <sup>b)</sup> | E&Y, Deloitte, PwC, national sources |
| Base company benefit                       | 3    | 6                | -18   | 35    | %-point change in tax on distributed profit <sup>b)</sup> | E&Y, Deloitte, PwC, national sources |
| Mixing company benefit                     | 2    | 3                | 0     | 8     | %-point change in tax on distributed profit <sup>b)</sup> | E&Y, Deloitte, PwC, national sources |
| Developing host x dividend conduit benefit | 0    | 3                | -25   | 12    | <i>See interacted variables</i>                           |                                      |
| Developing host x base company benefit     | 0    | 3                | -18   | 27    | <i>See interacted variables</i>                           |                                      |
| <i>Investment treaty variables</i>         |      |                  |       |       |   |                                      |
| Dutch inv. treaties dummy                  | 0.54 | 0.50             | 0     | 1     | Dummy   | Dutch government                     |
| Direct inv. treaty dummy                   | 0.60 | 0.49             | 0     | 1     | Dummy   | UNCTAD                               |
| <i>Other control variables</i>             |      |                  |       |       |   |                                      |
| European HQ dummy                          | 0.20 | 0.40             | 0     | 1     | Dummy   | -                                    |
| Developing host dummy                      | 0.29 | 0.45             | 0     | 1     | Dummy   | World Bank                           |
| Home corruption                            | 3.1  | 2.0              | 0.0   | 8.0   | CPI score (reversed scale, 0-9)                           | Transparency International           |
| Host corruption                            | 4.5  | 2.3              | 0.6   | 8.6   | CPI score (reversed scale, 0-9)                           | Transparency International           |
| Host tax treaties                          | 0.54 | 0.28             | 0     | 1.08  | No. of treaties / 100                                     | IBFD                                 |
| Host inv. treaties                         | 0.46 | 0.30             | 0     | 1.14  | No. of treaties / 100                                     | UNCTAD                               |

Note: data for end of 2007; the statistics are shown for the observations in the baseline regression. n = 1730 for mixing company benefit, n = 1742 for other strategy-specific tax variables, and n = 1757 for all other variables. <sup>a)</sup> Standard deviation; <sup>b)</sup> see Annex 1.

The strategy-specific variables express potential tax benefits as a percent-point change of the total tax on income generated in the host country. The analysis focusses on distributed profits and not on intragroup interest payments, because almost 80% of diverted FDI consists of equity investments.<sup>18</sup> The calculation of tax benefits involves tax data from all individual home and host countries as well as data on dividend withholding tax rates from Dutch tax treaties and over 1,200 tax treaties between home and host countries.<sup>19</sup> International tax data were obtained from surveys and country profiles by Ernst & Young, Deloitte and PwC, and supplemented with national sources where necessary.

The benefit of a dividend conduit is defined as the total tax on a profit generated in the host country that is distributed directly to the home country, minus the total tax that arises if the profit is distributed to the home country via a Dutch intermediate holding. The calculation takes into account the treatment of foreign dividend income in the home country. The benefit can be positive if a Dutch SPE reduces withholding taxes.<sup>20</sup> It can be negative if the Dutch route increases withholding taxes, even if the host and the home country both have a tax treaty with the Netherlands.

For home countries that do not exempt foreign dividend income, the base company benefit is calculated in a similar manner as the dividend benefit, assuming a profit is distributed to a Dutch intermediate holding only and not onwards to the home country.<sup>21</sup> This benefit reflects the payoff of a deferral strategy. The mixing company benefit is defined as half of the absolute difference between the home and host country tax rates.<sup>22</sup> This benefit reflects the payoff of mixing dividends from low-tax and high-tax sources: it increases if the

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<sup>18</sup> In principle, avoidance of capital gains tax on the potential future sale of a foreign subsidiary can also be a reason for diversion of equity investments, but this is probably not the main reason.

<sup>19</sup> For the selection of applicable tax rates, see note 13.

<sup>20</sup> As an example, consider a host country with a 20% WHT on dividends paid to non-treaty countries, which include the home country. The Netherlands has a tax treaty with the host country, which reduces this 20% rate to 10%, and also with the home country, which reduces the standard Dutch WHT on dividends from 15% to 5%. This reduces the total WHT from 20% to  $1 - (1 - 0.10)(1 - 0.05) = 14.5\%$ .

<sup>21</sup> The base company benefit may also capture structures involving a Dutch cooperative or structures with a US parent taking advantage of so-called tick-the-box regulations for the classification of foreign entities. Such structures may avoid further WHT and home country taxation even if the profit is distributed onwards to the home country.

