Do Bilateral Tax Treaties Promote Foreign Direct Investment?

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Abstract: We explore the impact of bilateral tax treaties on foreign direct investment using data from OECD countries over the period 1982-1992. We find that recent treaty formation does not appear to promote new investment, contrary to the common expectation. For certain specifications we find that treaty formation may actually reduce investment as predicted by arguments suggesting treaties are intended to reduce tax evasion rather than promote foreign investment.

I. Introduction

Economists have long been concerned over the effect of taxation on foreign direct investment (FDI). A plethora of studies have examined whether and to what extent FDI responds to tax incentives. While the specific results vary, the general consensus is that firms do indeed respond to a variety of tax policies.[1] This issue is of primary concern to economists because it can result in an inefficient allocation of investment across countries. As governments use their tax policies to affect the rates of return on capital, provide public goods, or simply capture part of the profits that would otherwise be repatriated to other countries, this can divert investment from its most productive locations. One potential method of relieving this inefficiency is a bilateral tax treaty on FDI. These treaties adjust the tax environment for investment between treaty partners by specifying the applicable tax base, the withholding taxes that can be applied, and other measures affecting the taxation of FDI. Worldwide, over 2,000 of these treaties are in force and they govern the taxation of the large majority of FDI (Radaelli, 1997).

Since treaties indicate cooperative taxation by treaty partners, many economists assume that treaties increase investment. However, it is by no means certain that treaties do so. In particular, since treaties can reduce tax avoidance and other tax-saving strategies by firms, they might actually have a dampening effect on FDI. Furthermore, legal researchers have questioned whether FDI promotion is even a primary goal of treaty formation. In light of these conflicting arguments, the effect of tax treaties on FDI is an open question. This chapter presents empirical

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[1] See Wilson (1999) and Gresik (2001) for surveys of the both the theory and empirical economic literature regarding the effects of taxation on foreign investment.

results on treaty formation by OECD members. Our findings suggest that, at least for recent

treaties, treaty formation most likely does not increase FDI activity between members and may

in fact decrease it. Thus, our results stand at odds with the FDI promotion rationale for treaty

formation.

Before delving into our data analysis, it is instructive to consider the conflicting opinions

about tax treaties. The FDI promotion view of treaties springs from the idea of a tax distortion to

investment. To illustrate this concept, consider the following simple model of FDI. An investor

in the parent country has an amount of capital K that she can invest either in her parent country,

a host country, or both. The amount of her exported capital is Z, thus Z represents the level of

FDI. The rate of return in the parent country is a decreasing function of capital invested in the

parent country $r(K-Z)$, while rate of return in the host country is decreasing function of FDI

$r^*(Z)$. Efficiency requires that capital be allocated between the two countries such that the rates

of return are equal (or that all the capital is invested in the high-return country). However, the

investor is not concerned with the total return on capital, but rather her share of it. In other

words, the investor bases her decisions on the after-tax rate of return in each country, not the

gross rate of return. As a result, if t and t^* are the marginal effective tax rates on investment in

the parent country and in the host, the investor will compare $(1-t)r(K-Z)$ with $(1-t^*)r^*(Z)$.[2]

Unless the marginal effective tax rates are equal, the equilibrium distribution of capital will be

inefficient because efficiency calls for capital export neutrality in which only real, that is non-

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[2] Since we are examining the marginal capital allocation, the appropriate tax rate is the
marginal rate. Identification of the marginal tax rate is notoriously difficult. Graham (1996)
provides discussion of the various proxies researchers have used for the marginal tax on
corporate income.

tax, variations govern capital flows. Therefore, as governments use their tax policies, it can

quite easily lead to differential tax rates across locations and inefficient levels of FDI. Note that

differential tax rates do not require different statutory taxes since the effective tax depends on

many factors, including the definition of the tax base, accelerated depreciation rules, research

and development tax credits, double taxation relief, and the like. It is generally believed that the

effective tax rate against host investment exceeds that on investment in the parent country,

implying that FDI is inefficiently low. Hines (1988) and Wilson (1993) support this concept by

illustrating how typical parent country tax policies such as accelerated depreciation for domestic

investments effectively result in tax rates that discriminate against overseas investment. Tax

treaties can help to alleviate this problem by coordinating tax policies between treaty partners.

This idea is mirrored in the introduction of the OECD's model tax treaty, which states that a

primary goal of treaty formation is "removing the obstacles that double taxation presents", thus

reducing its "harmful effects on the exchange of goods and services and movements of capital,

technology, and persons" (OECD, 1997, p. I-1).[3] If treaties do indeed reduce these tax barriers

to FDI, one would expect that FDI activity would rise after a treaty is enforced.

Although individual treaties include a wide range of specific investment incentives,

overall treaties reduce the barriers to FDI in two ways.[4] First, by harmonizing the tax definitions

and the tax jurisdictions of treaty partners, a treaty can reduce the double taxation of investment.

For example, income is typically taxed in a host country when it is generated through a

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[3] For an excellent discussion of the workings of the OECD model tax treaty, see Baker (1994).

[4] For specifics of the treaties, see the treaties themselves as reprinted by Diamond and Diamond (1998).

permanent establishment. However, without a treaty each country can form its own definition of

a permanent establishment. If this definition differs between countries, it can lead to double

taxation of overseas profits (Hamada, 1966). Janeba (1996) discusses how these definition

differences can then result in inefficient capital flows. This idea is confirmed empirically by

Hines (1988), who finds that the 1986 Tax Reform Act, which revised U.S. tax definitions, led

to an increase in U.S. outbound investment. Since treaties standardize tax definitions and

jurisdictions (often by matching them to those provided by the OECD's model tax treaty (OECD,

1997)), they have a similar potential to increase FDI.