<sup>22</sup> This is an approximation only, which assumes that a multinational repatriates equal pre-tax profits from host countries with lower and higher tax rates than the home country. Half of the resulting benefit is attributed to each type of host country. Withholding taxes are not taken into account.

home and host country tax rates are further apart and is always positive. For home countries that exempt foreign dividend income, the base and mixing company benefits are set to zero. It is expected that all strategy-specific tax benefits increase FDI diversion. Annex 1 contains the formulas for the strategy-specific tax benefits.

The analysis also includes two investment treaty dummies. Similar to the two tax treaty dummies, these capture FDI diversion due to investment treaties. It is expected that the Dutch investment treaties dummy has a positive effect and the direct investment treaties dummy has a negative effect on FDI diversion.

The analysis controls for two alternative explanations for investments via Dutch SPEs. First, a multinational from outside Europe may base its European headquarters (HQ) in the Netherlands and these headquarters may qualify as an SPE if Dutch assets are small compared to assets in other European countries. A European HQ dummy captures this situation.<sup>23</sup> Second, an investor may hold investments via a third country to reduce exposure to corruption in the home or host country. Corruption is measured using the Transparency International Corruption Perception Index (CPI) for 2007, which reflects perception of corruption by foreign investors.<sup>24</sup> It is expected that the possibility of European headquarters and higher corruption (a lower CPI score) in the home or host country increase FDI diversion.

The analysis uses the total numbers of tax and investment treaties signed by the host country as proxies for the country's general commitment to protect rights and interests of investors. If treaties have a signalling role, then one would expect a negative effect on FDI diversion. Finally, the regression variables include a dummy identifying developing host countries (excluding BRICSM) and interactions between this dummy and tax variables, to test whether FDI to developing countries is more likely to be diverted via Dutch SPEs.

The regression analysis uses tobit estimation because the share of diverted FDI is zero for approximately nine per cent of observations.<sup>25</sup> All regressions are estimated with robust standard errors. The baseline specification uses data for end of 2007. It excludes observations with total FDI below EUR 10 million. For such small positions, the diverted FDI share is

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<sup>23</sup> For the purpose of this dummy, Europe is defined as all EU countries plus Norway, Iceland, Switzerland, Croatia, Bosnia-Herzegovina, Serbia and Montenegro, Albania, and Macedonia.

<sup>24</sup> The 2007 CPI covers 179 countries, but none of the major tax haven islands identified in this study. For these jurisdictions, the corruption variable is set to zero (corresponding to the maximum CPI score of 10), because it is very unlikely that protecting against corruption is a reason to divert tax haven investments through the Netherlands.

relatively sensitive to potentially relevant non-reporting SPEs and inaccuracies resulting from the proportional attribution of assets to liabilities. As the analysis focuses on effects for normal economies, it also excludes tax haven host countries. The baseline specification includes 100 home countries and 146 host countries. It covers a combined €563 billion of diverted FDI stocks<sup>26</sup> and €6237 billion of non-diverted FDI stocks, representing roughly 75% of global FDI stocks.

Table 6 shows the results of regressions using general tax variables. In the baseline specification, the home and host country gravity factors are positive and highly significant, as expected. This confirms that in part, FDI diverted via the Netherlands simply follows the same pattern as regular FDI and may be attracted by the same forces, regardless of treaty benefits. If an additional ten per cent of the total outward FDI stock of a home country is invested in the Netherlands, then the share of the country's FDI to other destinations that is routed through the Netherlands is, on average, also approximately ten percentage points higher.<sup>27</sup> The host country gravity effect is slightly smaller.

Tax treaty effects are also significant and have the expected signs. On average, the existence of a Dutch treaty route is associated with approximately six percentage points more bilateral FDI being held via the Netherlands, whereas a direct bilateral tax treaty is associated with three percentage points less. These tax treaty effects are additional to gravity effects and it is difficult to think of another explanation than tax treaty shopping. The effect of foreign income taxation by the home country, indicated by the non-exemption dummy, is insignificant.

The bilateral investment treaty effects are significant and have the expected sign as well. The effects are similar in size to the tax treaty effects. This suggest that investment

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<sup>25</sup> The main results of OLS regressions are not materially different, though.

<sup>26</sup> At the end of 2007, total FDI diverted via the Netherlands was approximately €1,400 billion. The observations in the dataset add up to €864 billion, or roughly 60% of the total, because they do not include smaller SPEs, FDI assets attributed to unknown liabilities, or roundtripping FDI with the same origin and destination country. Total diverted FDI included in the regressions is further reduced to €563 billion, because for €110 billion of diverted FDI corresponding data on non-diverted FDI are unavailable, FDI into tax havens is disregarded, and tax data or control variables are missing for some minor countries.

<sup>27</sup> All effect sizes reported in the text are evaluated at mean values of the regression variables, taking into account the tobit estimation method and the transformation of the dependent variable. The effect sizes refer to the expected share of diverted FDI unconditional on this expected share being greater than zero, but the difference with conditional effect sizes is not substantial.

treaty shopping is another reason for investment diversion that is as important as tax treaty shopping. An alternative explanation could be that FDI diversion is mainly driven by tax planning and the resulting structures also benefit from investment protection, or the other way around. However, there is only some 50% overlap between the Dutch tax and investment treaty networks. Therefore it is likely that tax treaties and investment treaties are both determinants of FDI diversion.

**Table 6** Overall effect of tax treaties on FDI diversion

|                                      | (1)               | (2)                | (3)                | (4)                 |
|--------------------------------------|-------------------|--------------------|--------------------|---------------------|
| Home gravity variable                | 0.65***<br>(0.07) | 0.66***<br>(0.07)  | 0.86***<br>(0.10)  | 0.86***<br>(0.10)   |
| Host gravity variable                | 0.50***<br>(0.10) | 0.51***<br>(0.10)  | 0.39***<br>(0.13)  | 0.43***<br>(0.13)   |
| Dutch tax treaties dummy             | 0.07***<br>(0.03) | 0.07***<br>(0.03)  | 0.05<br>(0.03)     | -0.02<br>(0.05)     |
| Direct tax treaty dummy              | -0.04**<br>(0.02) | -0.05**<br>(0.02)  | -0.05**<br>(0.03)  | -0.02<br>(0.04)     |
| Non-exemption dummy                  | 0.01<br>(0.02)    | 0.01<br>(0.02)     | 0.02<br>(0.02)     | 0.02<br>(0.02)      |
| Developing host x Dutch tax treaties | -                 | -                  | -                  | 0.12**<br>(0.06)    |
| Developing host x direct tax treaty  | -                 | -                  | -                  | -0.13***<br>(0.05)  |
| Dutch inv. treaties dummy            | 0.07***<br>(0.02) | 0.06***<br>(0.02)  | 0.09***<br>(0.02)  | 0.08***<br>(0.02)   |
| Direct inv. treaty dummy             | -0.05**<br>(0.02) | -0.05**<br>(0.02)  | -0.01<br>(0.03)    | -0.01<br>(0.03)     |
| European HQ dummy                    | -                 | -0.05***<br>(0.02) | -                  | -                   |
| Developing host dummy                | -                 | -                  | -                  | 0.04<br>(0.05)      |
| Home corruption                      | -0.004<br>(0.004) | -0.002<br>(0.004)  | -0.001<br>(0.006)  | -0.001<br>(0.005)   |
| Host corruption                      | -0.003<br>(0.003) | -0.004<br>(0.003)  | -0.009*<br>(0.005) | -0.014**<br>(0.006) |
| Host tax treaties                    | -0.01<br>(0.04)   | 0.01<br>(0.05)     | 0.10<br>(0.07)     | 0.13*<br>(0.07)     |
| Host inv. treaties                   | 0.01<br>(0.04)    | 0.03<br>(0.03)     | 0.06<br>(0.05)     | -0.07<br>(0.05)     |
| Constant                             | -0.02<br>(0.03)   | -0.02<br>(0.03)    | -0.05<br>(0.04)    | -0.04<br>(0.05)     |
| Observations                         | 1757              | 1757               | 987                | 987                 |
| Adjusted R <sup>2</sup>              | 0.11              | 0.11               | 0.12               | 0.13                |

Notes: Dependent variable is the share of bilateral FDI stock diverted via the Netherlands. All specifications use tobit estimation. Robust standard errors are in parentheses. \* denotes  $p < 0.10$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .

The results indicate that avoidance of home or host country corruption does not play a significant role. Furthermore, FDI diversion is not significantly reduced if host countries have more treaties. This finding does not provide support for the idea that treaties have a signalling role.

The second regression tests whether a preference for establishing European headquarters in the Netherlands causes non-European multinationals to invest in Europe through the Netherlands. The coefficient of the corresponding European headquarters dummy is significant, but negative. This suggests the opposite, namely that the preference for Dutch SPEs is stronger in case of investments with a different destination or origin. The Netherlands does attract many European headquarters, or course, but so do various other European countries, whereas the Netherlands seems to be rather unique as a global treaty shopping platform.

The third regression excludes FDI via the Netherlands into the EU altogether. FDI into the EU accounts for a large number of observations but may follow different patterns due to the high degree of economic integration. In this specification, the Dutch tax treaties coefficient becomes insignificant, although FDI diversion still depends on the existence of a direct tax treaty between the home and host country. For investment treaties, the effect of a direct treaty becomes insignificant, but the diversion still depends on Dutch treaties. Thus, for FDI in non-EU countries, the results are only partially consistent with treaty shopping.