Second, tax treaties affect the actual statutory taxation of multinationals. They do so

through the rules affecting double taxation relief and the withholding taxes levied on

repatriations by FDI. Following the OECD model treaty guidelines, most tax treaties specify

that both countries must either exempt foreign-earned profits from domestic taxation or offer

foreign tax credits when calculating the domestic tax bill.[5] Although most countries already

offer their investors credits or exemptions, certain treaties do alter the relief method applied by

one or both treaty partners.[6] In addition to the provisions for double taxation relief, treaties

usually reduce maximum allowable withholding taxes on three types of remitted income:

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[5] Under a tax credit, the domestic tax bill is calculated by applying the standard domestic
tax rate to the pre-foreign tax level of overseas profits. A credit against this amount is then
applied up to the amount of the foreign taxes paid. If this credit exceeds the domestic tax
liability, the firm is in an "excess credit" position and pays no additional taxes on these overseas
profits. If the parent country tax bill is greater than the amount of the credit, the firm is in an
"excess limit" position and pays the remaining amount to the parent country's government.

[6] For instance, Belgium applies a reduced domestic tax rate to the foreign-earned profits
of its residents. Under the U.S./Belgium treaty, however, income earned by Belgian firms in the
U.S. is exempt from Belgian taxation.

dividend payments, interest payments, and royalty payments.[7]   Some treaties lower these

withholding rates to as low as zero. Most treaties specify that the same maximum rates apply to

both treaty partners.[8] If these reductions in the withholding tax reduce the tax burden on

overseas investment, equivalent to reducing t^* above, this should increase FDI.[9] Note that even

though withholding tax rates fall under a treaty, this does not imply that tax receipts from

inbound investment must decline. Since withholding taxes can be tailored to the specific

investment from a treaty partner, it may be possible to set tax rates which encourage tax-

sensitive inbound investment and actually raise total tax receipts.[10] In addition, treaties are

accompanied by improved information exchange between partner governments.[11] Because of

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[7] Note that a lower foreign tax rate does not guarantee a reduction in the firm's total tax bill. When a parent country offers foreign tax credits, only firms in an excess credit position will benefit by a reduction in host taxes (Altshuler and Newlon, 1991). Thus, a decrease in the overseas tax rate may not improve capital flows.

[8] One exception is the U.S. treaty with Pakistan in which U.S. firms receive no tax break from Pakistan while Pakistani firms do receive reduced tax rates from the U.S..

[9] Several researchers, including Altshuler and Newlon (1991), Hines (1992), Altshuler, Newlon, and Randolph (1995), and Mutti and Grubert (1996) have found that firms do respond to changes in withholding tax rates by changing both the timing and method of repatriation. However, this evidence suggests that treaties can affect the profitability of overseas investment, and does not necessarily imply that treaties will induce new FDI.

[10] As derived in Bond and Samuelson (1989) among others, the tax revenue maximizing tax rate on inbound FDI is $1/(1+\varepsilon)$, where ε is the elasticity of inbound FDI supply. If ε varies across countries, the revenue maximizing tax rate will differ across countries. Since a treaty allows a country to lower its tax rate, this can actually raise tax revenues if the current tax rate is greater than the optimal tax on FDI from that particular country.

[11] In addition to the bilateral treaties, the OECD has establised the multilateral Convention on Mutual Assistance in Tax Matters which provides for information exchange even between members without bilateral treaties (OECD, 1989).

this, tax evasion may fall under a treaty, leading to increased tax revenue.[12]

Combining these arguments, it is easy to understand the common expectation that tax treaties serve to increase the amount of FDI activity between treaty partners. Nevertheless, there exist several economic and legal arguments which suggest treaties may have no effect on FDI. For instance, Dagan (2000) asserts that the use of treaties to promote foreign direct investment is "a myth" (p. 939). He claims that since a parent country could unilaterally adjust its tax policy to eliminate distortions caused by differing parent and host country tax policies, promotion of efficiency plays little role in treaty formation. Instead, Dagan suggests that treaties are intended to reduce administration costs, reduce tax evasion, and to extract tax concessions from treaty partners. Radaelli (1997) also dismisses the double taxation objective in favor of the view that tax treaties are geared towards reducing tax evasion. Furthermore, there is the concern that tax treaties arise due to lobbying efforts by profit-seeking investors. If this is the case, then treaties may be geared towards maximizing investor profits rather than promoting efficient investment.[13] In addition to uncertainties about government objectives in treaty formation, it is by no means clear that firms' investment activities will necessarily respond to reductions in withholding tax rates. Hartman (1985) and Sinn (1993) argue that withholding taxes are irrelevant for expanding multinational firms since it is cheaper to expand an overseas affiliate through retained earnings than through repatriated and re-exported funds. This is because retained earnings avoid the

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[12] Devereux, Griffith, and Klemm (2001) find that, even though corporate tax rates for the U.K. appear to have declined since the mid-1960s, tax revenues from corporate income have not. They suggest that part of this result may stem from a broadening of the incomes classified as corporate.

[13] According to Radaelli (1997), treaty formation by the U.S. is free of such business lobbying efforts.

withholding taxes applied to repatriated funds. As a result, they suggest that only mature, non-expanding foreign affiliates will repatriate earnings, implying no effect of withholding taxes on FDI.

Finally, it is even possible that tax treaties may actually increase the tax barriers for certain kinds of investment. As noted above, through information exchange treaties can reduce the firm's ability to engage in transfer pricing. This is the practice by which, through manipulation of the price of goods traded between their various subsidiaries, firms can shift profits to low tax locations and minimize their global tax revenues. As argued by Casson (1979), transfer pricing provides firms with an incentive to invest in those low tax locations in order to shield profits from taxes.[14] Since treaties streamline and promote the exchange of tax information by governments, this reduces firms' ability to avoid taxes through misrepresentation of costs. As a result, treaties may reduce the incentive to engage in investment for tax minimization reasons, leading to a decrease FDI activity. In addition, recent tax treaties have sought to eliminate treaty shopping. Treaty shopping is a practice in which investments are funneled through a treaty country by a third nation for the purpose of avoiding or reducing taxes. According to Radaelli (1997), concerns over treaty shopping have been a primary focus of many new treaties and have prompted the U.S. to renegotiate many of its older treaties. In addition, certain so-called "tax haven" countries (particularly Aruba, Malta, and the Netherlands-Antilles) have seen several of their treaties cancelled due to perceived insufficient efforts to prevent treaty shopping. If a treaty is revised to close this possibility, then this could easily reduce the

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[14] Caves (1993) provides an explanation of transfer pricing. Graham and Krugman (1995) provide case studies of firms prosecuted by the U.S. for engaging in transfer pricing.

investment activity between treaty partners as third nation investors choose to simply send their capital directly to the ultimate host. While there are many variations in the regulations that address treaty shopping, the most common rules restrict treaty benefits if more than 50 percent of a corporation's stock is held by a third, non-treaty country's residents (Doernberg, 1997).

With these conflicting arguments in mind, it is by no means certain that bilateral treaties will increase the amount of FDI between partner countries. This issue is of importance because of the sizable costs to treaty formation. For most countries, tax treaties are like any other international agreement in that they must be drawn up and then ratified by the appropriate governing body. Ratification is no mean feat since the treaty cannot conflict with other national policies. For the U.S., this is not a severe problem since tax treaties are federal instruments and thus supercede state or local laws.[15] This is not always true elsewhere. Anders (1997), for example, gives an in-depth discussion of the difficulties the U.S.-German treaty faces since it may violate the anti-discrimination rules of the European Union. Even ignoring such possible roadblocks, the simple conflicts of bilateral negotiation require much time and effort. Conflicts over the terms of the treaty can lead to failure during the development stage or even during ratification. For example, the U.S.-Cyprus treaty required three attempts before it was finally ratified in 1988. Thus, in light of these large costs, it is important that we gauge the potential gains from treaty formation. We seek to provide one possible measure of the gains from treaty formation by estimating the impact of treaty formation on the FDI of OECD members.[16]

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[15] Generally, the only limitation U.S. tax treaties place on state taxation is that a foreign corporation must be treated the same as a firm incorporated in another state (White, 1991).

[16] Hines and Willard (1992) empirically examined the number of treaties a country signs as well as the tax concessions dictated by a particular treaty. However, they do not include the

Using recent models developed by Carr, Markusen, and Maskus (2001) and Markusen and Maskus (2001), we test whether or not treaty formation by OECD members is associated with changes in FDI activity. Using data from 1982 to 1992, we examine the behavior of FDI stocks and FDI flows. Initial results indicate that treaties seem to increase FDI. However, this result is suspect because the sample includes many older treaties which were enacted well before our data series begins. Therefore, we also split our sample into "old" and "new" treaties. Here, we find that new treaty formation is not significantly correlated with FDI activity. In fact, when we restrict ourselves to just those countries that enacted a treaty during our sample, we find that FDI stocks are significantly decreased after treaty formation. These results are consistent with Dagan (2000) and Radaelli (1997) who claim that recent treaties are not geared towards the promotion of FDI but rather towards reductions in tax evasion. While these results do not mean that treaties cannot be used to increase FDI they do suggest that the FDI promotion argument seems suspect.

The chapter proceeds as follows. In Section II, we present our empirical methodology. We discuss our data in Section III. Section IV presents our results and Section V concludes.

II. Empirical framework for statistical analysis

In order to examine how treaties affect FDI, we require a framework that describes the determinants of FDI. Over the past couple decades, James Markusen and co-authors have

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amount of FDI activity as an explanatory variable nor do they consider the effect of taxation on FDI. The United Nations (1998) has studied the effects of bilateral treaties for the promotion and protection of FDI. These treaties are generally geared towards increasing investment in developing nations by ensuring a favorable political and economic climate and do not address tax concerns.

developed formal general equilibrium theory models of multinational enterprise (MNE)

activity.[17] These theory models lead to predictions of equilibrium FDI activity across bilateral

pairs of countries in terms of a few observable factors. Recently, Carr, Markusen and Maskus

(2001) and Markusen and Maskus (2001) tested the "knowledge-capital" version of the

Markusen model of MNE activity using data on affiliate sales of U.S. firms in other countries

and foreign affiliate sales in the U.S. over the period 1986-1994. They find substantial empirical

fit of the knowledge-capital model to the data. The Carr, Markusen, Maskus (CMM) empirical

framework is specified by the following equation:

$$\text{FDI}_{ij} \quad ' \quad f(\text{SUMGDP}_{ij}, \text{GDPDIFSQ}_{ij}, \text{SKDIFF}_{ij}, \text{GDPDIFF}_{ij} (\text{SKDIFF}_{ij}, Z_{ij}, \text{TREATY}_{ij}) \quad \textbf{(1)}$$

The dependent variable, FDI_{ij} is a measure of FDI activity from a parent country (i) to a

host country (j). CMM use affiliate sales data as their "FDI" measure, though Blonigen and

Davies (2000) find that the CMM empirical framework also fits U.S. FDI stock (and to some

extent, FDI flow) data reasonably well.