The fourth regression uses the same observations and analyses whether the effects of tax treaties are different for developing host countries than for other non-EU host countries. The general effects of tax treaties on FDI diversion are now insignificant. Thus, the mere existence of tax treaties does not affect the routes of investment in non-EU high-income and BRICSM countries. In contrast, the interaction variables show significant effects of tax treaties on FDI in developing host countries. These effects have the expected signs, consistent with tax treaty shopping, and are relatively large.

So far, the regressions show that FDI diversion depends on three types of structural determinants. First, gravity effects confirm that FDI diversion partly follows the same pattern as FDI in general. This suggests that a Dutch investment route offers some generic benefits, regardless of tax or investment treaties. Second, tax treaties have an additional effect on FDI diversion, except for FDI in non-EU high-income and BRICSM countries. For other host countries, a Dutch treaty route increases diversion, while a direct treaty with the home country reduces it. Several alternative specifications, presented in Annex 2, confirm that the effects of

tax treaties are sufficiently robust. This provides some first evidence of treaty shopping. Third, investment treaties have a similar additional effect. This provides some evidence of investment treaty shopping as well. Other potential determinants included in the regressions do not help to explain the pattern of FDI diversion.

The next series of regressions uses strategy-specific tax variables to test whether the effect of tax treaties is related to reduced withholding taxes. Each regression includes a measure for dividend conduit benefits and either base or mixing company benefits.<sup>28</sup> The dividend conduit and base company benefits distinguish Dutch tax treaties that provide large withholding tax reductions from others that provide smaller reductions or none at all.

Table 7 shows the regression results. In the first specification, gravity forces are similar to above and the coefficients for corruption and numbers of treaties are again insignificant. The dividend conduit benefit has a significantly positive effect. On average, a ten percentage points reduction in total taxes on distributed profits is associated with an additional three per cent of bilateral FDI being diverted via the Netherlands, again over and above the diversion explained by gravity forces. Thus, reduced dividend withholding taxes are a structural determinant of FDI diversion, which provides strong evidence for tax treaty shopping.

The effect of the base company benefit is insignificant, while a positive effect was expected. This suggests that deferral of home country taxation is not a main determinant of FDI diversion, at least not in addition to structures that also yield a dividend conduit benefit. It is very well possible that such structures are also used to defer home country taxation, though, because reduced withholding taxes between the Netherlands and the home country do not imply that multinationals always distribute subsidiary profits up to the ultimate parent.

The second regression includes the benefit of a mixing company instead of a base company. The effect of the mixing company benefit is positive but also insignificant. Thus, while anecdotal evidence indicates that some SPE structures serve specifically to achieve mixing of foreign tax credits, this motive is not a major determinant of FDI diversion. Further specifications are shown with the base company benefit only, but estimations with the mixing company benefit instead are not materially different. The apparent irrelevance of strategies to avoid home country taxation is consistent with the regressions above, which showed no

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<sup>28</sup> If both measures would be included simultaneously, the effect for country pairs where the host country has the lowest tax rate would be modelled largely independently from pairs where the home country has the highest tax rate. This would not provide useful information about overall tax strategies.

difference between home countries that do and do not exempt foreign dividend income.

However, the analysis may not properly reflect tax strategies behind Dutch SPEs with a direct parent in a tax haven or a country that exempts foreign profits and an ultimate parent in a country that does not exempt foreign profits.