The first four independent variables on the right hand side of equation (1) are the

variables specific to the CMM framework. The first two terms are relatively straightforward,

with SUMGDP defined as the sum of the two countries' real gross domestic products (GDPs),

and GDPDIFSQ defined as the squared difference between the two countries' real GDP. There

is an expected positive correlation between SUMGDP and FDI activity and an expected negative

correlation between GDPDIFSQ and FDI activity. The intuition is that with some positive level

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[17] For recent examples of this work, see Markusen, Venables, Eby-Konan, and Zhang
(1996) or Markusen (1997).

of trade frictions, larger and more similar sized markets better support the higher fixed costs associated with setting up production across countries (versus exporting) and lead to greater FDI activity.

The third and fourth terms on the right-hand side of equation (1) are more complicated terms related to differences in the two countries relative endowments of skilled labor. Skilled labor is important in the Markusen theory of MNE activity because those firms that have firm specific assets (which are developed using skilled labor) will have the greatest incentives to expand their operations across borders. The SKDIFF variable is the parent country's skilled labor abundance minus the host country's skilled labor abundance. Given the role of skilled labor in the Markusen theory, this variable is expected to have a positive correlation with our FDI variable, which is measured as the activity from the parent to the host country. The final term is an interaction term between SKDIFF and GDPDIFF, the parent country's GDP minus the host country's GDP. The theoretical model predicts a negative correlation between this variable and FDI from the parent to the host country, since the theory predicts larger effects of SKDIFF on FDI when the parent country is a lot smaller than the host country.

In addition to the variables just described, additional control variables (Z_{ij}) have typically been included in the CMM empirical framework. First, distance ($DISTANCE_{ij}$) is included to proxy for transport and other trade costs that may affect a firm's decision about whether to become an MNE. Second, trade openness for both the parent and host countries (T_OPEN_i and T_OPEN_j) affect the MNE's ability to trade intermediates and final goods, which then affects the location of MNEs. Greater openness in the host country should lower FDI activity because it lowers trade frictions and makes exporting a relatively more attractive method of serving the

11

host market than FDI. Greater openness in the parent country should increase FDI, since it makes it easier to ship goods back to the parent country from foreign affiliates. FDI openness of the host country (F_OPEN$_j$) proxies for the costs of setting up an MNE, with greater openness expected to increase FDI activity.

The last independent variable on the right hand side of equation (1) is our focus variable: a measure of bilateral investment tax treaty activity. There are substantial measurement issues that determine how we define this variable. In particular, we can observe when countries make bilateral investment tax treaties with each other, but these treaties certainly differ from each other along many dimensions which are very difficult to quantify. In addition, the same treaty on paper, can have vastly different consequences for different pairs of countries depending on the unilaterally-adopted tax practices of the countries before entering the treaty. There is little that can be quantified across treaties with the exception of agreed-upon tax withholding rates. Unfortunately, these withholding rates are typically maximum allowable rates and there is evidence that countries sometimes set rates below these maximum allowable rates after the treaty, making them uninformative for our purposes of analysis (Blonigen and Davies, 2000). Because of these difficulties, we primarily measure tax treaty activity in this paper as a binary variable taking the value of "1" if two countries have a bilateral tax treaty in place and "0" if they do not. As a result, we will only be able to estimate an average total impact of tax treaties across our sample of countries.

While we only report results on the effect of bilateral tax treaties using the empirical CMM framework described above, we note that we get qualitatively similar results for the impact of tax treaties when using alternative empirical frameworks. This includes variations of

12

the CMM framework found in Markusen and Maskus (1999) and a "gravity-type" framework which posits FDI activity as only a function of the size of the countries (proxied by real GDP) and distance.[18] Although these results have been omitted for space, they are available upon request.

III. Data

One of the major hurdles in the analysis of the effect of bilateral tax treaties on FDI is data constraints. As noted above, this begins with measuring the treaty activity. However, there are also significant measurement issues with respect to the data on bilateral FDI activity as well. For this study we use OECD data on bilateral FDI stocks and flows, as reported by OECD-member countries.[19] Such data were not even compiled into a publicly-available form until 1993 with the first annual OECD *International Direct Investment Statistics Yearbook*.[20] Since the data are collected from national sources in each country, there is substantial variation in coverage by country source and by year, and there is variation in measurement of FDI activity itself. Almost all countries report inflows and outflows for at least some select bilateral pairings, with about half also reporting measures of inward and outward stocks of FDI. The earliest data available begin in 1982. Table 1 provides further details on data coverage across OECD

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[18] Brainard (1996), for example, uses a gravity-type specification.

[19] As mentioned in the section above, Carr, Markusen and Maskus (2001) and Markusen and Maskus (2001) use U.S. data on MNEs' foreign affiliate sales, which is a theoretically preferable measure of MNE activity. However, to our knowledge, there are very few countries that keep track of affiliate sales, and there is no comprehensive cross-country database of foreign affiliate sales activity, even for OECD countries.

[20] These data are available in print form in these annual yearbooks or in electronic form on the OECD Statistical Compendium CD-ROM, available for purchase from the OECD.

countries and years in our sample.

There are definite comparability issues of FDI measures across countries. For example, a number of OECD countries do not include reinvested earnings by firms in their measures of FDI. Countries can also differ in what percentage of foreign-owned shares of a firm are necessary for it to be classified as FDI rather than portfolio investment.[21] However, with only a couple exceptions, we note that FDI definitions are fairly consistent for the same country over time. This is important because in our statistical analysis we will be able to use techniques that estimate relationships between variables using only the sample data variation within individual countries over time, avoiding cross-country data measurement consistency problems that arise for other statistical techniques.

Besides our FDI and tax treaty measures, our statistical analysis employs the additional CMM empirical framework control variables. Our data on real GDP, which is used to construct the SUMGDP and GDPSIFSQ variables, come from the well-known Penn World Tables, which are described by Summers and Heston (1991) and are available online at http://datacentre.chass.utoronto.ca:5680/pwt/. To construct our measure of differences in skilled labor endowments, we use World Bank data on the average country-level education attainment as a proxy for such endowments. Nehru and Dhareshwar (1993) provide further details on these data. DISTANCE was measured as the distance between capital cities as reported by the Bali Online Corporation. This distance calculator can be found at http://www.indo.com. Trade

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[21] IMF and OECD guidelines specify investment as FDI when acquired shares are 10 percent or higher of target firm's outstanding stock, which many of the countries follow or eventually adopted. Graham and Krugman (1993) find that the foreign parent of a MNE in the U.S. on average owns 77.5 percent of the affiliates equity, suggesting that this problem may not be overwhelming.

openness measures of the two countries were obtained from the Penn World Tables and are defined as a country's total trade flows (exports plus imports) divided by its GDP. The F_OPEN_j was constructed in a similar manner as a country's total FDI flows divided by its GDP using the United Nations' *World Investment Directory*. Details on this variable construction can be found in Blonigen and Davies (2000).

The Penn World Tables run only through 1992, while our FDI data begin in 1982 at the earliest. These data availability issues limit our sample and analysis to the period from 1982 through 1992.

Table 2 provides descriptive statistics of our dependent and independent variables. We have 3276 observations on FDI outflows by OECD countries, and 2235 observations on FDI outbound stock. Average annual bilateral FDI outflows are almost $284 million with substantial variation across observations (standard deviation of just more than $1 billion).[22] Average FDI outbound stock is $3.378 billion with a standard deviation of $8 billion.[23] About 77 percent of the sample observations are of bilateral country pairs with bilateral tax treaties in place. The majority of these (74 percent) are what we term "old" treaties which were in place before our sample begins, with three percent of the sample observations connected to "new" treaties that were enacted during our sample. We discuss the importance of this distinction for our statistical analysis in more detail below.

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[22] These figures are in 1995 U.S. dollars.

[23] We remind the reader that these are figures for those bilateral pairs reported by each OECD country, which are typically skewed toward only reporting the countries with which it has the largest FDI activity.

IV. Statistical Analysis and Results

Our statistical analysis will proceed in stages, beginning with a relatively naive estimation of equation (1), and then proceeding with more sophisticated estimation procedures to correct for potential statistical problems. We do this to show that it is not easy to estimate the true effect of tax treaties on FDI, primarily because many treaties by OECD countries were in place before our sample begins. Most of these "old" treaties are between OECD countries, with many beginning in the decade after WWII. If we get a positive correlation between our tax treaty variable and our dependent variable, FDI activity, it is not clear whether other unobservable characteristics of the tax treaty country pairings may be leading to both increased FDI activity and a tax treaty. This occurs because the tax treaty variable, a simple binary variable, will pick up any residual effects on FDI that are not measured by the other control regressors. This problem, known as simultaneity, makes identification of the treaty effect difficult to measure. For example, there are likely a number of underlying reasons beyond their bilateral tax treaty that explain why the U.S. and the U.K. have large FDI activity with each other. These other reasons, however, may not be observable. Because of this, statistical analysis will assign the influence of the unobserved factors to the observed existence of a treaty. As such, while statistical analysis would indicate a strong positive relationship between the existence of a treaty and FDI activity, one hesitate to say that the treaty *causes* the activity between the two countries.

However, our sample also includes a number of bilateral tax treaties completed by OECD countries after our sample data begins. These "new" treaties afford a much better opportunity to measure the impact of a tax treaty, as we have data on FDI activity both before and after the

treaty takes place. Presuming that there are no other changes occurring at the time of the treaty that would affect FDI (besides those captured by our control regressors), we can estimate the effect of these new treaties on FDI more precisely by comparing the pre- and post-treaty information. Table 3 lists new treaties that were completed by OECD countries after the first year of our sample, 1983, through the last year of our sample, 1992.[24] As we show below, the estimated effects of old treaties versus new treaties on FDI activity are quite different. Given this discussion, we give much more weight to the credibility of our evidence for new treaties.

Column (1) of Table 4 provides statistical results when we use ordinary least squares (OLS) regression techniques to estimate equation (1) on our full sample of countries and years when FDI activity is measured as the parent country's FDI stock in the host country. Column (2) of Table 4 provides statistical results when we conduct the same procedure, but define our FDI activity measure as the parent country's FDI flow into the host country. With the exception of SKDIFF and the trade openness measures, the control variables have their predicted signs and are generally statistically significant in the FDI stock and FDI flow regressions. The SKDIFF variable is estimated with an incorrect negative sign in both regressions, but is not statistically significant at standard levels of statistical confidence. The general fit of the empirical framework to the data is better for the FDI stock regression, where the control variables explain about 33 percent of the variation in the dependent variable, as compared to the FDI flow regression, where only about 10 percent of the variation in the dependent variable is explained by the independent variables.

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[24] We note that because of missing data, some of the bilateral pairs completing treaties in Table 3, are not covered by our sample. More specifically, nineteen of the new bilateral treaties in Table 3 are covered in our sample in at least one of the two possible directions.

Both statistical regressions provide strong evidence for a positive effect of tax treaties on FDI activity. Everything else equal, the presence of a tax treaty means almost an extra $2.5 billion of parent FDI stock in the host country versus a situation where there was no bilateral tax treaty. This is quite significant given an average of $3.4 billion in FDI stock in the sample. The effect of treaties on FDI flows is estimated to be somewhat larger relative to its mean. Everything else equal, the presence of a tax treaty means an extra $242 million of annual parent FDI flows into the host country, compared to an average annual flow of $284 million. Even setting issues of magnitude aside, these estimates suggest that we can be over 99 percent confident that these coefficient estimates are not zero.