**Table 7** Effect of strategy-specific tax benefits on FDI diversion

|                                    | (1)                | (2)                | (3)               | (4)                | (5)               | (6)                 |
|------------------------------------|--------------------|--------------------|-------------------|--------------------|-------------------|---------------------|
| Home gravity variable              | 0.65***<br>(0.07)  | 0.66***<br>(0.07)  | 0.64***<br>(0.07) | 0.66***<br>(0.07)  | 0.84***<br>(0.10) | 0.85***<br>(0.10)   |
| Host gravity variable              | 0.49***<br>(0.10)  | 0.50***<br>(0.10)  | 0.46***<br>(0.10) | 0.50***<br>(0.10)  | 0.35**<br>(0.14)  | 0.39***<br>(0.14)   |
| Dividend conduit benefit           | 0.38**<br>(0.16)   | 0.32**<br>(0.16)   | 0.33**<br>(0.17)  | 0.37**<br>(0.16)   | 0.65***<br>(0.22) | 0.37<br>(0.31)      |
| Base company benefit               | -0.14<br>(0.13)    | -                  | -0.15<br>(0.13)   | -0.06<br>(0.12)    | -0.14<br>(0.20)   | -0.01<br>(0.22)     |
| Mixing company benefit             | -                  | 0.27<br>(0.23)     | -                 | -                  | -                 | -                   |
| Dutch tax treaties dummy           | -                  | -                  | 0.06**<br>(0.02)  | -                  | -                 | -                   |
| Direct tax treaty dummy            | -                  | -                  | -0.04*<br>(0.02)  | -                  | -                 | -                   |
| Developing host x dividend benefit | -                  | -                  | -                 | -                  | -                 | 0.60<br>(0.45)      |
| Developing host x base benefit     | -                  | -                  | -                 | -                  | -                 | -0.25<br>(0.42)     |
| Dutch inv. treaties dummy          | 0.06***<br>(0.02)  | 0.06***<br>(0.02)  | 0.06***<br>(0.02) | 0.06***<br>(0.02)  | 0.08***<br>(0.02) | 0.08***<br>(0.02)   |
| Direct inv. treaty dummy           | -0.06***<br>(0.02) | -0.06***<br>(0.02) | -0.05**<br>(0.02) | -0.06***<br>(0.02) | -0.03<br>(0.03)   | -0.03<br>(0.03)     |
| European HQ dummy                  | -                  | -                  | -                 | -0.05**<br>(0.02)  | -                 | -                   |
| Developing host dummy              | -                  | -                  | -                 | -                  | -                 | 0.05*<br>(0.03)     |
| Home corruption                    | -0.002<br>(0.004)  | -0.002<br>(0.004)  | -0.001<br>(0.004) | 0.000<br>(0.004)   | 0.002<br>(0.006)  | 0.004<br>(0.006)    |
| Host corruption                    | -0.002<br>(0.003)  | -0.002<br>(0.003)  | -0.002<br>(0.003) | -0.003<br>(0.003)  | -0.008<br>(0.005) | -0.012**<br>(0.006) |
| Host tax treaties                  | 0.00<br>(0.04)     | 0.00<br>(0.04)     | 0.00<br>(0.04)    | 0.01<br>(0.04)     | 0.09<br>(0.05)    | 0.11*<br>(0.06)     |
| Host inv. treaties                 | 0.02<br>(0.04)     | 0.02<br>(0.04)     | 0.03<br>(0.04)    | 0.04<br>(0.04)     | 0.03<br>(0.05)    | -0.04<br>(0.05)     |
| Constant                           | 0.00<br>(0.03)     | -0.01<br>(0.03)    | 0.00<br>(0.04)    | 0.00<br>(0.03)     | -0.02<br>(0.04)   | -0.04<br>(0.04)     |
| Observations                       | 1727               | 1715               | 1727              | 1727               | 957               | 957                 |
| Adjusted R <sup>2</sup>            | 0.11               | 0.11               | 0.11              | 0.11               | 0.13              | 0.13                |

Notes: Dependent variable is the share of bilateral FDI stock diverted via the Netherlands. All specifications use tobit estimation. All specifications use tobit estimation. Robust standard errors are in parentheses. \* denotes  $p < 0.10$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .

The third regression adds tax treaty dummies, which hardly affects the result for the dividend conduit benefit. This confirms that the reduction of dividend withholding taxes is a key determinant of FDI diversion, even after controlling for legal certainty and other general provisions provided by tax treaties. However, the Dutch tax treaties dummy is significant too. Thus, apart from the limitation of dividend withholding taxes, tax treaties do provide further benefits that induce FDI diversion. These benefits may result from legal certainty, but also from tax sparing clauses or the limitation on interest withholding taxes, for example.

The fourth regression adds the European headquarters dummy again. Similar to the previous regression series, it does not have the expected sign, which indicates that FDI diversion via the Netherlands is not driven by European headquarters of non-European firms. Also similar to the above, the fifth regression limits observations to host countries outside the EU. For these host countries, dividend conduit benefits have a larger effect on FDI diversion. On average, a 10 %-points reduction in dividend withholding taxes is associated with an additional five per cent of bilateral FDI being diverted via the Netherlands. The sixth regression tests again whether the effect of tax benefits on FDI diversion is different for developing host countries and other non-EU host countries. Using strategy-specific measures for tax benefits, though, no significant difference is found.

The regressions with strategy-specific tax variables confirm the three types of structural determinants identified above: gravity effects, tax treaties, and investment treaties. In particular, they show that bilateral withholding tax reductions are a key determinant of FDI diversion via Dutch SPEs. Several alternative specifications, presented in Annex 2, demonstrate that this pattern is sufficiently robust. Contrary to expectations, the analysis does not provide evidence that specific strategies to avoid home country taxation, which fall outside the definition of tax treaty shopping, have an additional effect on FDI diversion.