As mentioned above, our sample includes both old treaties that occur before our sample period begins and new treaties that occur during our sample's time period. Because of this, it is not clear whether the strongly positive treaty effects in columns (1) and (2) are the result of the treaties themselves or some other unobserved factor. To deal with this, columns (3) and (4) of Table 4 provide results when we estimate the same empirical framework as in columns (1) and (2), but allow for separate effects for old and new treaties; i.e., separate binary variables indicating whether an old or new treaty is present between the bilateral country pair in a given year or not. The estimated effects of old and new treaties are quite different for both of our specifications (FDI stock and FDI flows). Old treaties continue to show a positive effect on FDI activity, and that effect continues to be highly statistically significant and of slightly larger magnitude than our results in columns (1) and (2). Our estimates suggest that the presence of an old treaty increases outbound FDI stock by $2.8 billion (compared to $2.5 billion in the column (1) estimates) and increases outbound FDI flows by $264 million (compared to $242 million in

the column (2) estimates). In contrast, new treaties yield coefficient estimates that are *negative* in sign. In fact, given high standard errors relative to the small coefficient estimates, we cannot statistically reject the hypothesis that the new treaties have no impact on FDI activity.

As mentioned above, it is difficult to assign causation to the old treaty effects because they are in place before our sample period begins – the positive correlation may just suggest that countries that would naturally have high FDI activity due to other (unobserved) factors also make sure they have a bilateral tax treaty in place.[25] This is particularly worrisome since our (observed) control variables do not even account for half of the variation in the dependent variables. A common way to control for unobserved characteristics that affect the FDI activity between a bilateral pair of countries is to estimate what is known as a fixed effects specification. This means that, in addition our control variables, we also include a binary variable for each bilateral country pairing. These binary fixed-effect country-pair variables will estimate the aggregate effect of time-invariant characteristics (both observed and unobserved) that raise or lower the FDI activity for that bilateral pairing versus the average. In other words, it acts as an intercept term that is specific to the bilateral country pair. With fixed effects, our estimates then come only from the time series variation in our variables within each bilateral country pair, not the variation across bilateral country pairs. Note that now the effects of our time-invariant regressors, distance and old treaties, will be subsumed into these fixed effects. In other words, we cannot identify the effects of old treaties separately from other time-invariant characteristics,

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[25] There is a similar, though milder, concern that the new treaties occur because FDI activity is increasing or expected to increase between the countries due to unobserved factors. However, this would be expected to bias us toward finding a positive correlation between new treaties and FDI activity. In contrast, our results below find evidence for a *negative* correlation.

such as historical conditions, that affect the overall FDI activity between a bilateral country pair. Because of this, we focus solely on the new treaties enacted at some point during the sample of years. Estimation using only the variation within bilateral country pairs provides an additional benefit since it can help to reduce the problems caused by different definitions of FDI activity across the countries in our sample, providing more credible estimates.

Columns (1) and (2) of Table 5 present our fixed effects empirical estimation results. The fit of the equations increases dramatically: 94 percent of the variation in the dependent variable is explained in the FDI stock regression and 38 percent of the variation is explained in the FDI flow regression. Not surprisingly, statistical tests easily confirm that the fixed effect variables are jointly statistically significant for explaining FDI activity. The main CMM framework control variables still perform well. In fact, the skilled-labor difference variable (SKDIFF), now has the correct sign and is statistically significant. However, the trade openness measures generally have the wrong sign in these regressions.

The surprising result in columns (1) and (2) of Table 5 is that the estimated effect of the new treaties on FDI activity is now strongly negative. The estimated impact has increased substantially and the effects are much more statistically significant: A new treaty leads to a $2.5 billion decrease in FDI stock and $350 million decrease in annual FDI flows. In column (3), we introduce a lagged dependent variable to control for dynamic adjustment in our FDI stock equation as there is probably persistence in the FDI stock over time that can lead to statistical problems with our estimates. The coefficient on the lagged dependent variable is statistically significant, but does not seriously affect our other regressor coefficient estimates, including the

new treaty variable.[26]

In summary, we estimate very different correlations between old treaties and FDI activity versus new treaties and FDI activity. Given the simultaneity concerns described above, it is difficult to assign much weight to our old treaty evidence for positive effects on FDI, even though it is the best we can do given data constraints. Because consistent recording of FDI activity began much later than the enactment of these old treaties, it is virtually impossible to identify the effect of the treaties on FDI activity from other country-pair characteristics that might affect both the inherent FDI activity and the incentives to have treaties. In contrast, we are much more confident in our new treaty estimates from a statistical standpoint and these results yield a very surprising conclusion: new treaties are not promoting FDI activity and the evidence suggests that they may even be decreasing FDI activity.

While this new treaty result is surprising, it is confirmed by Blonigen and Davies (2000) who use a completely different database on U.S.-only FDI activity. The U.S. data, collected by the U.S. Bureau of Economic Activity (BEA), is arguably the best-measured and most comprehensive data on FDI activity of any country in the world. The BEA has data on U.S. bilateral FDI activity (both inbound and outbound) stretching back as far as 1966 for FDI flows and stock and the early 1980s for affiliate sales.[27] Using this U.S. database and U.S. bilateral tax treaty activity, Blonigen and Davies (2000) also find evidence for substantial negative effects of

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[26] A lagged dependent variable is not statistically significant in the FDI flow specifications.

[27] Of course, the disadvantage of the U.S. data versus the OECD data is that its observations are all tied to one country, making it difficult to know whether the results from such a sample generalize to the rest of the world.

new treaties on FDI activity.