Regarding the diversion of investments into non-EU countries, the mere presence of tax treaties is relevant for developing host countries only, whereas a reduction of dividend withholding taxes has an effect for all non-EU host countries. This might be explained by the fact that Dutch tax treaties with developing countries generate a dividend conduit benefit more often, as these treaties specify relatively low dividend withholding taxes. Dutch tax treaties with non-EU high income and BRICSM countries generate such a benefit less often, because half of these countries have no dividend withholding taxes and Dutch treaty rates are closer to treaty rates agreed with other partners.

## 6 Conclusions, discussion, and policy implications

This article analysed structural determinants of FDI diversion via the Netherlands. Focussing on tax treaties, it shows the following pattern: FDI diversion is higher if the home and host country both have a tax treaty with the Netherlands, and it is lower if there exists a direct treaty between the home and host country. Furthermore, it shows that diversion of investments is partly driven by specific corporate structures that reduce the total tax on distributed foreign profits by taking advantage of reduced withholding taxes under Dutch tax treaties. It can therefore be concluded that FDI diversion is partly driven by tax treaty shopping. The findings do not indicate that structures to specifically avoid home country taxation contribute to FDI diversion. Although the focus of this article is on tax treaties, it provides some evidence of investment treaty shopping via Dutch SPEs as well.

The results imply that apparent positive effects of tax and investment treaties on inward FDI can to some extent be attributed to treaty shopping. This has major implications for further research on foreign investment using bilateral FDI data, because FDI diversion changes the immediate destination of outward FDI and the immediate origin of inward FDI.

Although the results demonstrate that tax treaties matter for investment routes, they do not show how FDI diversion influences the overall amount of investment between ultimate origin and destination countries. This makes it difficult to assess the social costs and benefits of FDI diversion and hence also of Dutch tax treaties. Social benefits include higher after-tax returns for investors and potentially higher investment, which in turn may generate additional economic activity and tax revenues. The corresponding social costs consist of lower tax revenues at a given level of investment and implementation costs of tax planning. There are also indirect effects. A lower dividend withholding tax creates an incentive for a subsidiary to pay out higher dividends and reinvest less or repay less debt, for example. This reduces future investments and limits the tax base in the host country over time.

From a political perspective, though, the main issue is not whether these effects are on balance positive or negative. Instead, it is that FDI diversion limits a country's sovereignty to determine the tax treatment of investors from different countries. This outcome is unintended and largely unforeseen. Benefits of treaties with the Netherlands are intended for Dutch investors, not for investors from other countries investing through the Netherlands. Moreover, until recently, treaty partners could not foresee that tax treaty shopping might occur on a large scale.

The results have policy implications for non-EU countries as well as for the Netherlands (Weyzig and Van Dijk 2009). To keep better control over policy outcomes, non-EU countries may prefer unilateral measures to attract FDI instead of concluding new tax treaties that reduce withholding taxes on a bilateral basis. If countries suspect significant diversion of inward FDI via an existing treaty, they could opt to renegotiate the treaty and strengthen anti-avoidance provisions, but this process would be complicated and costly. It would be more efficient if the Netherlands were to take unilateral measures against treaty shopping. In principle, such measures could be effective even if other countries do not take similar measures, because the Netherlands is by far the largest pass-through country.

Some limitations to this study should be noted, although it is unlikely that these affect the main results. First, there are various limitations to the microdata. For example, some SPEs report larger assets than liabilities and the data do not cover smaller SPEs that may still be significant for particular destination countries. Second, the OECD macrodata on bilateral FDI also suffer from inconsistencies. Third, for a minority of SPEs with substantial liabilities to various countries, proportional attribution is not a very accurate method for constructing origin-destination matrices, because specific assets may be funded by specific liabilities. Due to these three factors, the figures in tables 2 to 4 have an error margin of several billions of euros. Fourth, longer ownership chains distort the estimation of home country tax effects. Fifth, the analysis uses normal withholding tax rates and disregards preferential regimes, but for some countries special tax concessions may significantly reduce the additional benefits of a tax treaty. Sixth, the analysis cannot take into account what tax treaties and regulations were in place at the time an investment was made. This last limitation is probably the most important one.

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## Annex 1: Calculation of tax benefits

### Dividend conduit benefit

If the home country exempts foreign dividend income:

$$Benefit = (1 - (1 - STR_{host})(1 - WHT_{host-home})) - (1 - (1 - STR_{host})(1 - WHT_{host-NL-home}))$$

and if the home country does not exempt foreign dividend income, but provides a tax credit:

$$Benefit = \max \left[ STR_{home}, (1 - (1 - STR_{host})(1 - WHT_{host-home})) \right] \\ - \max \left[ STR_{home}, (1 - (1 - STR_{host})(1 - WHT_{host-NL-home})) \right]$$

with  $STR$  denoting the statutory tax rate on corporate income and

$$WHT_{host-NL-home} = 1 - (1 - WHT_{host-NL})(1 - WHT_{NL-home}).$$

### Base company benefit

If the home country exempts foreign dividend income:  $Benefit = 0$ ;

if the home country does not exempt foreign dividend income, but provides a tax credit:

$$Benefit = \max \left[ STR_{home}, (1 - (1 - STR_{host})(1 - WHT_{host-home})) \right] \\ - (1 - (1 - STR_{host})(1 - WHT_{host-NL}))$$

### Mixing company benefit

If the home country exempts foreign dividend income:  $Benefit = 0$ ;

if the home country does not exempt foreign dividend income, but provides a tax credit:

$$Benefit = \frac{1}{2} |STR_{home} - STR_{host}|.$$

## Annex 2: Robustness checks

Table 8 presents robustness checks for the regressions with tax treaty dummies. The first regression omits gravity variables. In principle, apparent gravity effects may also result from other factors and in that case the gravity variables could distort the analysis. All tax and investment treaty effects are similar to the specification with gravity effects, though.

**Table 8** Robustness checks for overall effect of tax treaties on FDI diversion

|                           | (1)                  | (2)                  | (3)                | (4)                | (5)               |
|---------------------------|----------------------|----------------------|--------------------|--------------------|-------------------|
| Home gravity variable     | -                    | 0.63***<br>(0.08)    | -                  | 0.62***<br>(0.06)  | 0.88***<br>(0.13) |
| Host gravity variable     | -                    | 0.49***<br>(0.08)    | 0.51***<br>(0.08)  | -                  | 0.57**<br>(0.23)  |
| Dutch tax treaties dummy  | 0.08***<br>(0.03)    | 0.09***<br>(0.03)    | 0.06***<br>(0.02)  | 0.06*<br>(0.04)    | 0.06**<br>(0.02)  |
| Direct tax treaty dummy   | -0.06***<br>(0.02)   | -0.05**<br>(0.02)    | -0.06***<br>(0.02) | -0.06***<br>(0.02) | -0.05**<br>(0.02) |
| Non-exemption dummy       | 0.00<br>(0.02)       | 0.01<br>(0.01)       | -                  | 0.01<br>(0.02)     | -0.01<br>(0.01)   |
| Dutch inv. treaties dummy | 0.07***<br>(0.02)    | 0.05***<br>(0.02)    | 0.02<br>(0.02)     | 0.07***<br>(0.02)  | 0.05***<br>(0.02) |
| Direct inv. treaty dummy  | -0.05**<br>(0.02)    | -0.02<br>(0.02)      | -0.04***<br>(0.02) | -0.03*<br>(0.02)   | -0.04**<br>(0.02) |
| Home corruption           | -0.017***<br>(0.004) | -0.007<br>(0.004)    | -                  | -0.001<br>(0.004)  | 0.003<br>(0.004)  |
| Host corruption           | -0.007*<br>(0.003)   | -0.012***<br>(0.003) | 0.002<br>(0.003)   | -                  | 0.000<br>(0.003)  |
| Host tax treaties         | 0.00<br>(0.05)       | -0.11**<br>(0.04)    | -0.01<br>(0.04)    | -                  | 0.02<br>(0.04)    |
| Host inv. treaties        | 0.07*<br>(0.04)      | 0.07**<br>(0.04)     | 0.08*<br>(0.03)    | -                  | 0.00<br>(0.04)    |
| Home fixed effects        | -                    | -                    | Yes                | -                  | -                 |
| Host fixed effects        | -                    | -                    | -                  | Yes                | -                 |
| Constant                  | 0.20<br>(0.03)       | 0.03<br>(0.03)       | 0.04<br>(0.08)     | -0.09<br>(0.20)    | 0.03<br>(0.03)    |
| Observations              | 1802                 | 1709                 | 1757               | 1757               | 1781              |
| Adjusted R <sup>2</sup>   | 0.04                 | 0.12                 | -                  | -                  | 0.05              |
| Likelihood ratio          | -                    | -                    | 800.3              | 601.2              | -                 |

Notes: All specifications use tobit estimation. Standard errors are in parentheses; for specifications 1, 2 and 5 these are robust standard errors. Specifications 3 and 4 use normal tobit estimation with country dummies; the corresponding likelihood ratios have 94 and 117 degrees of freedom, respectively. \* denotes  $p < 0.10$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .

The second regression uses data for 2006 instead of 2007, which are different in several respects. The Dutch SPEs data are different because of restructurings and because the

reporting population is periodically revised. Availability of OECD data on bilateral FDI stocks is also different, because some data points are disclosed for only one of the two years. The 2006 data yield similar tax treaty effects, but do change some of the other results. The effect of a direct investment treaty between the home and host country is no longer significant and thus not entirely robust. Contrary to expectations, higher host country corruption is associated with significantly less FDI diversion. Moreover, the coefficients for the total numbers of host country tax and investment treaties are both significant, but they have opposite signs. These findings are difficult to explain.