V. Conclusion

The majority of economic and legal texts stress the intuitive notion that bilateral tax treaties should promote FDI activity. As discussed in the introduction, there are a number of reasons why this may not be true in theory. This chapter adds to this debate by providing some of the first evidence on the effect of bilateral tax treaties on FDI activity. Using OECD data we find that new treaty activity (during the 1983-1992 period) suggests strong negative impacts on FDI. While we find a positive correlation in the case of much older treaties, we cannot weight this evidence very heavily as we cannot observe FDI activity before these treaties were in place. Nevertheless, our results do cast doubt upon the FDI promotion rationale for treaty formation. This stands in contrast to the conventional wisdom among economists. While we leave several issues unaddressed, particularly the specific mechanisms by which treaties reduce FDI, we hope that these results serve as a guidepost for continued exploration of tax treaties and foreign investment.

Table 1: FDI Data Coverage By OECD Country.

Country	Type of FDI Measure	Number of Partner Countries Reported[a]	Years Covered[b]
Australia	Inflows	18	1982-
	Outflows	17	1982-
	Inbound stock	17	1982-
	Outbound stock	12	1982-
Austria	Inflows	11	1982-
	Outflows	13	1982-
	Inbound stock	9	1982, 1986-
	Outbound stock	11	1982, 1986-
Belgium-Luxembourg	Inflows	44	1982-
	Outflows	45	1982-
Canada	Inflows	3	1982-
	Outflows	3	1982-
	Inbound stock	29	1982-
	Outbound stock	30	1982-
Denmark	Inflows	20	1982-
	Outflows	22	1982-
Finland	Inflows	10	1982-
	Outflows	17	1982-
	Inbound stock	1	1989-
France	Inflows	23	1982-
	Outflows	23	1982-
	Inbound stock	43	1987-
	Outbound stock	34	1987-
Germany	Inflows	19	1982-
	Outflows	18	1982-
Greece	Inflows	14	1987-
Iceland	Inflows	0	1987-
Ireland	Inflows	0	1983-
Italy	Inflows	20	1982-
	Outflows	20	1982-
	Inbound stock	22	1985-
	Outbound stock	23	1985-

Japan	Inflows Outflows Inbound stock Outbound stock	9 36 9 37	1982- 1982- 1982- 1982-
Netherlands	Inflows Outflows Inbound stock Outbound stock	9 9 14 14	1982- 1982- 1984- 1984-
New Zealand	Inflows Outflows	4 4	1984- 1984-
Norway	Inflows Outflows Inbound stock Outbound stock	14 19 18 24	1986- 1987- 1987- 1988-
Portugal	Inflows Outflows	18 10	1982- 1982-
Spain	Inflows Outflows	20 18	1982- 1982-
Sweden	Inflows Outflows	15 36	1982- 1982-
Switzerland	Inflows Outflows Outbound stock	0 0 0	1983- 1986- 1986-
Turkey	Inflows Outflows	18 6	1982- 1989-
United Kingdom	Inflows Outflows Inbound stock Outbound stock	18 36 19 35	1982- 1984, 1987- 1982- 1984, 1987-
United States	Inflows Outflows Inbound stock Outbound stock	39 41 28 41	1982- 1982- 1982- 1982-

[a] Figures for 1990.
[b] Not all reported countries are necessarily reported each year during range indicated. "0"
indicates that data available only by region, not specific countries.

Table 2: Descriptive Statistics of Variables.

Variables	Number of Observations	Mean	Standard Deviation	Minimum	Maximum
Dependent Variables					
FDI outbound stock	2235	3378.13	8002.59	0.00	92733.80
FDI outflows	3276	283.82	1056.61	-2550.56	42267.61
Independent Variables					
$SUMGDP_{ij}$	3276	1259.53	1260.96	61.79	6449.00
$GDPDIFSQ_{ij}$	3276	1993241	4710473	0.11	2.06e+07
$SKDIFF_{ij}$	3276	1.21	2.54	-6.65	8.10
$SKDIFF_{ij}*GDPDIFF_{ij}$	3276	2124.00	5374.54	-7494.69	31011.47
$DISTANCE_{ij}$	3276	5695.07	5129.36	174.00	19007.00
T_OPEN_i	3276	56.38	31.01	17.62	156.45
T_OPEN_j	3276	68.22	55.26	8.96	386.23
F_OPEN_j	3276	12.42	14.20	0.15	93.69
$TREATY_{ij}$	3276	0.77	0.42	0.00	1.00
$OLD\ TREATY_{ij}$	3276	0.74	0.44	0.00	1.00
$NEW\ TREATY_{ij}$	3276	0.03	0.17	0.00	1.00

NOTES: FDI outbound stock, FDI outflows, SUMGDP, and GDPDIFSQ are measured in millions of real U.S. dollars. Distance is measured in miles between capital cities. Skill differences is measured in mean years of female and male education attainment. See text for variable definitions.

Table 3: New Treaties by OECD Countries from 1983-1992.

Country	Bilateral Tax Treaties (Year of Treaty in Parentheses)
Australia	Italy(1983), Korea(1983), Norway(1983), Ireland(1984), Finland(1985), Austria (1987), China(1990), Thailand(1990), Hungary(1992), Poland(1992).
Austria	Thailand(1986), Australia(1987).
Belgium-Luxembourg[a]	Korea(1985), Turkey(1988).
Canada	Bangladesh(1983), Brazil(1985), Cyprus(1986), India(1986), China(1987), Kenya(1987), Poland(1989), Slovak Republic(1987).
Denmark	Cyprus(1984), Indonesia(1986), China(1987).
Finland	Australia(1985), New Zealand(1985), Turkey(1985), Thailand(1986), China(1987), Yugoslavia(1987), Indonesia(1988).
France	Bangladesh(1988), Trinidad and Tobago(1988), Nigeria(1991).
Germany	Philippines(1984), Turkey(1986), Indonesia(1988).
Greece	Hungary(1984), Switzerland(1984), Czechoslovakia (1987), Norway(1989).
Iceland	None.
Ireland	Australia(1984), New Zealand(1987).
Italy	China(1987), India(1987).
Japan	Indonesia(1983).
Netherlands	Pakistan (1983), Romania(1983), China(1987), India (1989), Brazil (1991).
New Zealand	Norway(1983), Finland(1985), Ireland(1987), Indonesia(1988).
Norway	Australia(1983), New Zealand(1983), Yugoslavia(1984), China(1987), Pakistan(1987), Philippines(1988), Greece (1989).
Portugal	None.
Spain	Yugoslavia(1983).
Sweden	Trinidad and Tobago(1985), China(1987), Cyprus(1989), Indonesia(1989), Turkey(1989).
Switzerland	Greece(1984), Egypt(1988), Indonesia(1989), China(1991).

Turkey	Finland(1985), Germany(1986), Belgium-Luxembourg(1988) Sweden(1989).
United Kingdom	India(1983), Thailand(1983), China(1985), India(1987).
United States	Barbados(1984), China(1985), Tunisia(1986), Cyprus(1988), Indonesia(1989), India(1990), Spain(1991).

[a] Includes only treaties made by Belgium, not Luxembourg.

Table 4: Estimates of treaty effects on OECD outbound FDI stock and flows using Ordinary Least Squares.

	Empirical Models and Dependent Variables			
	Ordinary Least Squares with Treaty Variable		Ordinary Least Squares with Separate Old and New Treaty Variables	
Regressors	FDI Stock (1)	FDI Flows (2)	FDI Stock (3)	FDI Flows (4)
Treaty Variables:				
TREATY	2456.6** (0.00)	241.80** (0.00)		
NEW TREATY			- 419.11 (0.60)	- 32.268 (0.77)
OLD TREATY			2811.8** (0.00)	265.80** (0.00)
CMM Controls:				
SUMGDP$_{ij}$	4.399** (0.00)	0.428** (0.00)	4.457** (0.00)	0.433** (0.00)
GDPDIFSQ$_{ij}$	- 0.0001 (0.25)	- 0.00004** (0.00)	- 0.0001 (0.13)	- 0.00004** (0.00)
SKDIFF$_{ij}$	- 42.653 (0.58)	- 7.274 (0.40)	28.401 (0.72)	- 1.887 (0.83)
SKDIFF$_{ij}$ * GDPDIFF$_{ij}$	- 0.368** (0.00)	- 0.023** (0.00)	- 0.360** (0.00)	- 0.023** (0.00)
DISTANCE$_{ij}$	- 0.401** (0.00)	- 0.031** (0.00)	- 0.397** (0.00)	- 0.031** (0.00)
T_OPEN$_i$	- 6.567 (0.48)	- 0.348 (0.62)	- 3.709 (0.69)	- 0.264 (0.70)
T_OPEN$_j$	- 31.154** (0.00)	- 1.634** (0.00)	- 32.258** (0.00)	- 1.695** (0.00)
F_OPEN$_j$	219.58** (0.00)	16.449** (0.00)	226.18** (0.00)	16.808** (0.00)
R-squared	0.33	0.10	0.34	0.11
F Test	123.11**	42.33**	113.21**	38.81**
Sample Size	2235	3276	2235	3276

NOTES: P-values are in parentheses, with ** and * denoting statistical confidence levels at the

99 and 95 percent levels, respectively. P-values indicate statistical probability (in decimal form) that the true parameter value is zero (i.e., has no effect on the dependent variable). R-squared is the ratio of the variation in the dependent variable explained by the regressors. F test is a statistical test of whether we can reject the hypothesis that the coefficients of the regressors are jointly zero.

Table 5: Estimates of treaty effects on OECD outbound FDI stock and flows using a fixed effects specification.

Regressors	Empirical Models and Dependent Variables		
	Fixed Effects with New Treaty Variable Only		
	FDI Stock (1)	FDI Flows (2)	FDI Stock with Lagged Dependent Variable (3)
Treaty Variables:			
NEW TREATY	- 2551.7** (0.00)	- 350.01 (0.06)	- 2183.2** (0.00)
Control Regressors:			
LAGGED FDI STOCK			0.309** (0.00)
$SUMGDP_{ij}$	9.592** (0.00)	1.380** (0.00)	7.095** (0.00)
$GDPDIFSQ_{ij}$	- 0.0005** (0.00)	- 0.0001** (0.00)	- 0.0003** (0.00)
$SKDIFF_{ij}$	2861.9** (0.00)	66.303 (0.63)	1476.4** (0.00)
$SKDIFF_{ij} * GDPDIFF_{ij}$	- 0.748** (0.00)	- 0.008 (0.90)	- 0.499** (0.00)
T_OPEN_i	0.916 (0.95)	- 3.160 (0.50)	- 0.532 (0.97)
T_OPEN_j	- 35.253** (0.00)	- 0.451 (0.86)	- 21.571** (0.00)
F_OPEN_j	114.60** (0.00)	7.502 (0.18)	73.074** (0.00)
R-squared	0.94	0.38	0.96
F Test	106.31**	14.56**	213.76**
Sample Size	2235	3276	2041

NOTES: P-values are in parentheses, with ** and * denoting statistical confidence levels at the 99 and 95 percent levels, respectively. P-values indicate statistical probability (in decimal form) that the true parameter value is zero (i.e., has no effect on the dependent variable). R-squared is the ratio of the variation in the dependent variable explained by the regressors. F test is a statistical test of whether we can reject the hypothesis that the coefficients of the regressors are jointly zero.

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