The third regression includes home country fixed effects, which would capture relevant characteristics of home countries that may accidentally have been omitted from the specification. The tax treaty effects are not affected, but the effect of a Dutch investment treaty route is not robust to this specification. The fourth regression includes host country fixed effects instead. This reduces the significance, but not the size, of the estimated effect of a Dutch tax treaty route. The fifth regression uses a linear dependent variable, without the transformation to model decreasing marginal effects. The corresponding model fit is much lower, but otherwise the results are similar. It can be concluded that the overall effect of tax treaties on FDI diversion is sufficiently robust.

Table 9 presents the same robustness checks as table 8 for the regressions with strategy-specific tax variables. The first regression, without gravity variables, shows a significant effect of the base company benefit, but the negative sign suggests that this variable does not capture deferral strategies properly. The second regression, with 2006 data, mainly produces different coefficient estimates for direct investment treaties and for some of the country variables, similar to above. The third regression includes home country fixed effects. This reduces the size and significance of the dividend conduit benefit effect, but not to the point where it becomes entirely insignificant. The fourth regression includes host country dummies instead, which does not affect the original results. The fifth regression, with a linear dependent variable, has a lower model fit again, but the coefficient for the dividend conduit benefit remains significant at the 10% level. Thus, the effect of strategy-specific tax benefits is also sufficiently robust.

**Table 9** Robustness checks for effect of strategy-specific tax benefits on FDI diversion

|                           | (1)                  | (2)                  | (3)                | (4)                | (5)               |
|---------------------------|----------------------|----------------------|--------------------|--------------------|-------------------|
| Home gravity variable     | -                    | 0.60***<br>(0.08)    | -                  | 0.64***<br>(0.06)  | 0.88***<br>(0.13) |
| Host gravity variable     | -                    | 0.50***<br>(0.08)    | 0.51***<br>(0.08)  | -                  | 0.59***<br>(0.23) |
| Dividend conduit benefit  | 0.49***<br>(0.17)    | 0.52***<br>(0.16)    | 0.27*<br>(0.15)    | 0.37**<br>(0.17)   | 0.26*<br>(0.15)   |
| Base company benefit      | -0.37***<br>(0.13)   | -0.19<br>(0.12)      | -0.10<br>(0.14)    | -0.07<br>(0.14)    | -0.21*<br>(0.11)  |
| Dutch inv. treaties dummy | 0.06***<br>(0.02)    | 0.06***<br>(0.02)    | -0.02<br>(0.02)    | 0.06***<br>(0.02)  | 0.05**<br>(0.02)  |
| Direct inv. treaty dummy  | -0.06***<br>(0.02)   | -0.03*<br>(0.02)     | -0.05***<br>(0.02) | -0.05***<br>(0.02) | -0.04**<br>(0.02) |
| Home corruption           | -0.014***<br>(0.004) | -0.006<br>(0.004)    | -                  | 0.001<br>(0.004)   | 0.004<br>(0.003)  |
| Host corruption           | -0.005<br>(0.003)    | -0.012***<br>(0.003) | 0.002<br>(0.003)   | -                  | 0.001<br>(0.003)  |
| Host tax treaties         | 0.01<br>(0.04)       | -0.08**<br>(0.04)    | -0.01<br>(0.04)    | -                  | -0.02<br>(0.04)   |
| Host inv. treaties        | 0.08**<br>(0.04)     | -0.06<br>(0.03)      | 0.08**<br>(0.03)   | -                  | -0.01<br>(0.03)   |
| Home fixed effects        | -                    | -                    | Yes                | -                  | -                 |
| Host fixed effects        | -                    | -                    | -                  | Yes                | -                 |
| Constant                  | 0.23***<br>(0.03)    | 0.07**<br>(0.03)     | 0.05<br>(0.08)     | -0.02<br>(0.04)    | 0.04*<br>(0.02)   |
| Observations              | 1772                 | 1680                 | 1814               | 1766               | 1751              |
| Adjusted R <sup>2</sup>   | 0.04                 | 0.12                 | -                  | -                  | 0.05              |
| Likelihood ratio          | -                    | -                    | 811.8              | 593.7              | -                 |

Notes: All specifications use tobit estimation. Standard errors are in parentheses; for specifications 1, 2 and 5 these are robust standard errors. Specifications 3 and 4 use normal tobit estimation with country dummies; the corresponding likelihood ratios have 106 and 118 degrees of freedom, respectively. \* denotes  $p < 0.10$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .