The Regional Impact of Bilateral Investment Treaties on Foreign Direct Investment

Arjan Lejour
Maria Salfi

The Regional Impact of Bilateral Investment Treaties on Foreign Direct Investment

Arjan Lejour* and Maria Salfi**

*Corresponding author: CPB Netherlands Bureau for Economic Policy Analysis, The Hague, the Netherlands, www.cpb.nl, e-mail arjan.lejour@cpb.nl, tel. +.31.70.3383311

**European Centre for International Political Economy (ECIPE)

Abstract

We examine the impact of bilateral investment treaties (BITs) on bilateral FDI stocks using extensive data from 1985 until 2011. We correct for endogeneity using indicators for governance and membership of international organisations. We find that ratified BITs increase on average bilateral FDI stocks by 35% compared to those of country pairs without a treaty. Upper middle income countries seem to benefit the most from ratified treaties whereas high income countries with high governance levels do not profit at all. In addition, lower middle and low income countries experience significantly larger inward FDI stocks from partner's countries. Distinguishing by region, we find that ratified BITs increase FDI stocks mainly in East Asia and Middle & Eastern Europe.

Key words: bilateral investment treaties, instrumental variables, developing countries

JEL codes: F21, F23, H25, H26

1. Introduction

Developing countries often consider foreign direct investment (FDI) as an engine to boost economic growth. Therefore they try to promote investment inflow by various means. One approach is to offer investment guarantees to foreign investors using Bilateral Investment Treaties (BITs). BITs guarantee foreign investors the same rights as domestic investors and contain rules on international arbitrage. The first BIT was signed in 1959 between Germany and Pakistan and its popularity quickly increased from the early 1960s on.[1] In 1990 there were 470 treaties and in 2012 even 2857 (UNCTAD, 2013).

One concern is whether these treaties really promote FDI. Various studies have addressed this topic using data for different countries and considering different time periods, leading to controversial outcomes. Regularly researchers do not find a significant effect on FDI or the effect is quite weak. This raises the question why countries would want BITs because negotiating and ratifying a treaty involve transaction costs. Even more important the treaties contain rules about the possibility of international arbitrage. In the past these arbitrage cases were very rare but in the last decade the number of disputes has accelerated (UNCTAD, 2013).

This paper aims to estimate the effects of BITs on bilateral FDI stocks for various regions and country income groups using a very rich data base of bilateral FDI stocks. We contribute to the literature in various ways. First, we compare the results for various samples distinguished by region and income groups systematically using the same estimation methodology. The differences in outcomes explain to some extent also the controversial results in the literature. Related to this we use a very extensive data set covering bilateral FDI data of reporting OECD countries toward their partner countries between 1985 and 2011, ensuring that the possible investment effects are not influenced by data selection issues. Second, by using membership of international organisations and governance variables as instruments for bilateral investment treaties we correct for the possible endogeneity of BITs.

We have 34 OECD countries reporting inward and outward stocks towards 217 partner countries. The UNCTAD provides information on bilateral investment treaties including the year of ratification. In our estimations we explain bilateral FDI stocks by GDP variables based on the "knowledge-capital" model of Markusen and Maskus (2002) and the gravity

---

[1]Note however that this treaty has never been ratified. The first ratified treaties are the ones of Switzerland with Niger and Ivory Coast in 1962.

equation. We add bilateral tax treaties on capital and income, an EU dummy and regional-year dummies. Except for the panel regressions, we use propensity matching score models as robustness analysis to identify the BITs effect on FDI stocks.

The main results are as follows. If countries have ratified a bilateral investment treaty then they invest on average 35% more in terms of stocks than country pairs without a ratified BIT. The effects are even slightly larger if we include countries defined as tax havens or use only FDI data on inward stocks between the OECD countries. The effect differs between countries classified by income group. Upper middle income countries seem to benefit the most from BITs. The impact on FDI stocks is about twice the average effect. BITs do not support significantly foreign investment in high income countries. This outcome is expected because BITs involve rules about arbitrage to compensate for the lack of legal security. Distinguishing bilateral investment treaties by region, we find that the FDI impact is much larger if the host country is located in East Asia or Middle and Eastern Europe, while the investment effects are not significant for countries in Sub-Saharan Africa and Latin America and the Caribbean.

The rest of the paper is structured as follows. Section 2 presents the characteristics of BITs and their development over time. Section 3 discusses the related literature. The data and estimation framework are discussed in section 4. The empirical results are discussed in section 5 using panel regressions. We present results for the full sample and by region and income per capita level. Section 6 presents the robustness analysis for various data samples and the propensity matching score method. Section 7 concludes.

2. BITs and FDI

2.1 The evolution of Bilateral Investment Treaties

Mainly Germany and Switzerland ratified new bilateral investment treaties in the 1960s, most of these were negotiated with developing countries. Until the 1980s at most ten treaties were yearly ratified. It is at the end of the 1980s that BITs became popular. The number of new treaties increased to about 100 per year, see figure 1. This trend is probably related to the liberalization of international capital movements, which stimulated the rise of FDI. Moreover, the fall of the iron curtain and breakup of the Soviet Union were also crucial events that raised the popularity of the BITs. In 2013, nearly 3000 bilateral investment treaties have been

signed but only 2233 are ratified.[2] Germany, China and Switzerland are the top three countries with more than 100 ratified investment treaties.[3]

Figure 1: Development of the number of ratified BITs
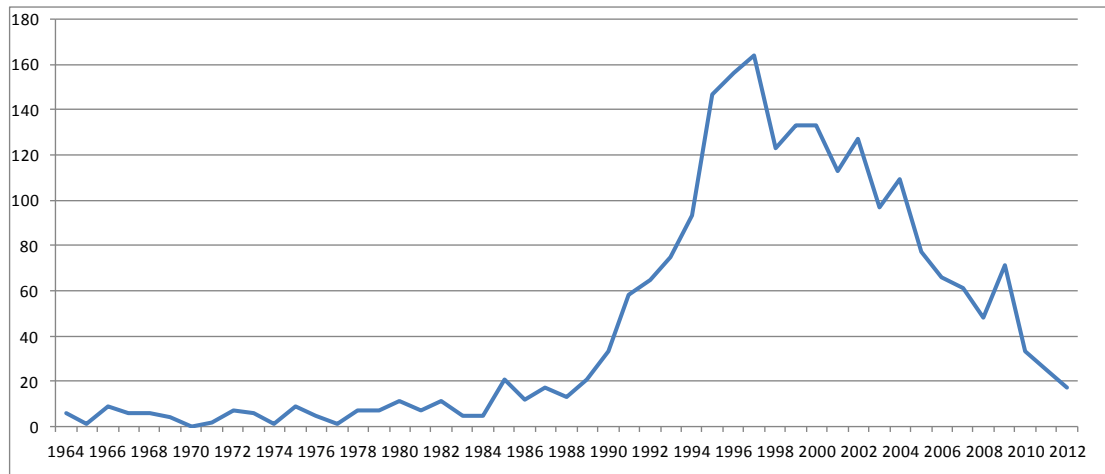
Source: UNCTAD, 2013

However, in the year 2012 only 20 BITs were signed representing the lowest annual number of treaties in the last 25 years (UNCTAD, 2013). UNCTAD predicts that international investments agreements will not be driven anymore by bilateral treaties but rather by regionalism, allowing for agreements comprising more countries together. Examples are the European Union, the Association of South East Asian nations (ASEAN) and the North American Free Trade Agreement (NAFTA).

Moreover, most of the BITs were signed in the 1990s and their validity ranges from 10 to 20 years. By the end of 2013 about 1300 BITs were expired, followed by 350 more between 2014 and 2018 (UNCTAD, 2012). Another peculiarity of these agreements is their termination procedure. About 80% of BITs are characterized by an "anytime termination stage", in which the treaty can be ceased at any time after its automatic renewal. Several countries have decided to not renew a treaty last year such as Indonesia and South Africa. Both countries are not convinced of the positive effects of BITs. They claim that multinationals are misusing ISDS in order to overstep the national legal system.

---

[2]The UNCTAD does not mention a ratification date for 702 treaties, which in principles implies that these treaties are not in force and does not offer protection to FDI. Egger and Pfaffermayr (2004) show that only ratified treaties have a significant impact on FDI. For this reason we ignore non-ratified treaties.
[3]Annex A3 provides an overview of the number of BITs by country, also ranked by income category.

Figure 2 shows the number of ratified treaties among the countries of the sample, classified by income group, following the World Bank classification. We use the oldest World Bank classification from 1987 to correct to possible endogeneity between the ratified BITS, FDI and economic development. A number of countries ratifying treaties in the 1960s and 1970s have moved from a lower income classification towards a higher income one. Countries such as Hong Kong, Singapore and Western Europe are classified as high income while the majority of countries in Eastern Europe, Middle East and Latin America are classified as upper middle income[4]. In this manner, it is possible to accredit the number of BITs ratified between high/upper middle income countries and lower income countries when the treaty was actually ratified. The majority of BITs are ratified between high income/upper middle income countries and lower middle income countries. Defining lower middle and low income countries as developing ones and the others as developed countries, we conclude that the majority of BITS are ratified between developed and developing countries.

Figure 2: The stock of BITs ratified between different income groups in 2012
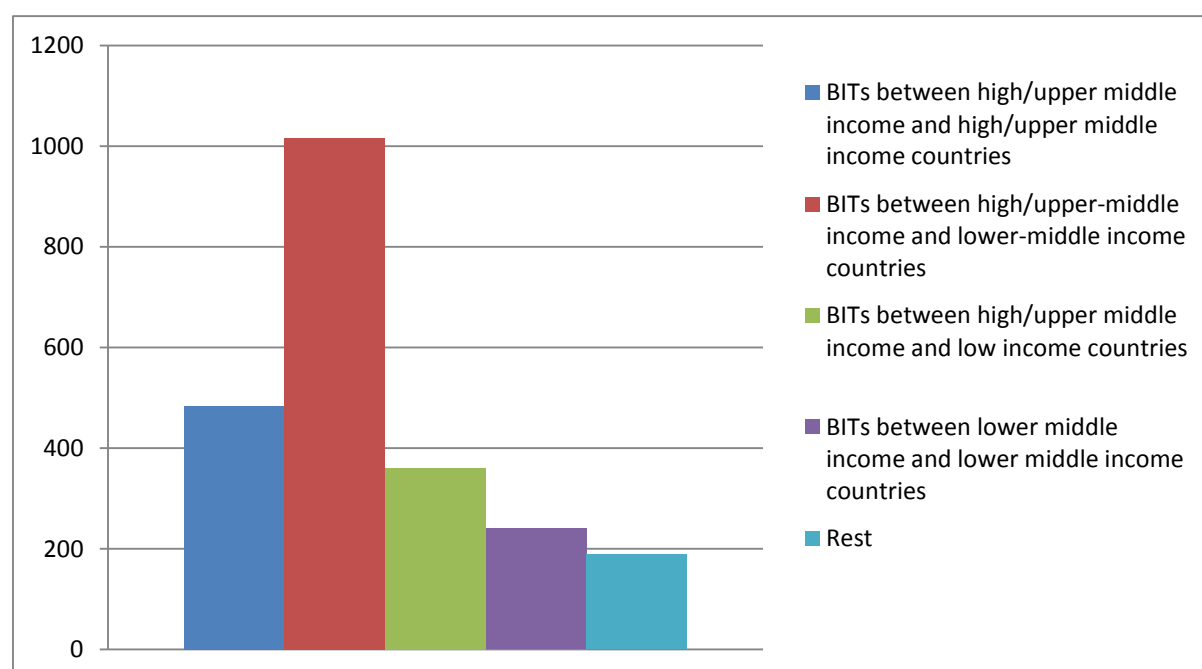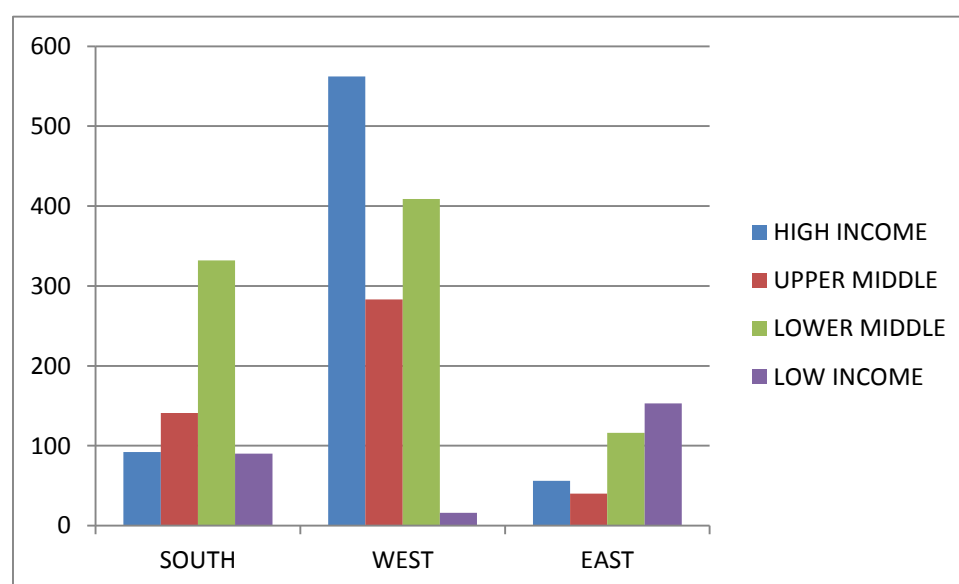

Source: UNCTAD

The number of ratified BITs between high/upper middle income countries- among developed countries- is about 500. High income countries rarely signed recently new treaties between

_____

[4]The annex provides a complete overview of the classification by income group.

themselves; exceptions are Hong Kong, Singapore and some Middle Eastern countries. Most of those countries, such as United States, Canada, Australia and countries in Western Europe, have well developed juridical systems and independent courts which makes a BIT unnecessary. Nonetheless, a substantial share of ratified BITs is between Western and Middle-Eastern European countries. When most of these treaties were ratified, which was 20 years ago, these upper middle income countries were not characterized by reliable legal systems. The power of a BIT was therefore essential in order to signal government and legal accountability to foreign investors.

Figure 3 illustrates the BITS in the host countries in three regions: South, West and East. The South region comprises Sub-Saharan Africa, Middle East & North Africa, Latin America and the Caribbean countries, while West indicates Europe & Central Asia and North America. East is formed by South and East Asia and the Pacific's countries. In the South region, lower middle income countries account for more than 300 treaties, followed by upper middle incomes countries with 120 treaties. High income countries' BITs amount to almost 100 BITs in the South region, the same as low income countries.

Figure 3: The stock of ratified BITs in different geographical regions in 2012, host countries differentiated by income groups
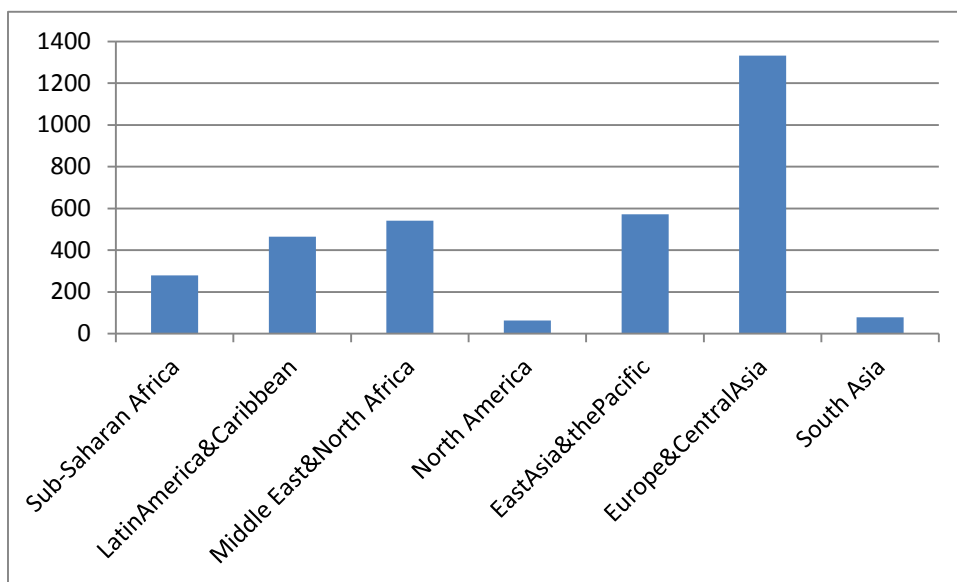

Source: UNCTAD, 2013

Most of the high income countries are located in the West region and this explains the large number of BITs shown in the graph. Upper middle income countries in the West region are

mostly East European countries whereas lower middle income countries comprise of Balkan countries and a few Central Asia countries. In the East region the majority of countries with BITS is low and lower middle income countries.

Figure 4 shows the number of ratified BITs by disaggregated regions. The highest number of BITs has been ratified by countries in Europe and Central Asia; almost 600 BITs have been ratified in East Asia & the Pacific, followed by the Middle East and North Africa with 500 treaties. The lowest number of BITs instead has been ratified in South Asia and North America.

Figure 4: Number of ratified BITs by disaggregated geographical regions

Source: UNCTAD, 2013

Bilateral investment treaties are designed to encourage foreign direct investment between two countries, regulating the scope and means of the investment. Foreign investors are fully protected for financial compensation against unjustified cases of expropriation and against host country actions that would adversely impact the profitability of the investment having the possibility to easily appeal to international arbitration in case of a dispute. We have seen that developed countries have signed most treaties with developing countries. Logically, high and upper middle income countries employed BIT's power as a way to protect their investment in lower middle income countries, where institutions and property rights are not as stable and enforceable as in developed countries. BITs are probably a small incentive to invest in a particular region but they may influence the final decision for firms to allocate capital in a country.

Developing countries have other reasons to sign BITs. The treaty protects foreign investors facilitating the entry and operation of investment, persuading the host country to remove certain impediments in their regulatory system. BITs can actually support and initiate market liberalization in developing countries, creating conditions to facilitate the entry of foreign investors. Ratifying a BIT by a developing country can signal a change toward political stability. Developing countries are often characterized by unstable institutions and, especially, low enforceability of property rights, high level of corruption and weak government effectiveness. In order to reassure foreign investors, bilateral investment treaties can be used to guarantee certain standards of treatment which are usually not enforceable within the juridical system. Therefore countries characterized by macroeconomic and institutional instability can use BITs to signal to foreign investors that they are committed to the investment.

Nonetheless, recent cases of international investment arbitrage disputes covered by international treaties have raised concerns of the potential risks for developing countries, such as the loss of sovereignty. These cases are not only related to multinational's property expropriation by the host country but also to weak environmental and labor rules which raise the profitability of the daughter company. Various international lawyers and economists believe that BITs can be used by multinationals in order to employ an unfair and lucrative way of doing business, seeking compensation for risks that they had not previously expected to be protected from (Hallward-Driemeier, 2003).

2.2 FDI development

Foreign Direct Investment (FDI) has accelerated over time. Investment constantly increased since the 70s, peaking in 2000 and 2007. A drastic declined occurred in 2002 and 2009 due to the burst of the IT boom and the more recent global crisis, respectively.

Figure 5: Evolution of world FDI inflow from 1970 to 2012, in billion US$
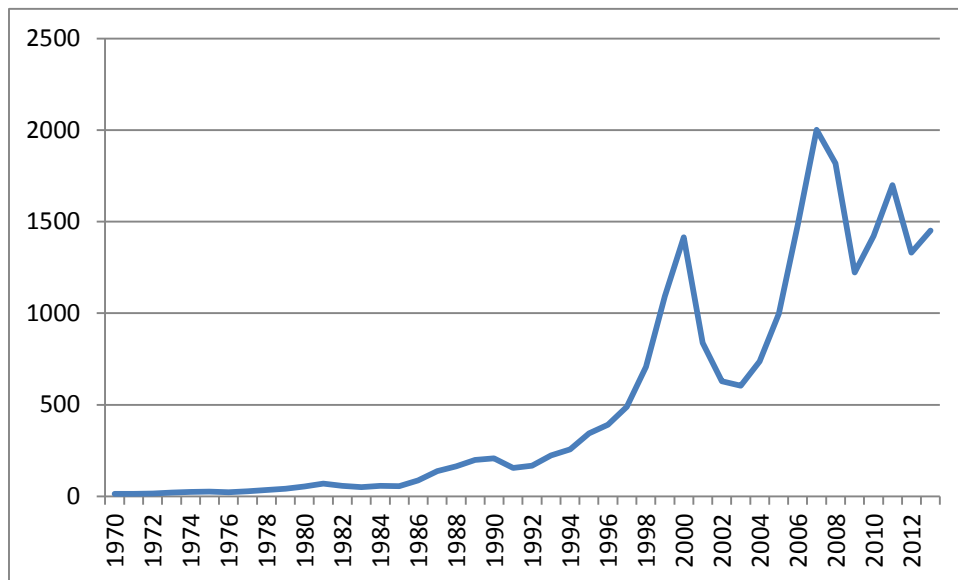
Source: UNCTAD

Figure 6 depicts the FDI inflow among regions. We clearly see that FDI is mainly directed in Europe and Central Asia and East Asia and the Pacific countries and North America. In Europe and Central Asia, investment go mainly to developed countries (upper middle and higher income countries), whereas in East Asia and the Pacific, more than half of the FDI is going to developing countries (lower middle and lower income countries). Although the majority of BITs are ratified between developed and developing countries, most FDI settles in high and upper-middle income countries.

Figure 6: FDI Inflow by geographical regions,[5] billion US$
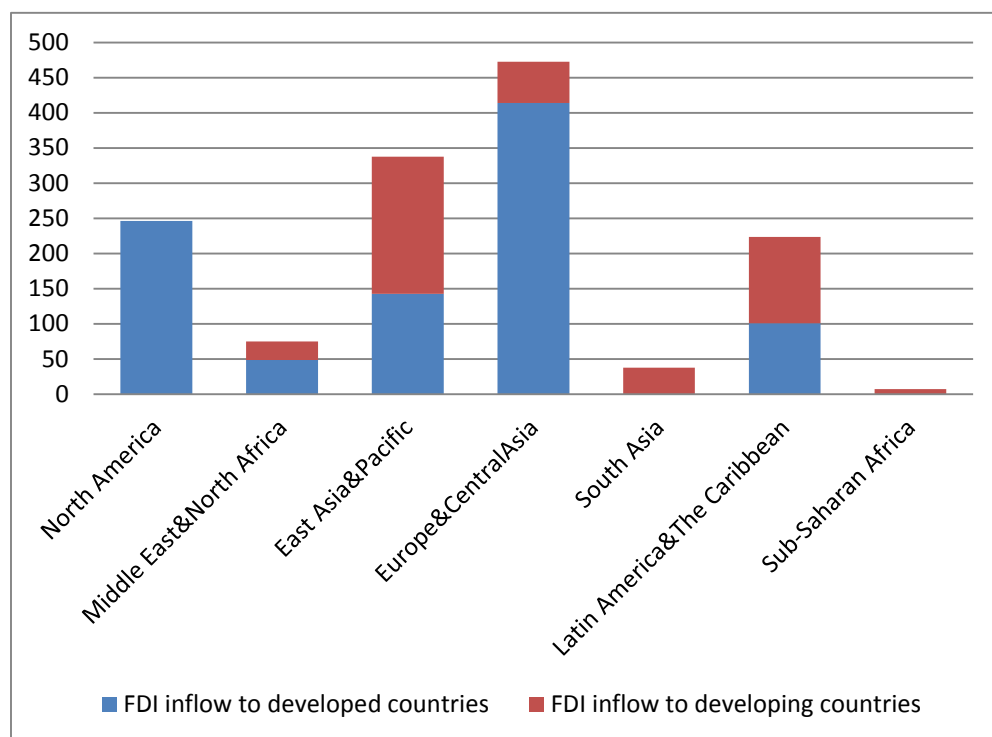
Source: UNCTAD

3. Literature Review

Various studies examine the relationship between BITs and FDI with different econometric methodologies, different samples, time periods and outcomes.[6] An important econometric issue, which is not always addressed, is the reversed causality between FDI and BIT. On the one hand, signing or ratifying a BIT can attract larger amount of investment, on the other hand, a high level of investment in a country can also be an incentive to sign a treaty.

Papers ignoring the reversed causality find, in general, larger FDI effects. Some examples are Neumayer and Spess (2005), Salacuse and Sullivan (2005) and Banga (2003). Neumayer and Spess (2005) claim that low income countries with a large number of BITs experience larger FDI inflows. According to their results, a developing country engaging in a BIT is expected to face an increase of FDI inflows between 40 and 90 percent. Moreover, they find that there

---

[5] FDI calculated by a 6 years average (2008-2013)
[6] See for a concise and informative survey, UNCTAD (2014). We focus on the effects of separate BITs and ignore investment arrangements in preferential trade and investment agreements, see Banga (2003) and Medvedev (2012), among others. Moreover, we also ignore the content of the BITs regarding dispute settlement provisions. According to Berger et al. (2011), this hardly affects the effects on FDI.

is little evidence that BITs function as substitutes for institutional quality. However, their methodology does not account for endogeneity and their results are biased towards fast growing economies, countries with larger populations as well as countries with more intensive natural resources. Salacuse and Sullivan (2005) conducted a cross-sectional and a fixed effects analysis for 99 developing countries. They find that a BIT signed between the United States and a developing country helps to increase FDI inflow. However, a treaty signed with other OECD countries is always statistically insignificant. On the contrary, Gallagher and Birch (2006) find that FDI flows from the US to the Latin America and Caribbean countries is not boosted by signing a BIT. However they find that overall investment treaties increase FDI by 4.8 percent.

Banga (2003) finds that BITs with developed countries attract FDI from developed countries but BITs with developing countries are not a significant determinant of FDI. He also analyzed the impact of FDI policies, which differ for developed and developing countries. Fiscal incentives attract FDI from developing countries and removal of restrictions on their business operations attracts FDI from developed countries. The investigation has been conducted for 15 developing countries in South and East Asia from 1980 to 2000 at first and second for 10 developing countries from 1986 to 1997.

Studies that account for endogeneity find controversial results. Egger and Pfaffermayr (2004) find that the ratification of new investment treaties exhibits a significant positive effect on outward FDI, up to 30 percent higher in their preferred specification using a matching estimator. Their sample is composed of bilateral FDI outward stocks from OECD to OECD countries and from OECD to non-OECD countries. The effect is stronger for countries with a stable investment and political environment, while is weaker for countries with an unstable political-economic situation.

Egger and Merlo (2007) focus on the BITs effect on FDI outflow from OECD to OECD and transition economies. The results show that ratified BITs increase the outward FDI stock by about 4.8% in the short term and by 8.9% in the long term in developing countries, accounting for endogeneity by the Generalized Method of Moments (GMM) estimator of Arellano and Bond.[7]

---

[7] In a recent article Egger and Merlo (2012) associates BITs with a high number of German multinational firms active in the host country. Results demonstrate that there is a significant and positive impact of both signed and ratified BITs on the number of firms investing in a host country.

Positive results are also found by Busse et al. (2010). The authors do not provide a clear definition of developed and developing countries. They find a significant relation between BITs and FDI either when they estimate the model with the Poisson Pseudo Maximum Likelihood (PPML) estimator or with the GMM estimator. When PPML is employed, the magnitude of the coefficient ranges between 14 to 58 percent; however the results are much smaller when endogeneity is considered by the GMM estimator. Moreover the results are conditional on the political and economic environment of the country.

Instead, Hallward-Driemeier (2003) finds little evidence that BITs stimulate investment, analyzing twenty years of bilateral FDI flows from the OECD to developing countries. In this case, developing countries are classified as low, lower middle and upper middle income countries. The model is estimated via a 2SLS estimator where the number of other BITs in a host country is used as an instrumental variable. The BIT variable is also used as an interaction term with law and order and corruption. The author concludes that countries with weak domestic institutions do not have any additional benefits, whereas countries with already stable domestic institutions are more likely to gain from signing the treaty. BITs act more as complement for improving domestic institutions rather than as a substitute.

These results are consistent with Tobin and Rose-Ackerman (2005) which use a Two Stage Least Square (2SLS) estimator. In the general analysis, BITs only have a positive effect on investment in countries with a stable business environment. BITs affect negatively FDI inflows when the political risk in a country is high whereas the opposite occurs when the risk level is low.

Aisbett (2009) tests whether BITs stimulate investment in 28 low and lower middle income countries between 1980 and 1999 and finds no significant results. She eliminates endogeneity via dummy variables controlling for host and source countries through the years. The dummies control for any unobserved features in the model and they correct serial correlation issues. One main concern of the author is that the results are driven by data limitations.

Although developing countries have always promoted FDI, the benefits of signing (and ratifying) BITs are unclear. A number of empirical studies showing a large positive effect of BITs on FDI might report incorrect results due to unaccounted endogeneity. Moreover, results seem also to be driven by data selection issues as is also suggested by Berger et al. (2011) and UNCTAD (2014). These are related to the geographic region, income per capita and time period. The term developing countries is used for various selections of countries,

which hampers the comparability of various papers. In our analysis, we control for endogeneity, distinguish between income groups and regions and we run robustness analyses to verify the reliability of our estimations.

4. Data and methodology

4.1 Data

The sample is formed by 217 countries from 1985 to 2011 (see Appendix A3), making it the largest and most recent period utilized in nearly all studies covering the effect of BITs on FDI. Other papers have often used a much shorter period of time or a much smaller sample. The data for Foreign Direct Investment, the dependent variable, are collected by the OECD's database and they consist in bilateral FDI stocks. We have 34 OECD countries reporting inward stocks, the accumulated amount of FDI invested *in* the reporting country, and outward stocks, the accumulated amount of FDI invested *by* the reporting country, with potentially 217 partner countries. This implies that we consider FDI stocks and investment treaties between OECD countries and between OECD and non-OECD countries. For bilateral FDI stocks between OECD countries, we have in principle two reporting countries and thus two reported stocks in both directions. In case two reported stocks are available, we prefer the reported inward stocks because the quality of inward FDI data is often better than outward FDI.[8] If only one type of reported stock is available then we choose for this stock and otherwise we report a missing.[9] We have potentially 14688 observations per year. It is an unbalanced panel; varying from 644 observations in 1985 to 11045 in 2010. In total we have 132,564 observations with bilateral FDI stocks.

FDI values shall not contain FDI stocks held by shell companies which could seriously impact the results for countries such as The Netherlands and Luxembourg. Shell companies direct investment to daughter companies operating around the world. So, inward FDI via these companies is not invested the direct host country. Still, there is a possibility that other countries report FDI stocks including shell companies to OECD because those companies are often not explicitly distinguished in national statistics. This could imply that FDI stocks

---

[8] Data experts on FDI argue that governments and firms have a bigger incentive to register the inward flows more accurately than the outward flows for tax and subsidy reasons.

[9] Because the quality of FDI reporting is not very high, there are sometimes substantial changes in the bilateral FDI stocks due to a shift in reporting from the outward to the inward stock over time or vice versa. As a robustness check we have only used the reported inward stock data between OECD countries.

diverted via shell companies are doubled counted as outward stocks in the home and in the host country and as inward stocks in the host and home country. However there is not a clear view on the size of the problem and how it could impact the results.

The United Nation Conference on Trade and Investment (UNCTAD) provides information about signed and ratified Bilateral Investment Treaties for 163 countries and partner countries from 1962 to 2013. In principle this information includes all BITs, although sometimes countries do not inform UNCTAD directly if there is a new agreement which have been signed (or ratified) or if one treaty has ceased to exist. Data for control variables and for instrumental variables have been collected from the World Bank. Data on GDP and GDP per capita are from World Bank's World Development Indicators. The data for the Double Tax Treaties on capital and income have been taken from the UNCTAD's database. Dummy variables indicating EU, OECD or WTO's membership take account of accession years.

The Worldwide Governance Indicators (WGI) has been utilized to construct the governance instruments. Of the six indicators,[10] we have chosen rule of law and government effectiveness. The available data range from 1996 to 2011 although the years 1997, 1999 and 2001 are missing. The missing observations have been interpolated while for the period previous the year 1996, we have used the oldest value available. This impacts only 15% of the observations, considering non-missing FDI stocks. Therefore, in a robustness analysis, we ignore the years until 1995. Rule of law captures country's perceptions to which agents have confidence in the rules of society, and in particular in the quality of contract enforcement, property rights, police's power in enforcing the law, reliability and transparency of the court's system, as well as the likelihood of crime and violence. Government effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies (Worldwide Governance Indicator, World Bank). Appendix A2 provides a table that summarizes all variables and data sources.

---

[10]The others are voice and accountability, political stability and absence of violence, regulatory quality and control of corruption.

4.2. Methodology

Gravity equations are widely used in empirical literature in order to describe the variation of bilateral trade. The gravity model states that trade flows between two countries should be positively related to both countries' market size and negatively to the distance between them. It is also applied for other bilateral variables including FDI stocks. Carr et al. (2001) and Markusen and Maskus (2002) have provided a theoretical and empirical underpinning for explaining bilateral FDI stocks including gravity factors.

Following this line of reasoning, the regression model is constructed as follow:

$$FDI_{ijt} = f\ (SUMGDP_{ijt},\ GDPDIFSQ_{ijt},\ BIT_{ijt},\ DTT_{ijt},\ EU_{ijt},\ D_{rit},\ D_{rjt},\ YEAR_t\ ) \tag{1},$$

where the dependent variable is the log of bilateral FDI stocks from a home country (i) to a host country (j). The sum of real GDP of country (i) and country (j) and the squared difference between the two countries' real GDP, both measured in log, are the standard variables utilized in the gravity equation. BIT is a dummy taking the value of 1 if two countries have a ratified treaty in common, otherwise it takes the value of zero. We include also a dummy variable for double tax treaties (DTT) to control for relocation of capital which can be driven by tax motives. A European Union dummy has been added to the model, indicating 1 if both countries are EU member. It takes account of the EU enlargements in 1995, 2004 and 2007.

Finally, we include region-year dummies for the parent and host country to identify non-observed time-varying effects for eight country groups, next to year-dummies in the panel regressions. It would be more appropriate to use country-year dummies, following the framework of Anderson and Van Wincoop (2003), however our sample consists of about 200 host countries and a 27 years' time frame which would add 105,000 variables to the regression, which is computationally not feasible. The use of region-year dummies (Sub-Saharan Africa, Latin America & the Caribbean, Middle East and North Africa, North America, East Asia and the Pacific, Europe and Central Asia, South Asia, following the World Bank's classification) is therefore a compromise.

The model in equation (1) suffers from endogeneity caused by the reversed causality relation between FDI and BITs. It is possible that, as a mean of investment's protection, investment treaties are formed because bilateral FDI between two countries is quite large. Panel regression via Ordinary Least Square estimator with country pairs fixed effect takes care of

omitted variables affecting the BITs and FDI equation but not of reversed causality. Following Egger et al. (2006), we use a probit model to predict the probability that a bilateral investment treaty is formed. The probability to form a treaty depends on the standard explanatory variables and various geographic and institutional variables.

$$P(BIT_{ijt}) = g\ (SUMGDP_{ijt},\ GDPDIFSQ_{ijt},\ DTT_{ijt},\ EU_{ijt},\ WTO_{ijt},\ RuleLAW_{jt},\ GOV_{jt},$$

$$OECD_{it},\ OECD_{jt},\ OECD_{ijt,}\ GDPCAP_{it},\ GDPCAP_{jt},\ GDPCAP_{ijt},\ \#BITS_{it},\ \#BITS_{jt})\quad(2)$$

The institutional variables are rule of law and governance effectiveness. Due to the legal framework that characterized bilateral investment treaties, the two variables help to describe the probability that a treaty is formed. Bilateral investment treaties ensure foreign investors protection from expropriation, free transfer of means and full protection and security. It seems likely that if the confidence in the rules of law by foreign investors decreases then the probability to form a BIT increases. Moreover better institutions improve the conditions for inward FDI and they could therefore stimulate the probability to negotiate a treaty.

We include GDP per capita, a dummy variable for countries that are OECD's members and a variable for the number of BITs of both the home and host country in equation (2) following Hallward-Driemeier (2003) and Ligthart et al. (2012), among others. Two interactions terms are also included: the product between GDP per capita for both countries and the product between the OECD's member dummy of both countries.

In the second step of the estimation, the BIT dummy in equation (1) is substituted by the estimated probability that a BIT is ratified:

$$FDI_{ijt} = f\ (SUMGDP_{ijt},\ GDPDIFSQ_{ijt},\ Pr(BIT_{ijt}),\ DTT_{ijt},\ EU_{ijt},\ D_{rit},\ D_{rjt},\ YEAR_t)\quad(3)$$

Table 1 presents the summary statistics of the variables used in the probit and OLS regressions. We have 106 487 observations with non-missing observations for bilateral FDI stocks and the GDP constructs for these country pairs. For a few small countries, we miss governance indicators from the World Bank.

Table 1 : Summary Statistics for the variables included in the probit

	Obs	Mean	Std. Dev.	Min	Max
BITs[3]	106487	0.23	0.42	0.00	1.00
log(FDI)[2]	106487	1.94	2.94	-5.06	12.81
log(SUMGDP)[4]	106487	26.78	1.44	22.55	30.49
log(GDPDIFFSQ)[4]	106487	-2.88	1.97	-12.58	-0.69
log GDP capita[4]	106477	9.11	1.59	4.16	11.84
OECD (dummy)[2]	106487	0.54	0.50	0.00	1.00
#BITs[3]	106487	27.74	27.35	0.00	125.00
log GDPcapita_org*logGDPcapita_des[4]	106471	81.86	17.13	34.10	135.74
OECD_org.* OECD_des (dummy)[2]	106487	0.15	0.35	0.00	1.00
EU (dummy)	106487	0.06	0.24	0.00	1.00
DTT (dummy)[3]	106487	0.32	0.47	0.00	1.00
WTO (dummy)[1]	106487	0.76	0.43	0.00	1.00
Government effectiveness[4]	105711	0.70	1.05	-2.25	2.43
Rule of law[4]	105888	0.64	1.04	-2.23	2.00

Sources: [1]WTO, [2]OECD, [3]UNCTAD, [4]World Bank.

5. Results of the panel estimators

5.1 The average effect of BITs on FDI

This section presents the quantitative effects of bilateral investment treaties on bilateral FDI stocks using an OLS estimator with fixed effects for the country pairs[11] and an IV estimator for the BIT dummy to deal with reverse causality. Table B1 in Appendix B presents the marginal effects of the probability of forming a BIT. The average probability of forming a BIT is 0.23. This probability is larger if GDP in both countries is larger. This also holds for GDP per capita, OECD and WTO membership. The number of BITs ratified in earlier years has a positive effect on the probability to form a treaty either for home or host countries. Both interaction terms - the product between GDP per capita for both countries and the product between the OECD's member dummies of country pairs - have a negative effect on the BITs' probability of being formed; implying that two high income or OECD countries are not likely to form a treaty. This is also the case for countries that are EU member since the foreign investors' rights are enforced by the internal market rules and regulated by the EU Court of

---

[11]We have also run regressions with random effects, but the Hausman test has rejected (not surprisingly) this specification in favor of the fixed effect specification.

Justice. Rule of law in the host country has a negative effect on the probability of forming a treaty, but government effectiveness has a positive effect.

In the second estimation step, the BIT dummy is substituted by the probability of a treaty to be formed. The results are presented in Table 2 for different specifications. Column (1) shows the model evaluated by taking into account country pairs having in common a new BIT[12] and 3 years FDI observations previous to the ratification year. Regional and year dummies are included in all specifications.

Table 2: *Panel estimations of ratified BITs on bilateral FDI stocks*

	(1)	(2)	(3)	(4)	(5)
Method	IV	IV	IV	IV	OLS
BITs	New	All	All	All	New
Years	All	All	from 1995	from 2003	all
log(SUMGDP)	0.280***	0.391***	0.141*	0.237***	0.246***
	(0.0858)	(0.0794)	(0.0749)	(0.0633)	(0.0854)
log(GDPDIFFSQ)	0.167***	0.153***	0.0920***	-0.00637	0.155***
	(0.0347)	(0.0336)	(0.0327)	(0.0341)	(0.0346)
DTT	0.302***	0.204***	0.268***	0.189***	0.329***
	(0.0532)	(0.0459)	(0.0594)	(0.0702)	(0.0522)
Pr(BIT)	0.302***	0.294***	0.174***	0.0770	0.302***
	(0.0468)	(0.0386)	(0.0446)	(0.0496)	(0.0490)
EU	0.645***	0.751***	0.699***	0.660***	0.627***
	(0.102)	(0.0715)	(0.134)	(0.109)	(0.100)
Constant	-6.550***	-9.635***	-2.410	-5.153***	-5.708***
	(2.203)	(2.041)	(1.960)	(1.639)	(2.192)
Observations	73930	92615	65652	48132	73930
R-squared	0.350	0.386	0.204	0.069	0.350
Number of country pairs	7167	9050	7147	7071	7167

Robust standard error in parenthesis, *** p<0.01, ** p<0.05, * p<0.1

Our main explanatory variable, BIT, is highly significant with a positive coefficient. The coefficient of 0.302 for new BITs suggests that bilateral FDI stocks are 35% higher on average if a BIT is ratified since 1985. This is a relative large effect, comparable to the outcomes of Egger and Pfaffermayr (2004). Control variables present positive and significant coefficients. The EU dummy has also a strong effect, implying that bilateral FDI stocks between Member States are twice as high as between other countries. A Double Tax Treaty (DTT) has also a positive significant effect (see also Lejour (2014) and Neumayer (2007)). Specification (1) is our preferred one, since it captures the differences in FDI stocks between countries forming a BIT in the sample period and countries without it. If we also include country pairs with BITs concluded before the sample period (specification (2)) we find that

---

12 A BIT is considered new if it has been ratified after 1985 and old if it has been ratified before 1985.

the coefficients of the BITs are hardly different. Comparing the results in column (1) with those estimated by OLS in column (5), reveals that the coefficients are similar; suggesting that reversed causality is only a minor problem in this large sample.

We restrict the sample starting from 1995 and from 2003 instead of 1985 in order to reduce its imbalance. When the sample is smaller (see columns (3) and (4) compared to column (2)), the coefficient of the BITs dummy becomes smaller. If only observations between 2003 and 2011 are used, the coefficient is not significant any longer. This suggests that longer time periods are necessary for identifying the effects of BITs on FDI.

5.2 The effect of BITs on FDI by income group

One of the advantages of our large data set is that we can differentiate the sample by income per capita and geographical criteria.[13] It is important to check whether regression's results differ for various data selections. This could be an explanation for the diverging results in the literature. Income classification is constructed following World Bank income classification of the year 1987, which is the oldest one available. For countries which 1987's income classification is not available we employed the oldest year that is obtainable. We choose for the oldest classification to avoid a possible endogeneity issue. In more recent classifications, some countries are moved to a higher GDP per capita ranking, which could be partly due to an increase in FDI and even to an investment treaty. Although we do not expect that this effect would be substantial, we do not want to classify countries as upper middle income countries while BITs were concluded when these countries were middle income or even low income countries. Following the World Bank income classification of 1987, the instrumented BITs variable is split into groups in order to analyze the specific effect that bilateral investment treaties between certain income groups may have on FDI.

According to Table 3, BITs between high income countries (high-high) have no significant impact on bilateral FDI stocks. This could be expected because high income countries do not need to ratify a treaty between each other since they often have stable and reliable institutions and respected property rights. This suggests that BITs and stable institutions are substitutes and not complements. Instead, if countries classified as upper middle income or as high and

---

[13] Note that we can address various selection biases of other studies with more limited data in this way. However, there are still many (small) countries which do not report bilateral FDI stocks, which also could a selection bias if there a systematic differences between reporting and non-reporting countries.

upper middle income have a ratified treaty in common (highup_highup), their bilateral FDI stocks can increase by 75%. Many countries in Middle and Eastern Europe are classified as upper middle income countries. The BITs in the Rest 1 category (consisting of the treaties left out the previous categories presented in estimation (1)) have a much smaller effect on FDI.

Table 3: Effects of ratified BITs on FDI stocks by income per capita

	(1)	(2)	(3)
High_high	-0.00666	-0.00512	-0.00625
	(0.0971)	(0.0970)	(0.0970)
Highup_highup	0.560***	0.560***	0.557***
	(0.106)	(0.106)	(0.106)
Highupper_lowlower		0.413***	
		(0.0902)	
Highupper_lower			0.378***
			(0.104)
Highupper_low			0.547***
			(0.168)
Rest 1	0.268***		
	(0.0569)		
Rest 2		0.144**	0.143**
		(0.0728)	(0.0728)

Robust standard errors in parenthesis, *** p<0.01, ** p<0.05, * p<0.1. The coefficients of the other explanatory variables are presented in Table B2 in appendix B.

In the second regression, we have divided the "Rest 1" category in treaties between high/upper middle income countries and lower middle and low income countries as host and Rest 2. Comparing column (1) with column (2) in Table 3, BITs between high/upper middle income countries and low or lower middle income countries have a significant effect on bilateral FDI stocks albeit the coefficient is lower than the BITS' coefficient of high and upper middle income countries. BITs with low income countries have larger effects on FDI than with lower middle income countries according to estimation (3). BITs in "Rest 2" category have a small positive impact on FDI stocks. This group consists of treaties between lower middle income and low income countries and treaties between lower income countries and higher income countries as host countries.

5.3 The effect of BITs on FDI by geographical region

We use the geographic criteria according to the World Bank's regional classification amended with North America and Western Europe. For convenience, we summarized these regions in three groups South (Sub Saharan Africa, Middle East and North Africa, Latin

America and Caribbean), East (South Asia, East Asia) and West (Central and Eastern Europe, North America and Western Europe) in columns (1) and (2) of Table 4. It presents only the coefficients of the instrumented BITs, the other coefficients can be found in Table B2.

Table 4: Effect of ratified BITs on FDI stocks by geographical region

Region	Coeff	Region	Coeff
South	0.129	Sub Saharan Afrika	0.136
	(0.0890)		(0.183)
		Latin America & Caribbean	0.0316
			(0.127)
		Middle East and North Africa	0.326**
			(0.157)
West	0.259***	Western Europe	0.132*
	(0.0609)		(0.0676)
		Middle and Eastern Europe	0.610***
			(0.126)
		North America	0.185
			(0.325)
East	0.512***	East Asia	0.423***
	(0.0988)		(0.104)
		South Asia	1.190***
			(0.272)

Robust standard error in parenthesis, *** p<0.01, ** p<0.05, * p<0.1. The coefficients of the other explanatory variables are presented in Table B2 in appendix B.

From Table 4 we can conclude that ratified BITS with southern countries have hardly any significant impact on bilateral FDI stocks, unless the stocks are directed to the Middle East and North Africa. Ratified BITs by countries in the West region have a significant impact on the stocks mainly because of the attractiveness of Middle and Eastern Europe, often labeled as "transition economies". The estimated coefficient is about twice as large as the average coefficient in Table 2, column (1). The large impact of BITS in these host countries compared to other host countries is also found by Egger and Pfaffermayr (2004) and Berger et al. (2011). Also BITs with countries in Asia have a larger impact on FDI stocks. The coefficient for South Asia is very high but this is probably due to some country specific characteristics since there are only few countries that have ratified BITs in this region.

5.4 The effect of BITs on FDI by income group and region

Estimations in Tables 3 and 4 deliver various outcomes. Ratified BITs with lower middle and low income countries have a significant impact on FDI stocks but not in the south region where many of these countries are located. To disentangle this paradoxical outcome we split

the host countries in regional and income-per-capita groups. We divide the region in 3 and 8 groups.

Table 5: Effects of ratified BITs on FDI stocks by income per capita and region

	High_high	Highup_highup	Highupper_lowlower	Rest 2
South	0.694**	0.102	0.0845	0.102
West	-0.104	0.747***	0.610***	0.168**
East	-0.0162	0.653***	0.605**	0.164
Sub Saharan Africa			0.190	-0.495
Latin America & Caribbean		0.0813	-0.0868	0.235
Middle East and North Africa	0.711**	0.144	0.194	0.0369
Western Europe	-0.0944	0.457***		0.196**
Middle and Eastern Europe		1.243***	0.654***	0.0141
North America	-0.381**	1.720**		0.136
East Asia	-0.0189	0.640***	0.629***	0.114
South Asia			1.165***	1.467

Robust standard error in parenthesis, *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 5 shows that BITs have a positive effect on investment if lower middle and low income countries located in the West region (Middle and Eastern Europe) or in Asia are the host countries. This is not the case for low and lower middle income countries located in Latin America and Sub-Saharan Africa. This seems to suggest that geography matters more than income per capita for FDI's attractiveness. The only exception is a few high income countries in the Middle East where FDI stocks are positively affected by ratified BITs.[14]

The differences in results coming from the income and regional classifications explain partly the diverging results found in the literature. If the sample of host countries is formed by upper middle income countries or countries that are located in Asia and Europe then we can expect positive effects of BITs (Egger and Pfaffermayr, 2004, and Berger et al. (2011)). This is not the case for countries in Africa or Latin America as shown by Gallagher and Birch (2006) which find only a small effect for Latin America and Caribbean and by Aisbett (2009) which does not find an effect at all.

---

[14] Due to the lack of observations we do not have results for categories high and upper middle income countries that are part of Sub Saharan Africa, Latin America and South Asia and low and lower income countries in Western Europe and North America.

6. Robustness Analysis

6.1 Different data selections

We have conducted various robustness analyses with our preferred specification with country pairs without BIT and country pairs with the probability of forming a BIT. Column (1) in Table 6 exhibits the results including tax havens.[15] This adds another 10 thousand observations to the sample. Comparing the results with Column (1) in Table 2, they show that the effect of BITs on FDI stocks is slightly larger, but the difference between the coefficients in both specifications is not statistically significant. The regression in the second column of Table 6 ignores the reported outward FDI stocks between OECD countries in order to control for the possible variation in FDI stocks due to changes between inward and outward stocks (see Section 4). This has only a small effect on the number of observations and on the coefficient for the predicted BITs. It is somewhat larger, but the difference is not statistically significant.

Table 6: *Robustness analysis of ratified BITs on bilateral FDI stocks*

	(1) Tax havens	(2) Inward FDI	(3) From 1996	(4) Interaction	(5) Pr(DTT)
log(SUMGDP)	0.213***	0.237***	0.292***	0.238***	0.236***
	(0.0805)	(0.0862)	(0.0850)	(0.0868)	(0.0857)
log(GDPDIFFSQ)	0.126***	0.166***	0.166***	0.146***	0.140***
	(0.0333)	(0.0341)	(0.0345)	(0.0345)	(0.0350)
DTT	0.278***	0.296***	0.293***	0.304***	0.310***
	(0.0517)	(0.0551)	(0.0532)	(0.0526)	(0.0529)
Pr(BIT)	0.311***	0.341***	0.360***	0.373***	0.178***
	(0.0460)	(0.0471)	(0.0479)	(0.0564)	(0.0444)
Interaction BIT & inst				-0.144***	
				(0.0499)	
Institutions				0.318***	
				(0.0620)	
EU	0.753***	0.688***	0.642***	0.654***	0.617***
	(0.100)	(0.109)	(0.101)	(0.100)	(0.100)
Constant	-4.939**	-5.565**	-6.849***	-5.684**	-5.477**
	(2.057)	(2.211)	(2.183)	(2.224)	(2.199)
Observations	85769	70729	73930	73490	73930
R-squared	0.324	0.345	0.352	0.353	0.346
No of country pairs	8543	7136	7167	7101	7167

Robust standard error in parenthesis, *** p<0.01, ** p<0.05, * p<0.1

---

[15] This list with countries defined as tax haven is defined in Annex A3 and based on Gravelle (2013).

The third column in Table 6 presents a robustness analysis of the assumption that the levels of governance and the rule of law before 1996 are constant in the probit regression. We have reduced the length of the sample period to 16 years: 1996 to 2011. Then the coefficient on the predicted BITs is about one standard deviation larger than in column (1) of Table 2.

Among others, Hallward-Driemeier (2003) and Tobin and Rose-Ackerman (2005) have included interaction terms between BITs and institutional quality in the host country. They find larger FDI effects if the quality of institutions is higher. In column (4) of Table 6, we include the average level of institutions according to the six World Bank governance indicators and an interaction term with BITs. The level of institutions has a positive effect on the bilateral FDI stock while the interaction term of BIT and institutions has a negative effect. The latter result suggests that the effects of BITS are smaller if the quality of institutions is higher although we have already control for institutional power in the probability of forming a treaty. The average quality of institutions is 0.61. Combined with the coefficient of the BIT dummy the effect on FDI stocks is slightly smaller compared to column (1) in Table 2. Column (5) shows the results where both BIT and DTT are instrumented.[16] The relation between FDI and DTT could also suffer from reverse causality since the BIT effect on FDI could be driven by double tax treaties between a home and host country. The BIT's coefficient is lower than in column (1) in and column (3) in Table 2, suggesting that double tax treaties influence the effect that BITs has on FDI.

Furthermore, other control variables such as inflation, exchange rates and external debt as a percentage of GDP have been added to equation (3) as proxies for macroeconomic stability. However, the coefficients of these variables were not significant and, in addition, the number of observations dropped substantially due to lack of data. We therefore have chosen a more parsimonious model without the latter variables.

6.2 Propensity score matching

As an alternative for the panel estimations, we identify the effects of the Bilateral Investment Treaties by comparing the FDI stocks of country pairs which are likely to negotiate a treaty

---

[16] We use a probit to predict a DTT treaty using the same exogenous variables as for BIT. Moreover, we include the combined corporate tax rate of the host and home country and the combined withholding taxes of both countries on dividends, interests and royalties, following Ligthart et al. (2012). Results are available upon request.

with those that are not. Egger et al. (2006) use a propensity score matching method to analyze the effect of bilateral (tax) treaties on foreign direct investment. Difference-in-difference methods, like propensity matching score methods, isolate time-invariant unobserved effects by comparing a treatment and control group. Propensity score matching methods try to match observations which are treated with those in the control group which are not treated. In our case the treatment group is formed by country pairs having a new ratified BIT, while the control group is formed by country pairs not having a ratified BIT.

We compare the levels of bilateral FDI stocks two years before and two years after the treaty is ratified (d22) to find out whether the change in FDI stocks is significantly different from country pairs without a treaty. We also compare FDI stock growth four years after the treaty is ratified (d42) as an indication of the long term effects. As a robustness check we compare the growth of bilateral FDI stocks with and without a treaty six and three years after the treaty is ratified since three years before the ratification (d63 and d33). In all four cases FDI growth for the treatment pairs is significantly higher than for the control pairs.[17]

The treatment group consists of minimum 268 to maximal 344 observations for d_63 and d_22, respectively and the control group consists of about 10000 observations for d_63 and about 15000 observations for d_22, respectively.[18] The matches are based on the following explanatory variables: the sum of GDPs, the GDP difference (squared), and bilateral tax treaties. The matches between control and treatment country pairs could be made one by one, that is to say one of the observations in the control group has to match as closely as possible one observation in the treaty group, or multiple observations in the control group are matched to one observation in the treatment group. As an alternative to the one-to-one match, the five-to-one match was chosen, similarly to Egger et al. (2006).[19]

Table 7 shows that the BITs coefficients are always significant and positive for both the one-to-one and the five-to-one matches. We have similar results for the predicted BITs across all specifications. In order to compare the coefficients across the different time periods, we have calculated the cumulative increase of FDI stocks for the various specifications, compared to the control group. Considering the ratified BITs in the 5-1 matching, we see an increase in FDI stock from 30 to 40 percent compared to the control group. The increases in bilateral

---

[17] The t statistics are significant at the 99% level.
[18] If BITs are instrumented the treatment and control group are different because predicted BITs do not match perfectly with the ratified treaties. Then we have about 2000 less observations for the control group.
[19] We have also experimented with 10-1 matching. These results are nearly the same as for 5-1 matching.

FDI stocks are somewhat smaller if the instrumented BITs are used. This suggests that that the correction of reverse causality has a mitigating effect on the FDI stocks. Then the FDI stocks increase varies from 21 to 29 percent if a treaty is formed with 5-1 matching.

Table 7: Regression results of propensity score matching method for country pairs with BITs

	d_22		d_42		d_33		d_63		
	Coeff.	%FDI	Coeff.	%FDI	Coeff.	%FDI	Coeff.	%FDI	
BITs	0.396	31.0	0.649	45.0	0.491	31.3	0.912	49.2	1-1
	(0.114)	5.3	(0.134)	2.3	(0.126)	2.9	(0.158)	2.0	
BITs	0.382	29.7	0.590	39.6	0.403	24.5	0.768	38.2	5-1
	(0.095)	5.5	(0.114)	3.4	(0.109)	3.2	(0.130)	1.9	
Obs.	15789		13446		13418		10109		
IV BITs	0.267	20.1	0.320	19.1	0.348	21.1	0.483	21.3	1-1
	(0.089)	5.1	(0.100)	2.4	(0.086)	2.9	(0.105)	1.7	
IV BITs	0.344	27.0	0.409	25.6	0.447	28.6	0.484	20.6	5-1
	(0.066)	5.0	(0.080)	2.2	(0.074)	2.9	(0.088)	1.7	
Obs.	13345		11066		11060		7894		

Robust standard errors are in parentheses. All coefficients are significant at the 99% level. The FDI effects are cumulative changes of bilateral FDI stocks in the d_xy period compared to the average FDI stock increase without a BIT. The upper values are cumulative FDI stocks increases and the lower values are annual increases since the treaty ratification.

6.3 Propensity score matching by income group and geographical region

As a robustness check, we have also split the treatment and control groups for the propensity matching score method in various subgroups. First, we did so for income per capita. Table 8 presents the results for d_33 IV, d_22 IV and d_33 for the groups of low, lower middle, upper middle and high income countries. The results for the middle income countries are comparable to the results of the panel OLS estimation. The three specifications deliver similar coefficients. This is not always the case for the other income groups. According to the propensity matching score, bilateral FDI stocks of country pairs with treaties grow significantly faster than of non-treaty country pairs if the destination is a high income country. Moreover, treaties have no significant positive impact if the host country is a low income country.

Because of the much lower number of observations in these regressions, we could not identify significant effects when dividing the data sample by region. The only exceptions are East Asia and Middle and Eastern Europe (columns (5) and (6)). Also in the panel regressions we have found the largest coefficients for these regions.

Table 8: Effects of ratified BITs on FDI stocks by income per capita and region using propensity matching score method

Country	Low	Lower middle	Upper middle	Upper	East Asia	Middle Europe	
d_33	-1.179***	0.525***	0.557***	0.174**	0.337***	0.832***	Coef
IV	(0.266)	(0.184)	(0.166)	(0.088)	(0.126)	(0.262)	Std err
	802	1814	2167	6246	1682	785	Obs
d_22	-0.597	0.488***	0.543***	0.158**	0.278**	0.940***	Coef
IV	(0.460)	(0.147)	(0.129)	(0.087)	(0.126)	(0.226)	Std err
	1085	2339	2600	7284	1897	1075	Obs
d_33	0.046	0.143	0.583***	0.347	0.249	0.855***	Coef
Real	(0.367)	(0.183)	(0.186)	(0.211)	(0.160)	(0.250)	Std err
	897	1988	2183	8322	1929	6258	Obs

*Robust standard error in parenthesis. *** p<0.01, ** p<0.05, * p<0.1*

7. Conclusions

We examine the impact of bilateral investment treaties on bilateral FDI stocks using an extensive database of all OECD countries from 1985 until 2011. We use indicators for governance and membership of international organisations to correct for endogeneity between FDI and BITs. We find that ratified BITs increase on average bilateral FDI stocks by 35% compared to FDI stocks of country pairs not having a ratified treaty. Moreover, the effect differs by income group. Upper middle income countries seem to benefit the most from ratifying a treaty whereas high income countries characterized by a high level of governance do not profit from it. In addition, lower middle and low income countries experience larger inward FDI stocks from partner's countries. Distinguishing by region, we find that ratified BITs increase FDI stocks mainly in East Asia and Middle and Eastern Europe.

The results seem to be somewhat paradoxical. Ratified BITs with lower middle and low income countries have a significant impact on FDI stocks, but not in the South region where many of these countries are located. Therefore we have divided countries by income group and region. In this case, BITs have a positive effect on foreign investment if lower middle and low income countries located in the West region (Middle and Eastern Europe) or in Asia are the host countries. This is not the case for low and lower middle income countries located in Latin America and Sub-Saharan Africa. This seems to suggest that geography matters more than income per capita for FDI's attractiveness. Therefore countries own characteristics and location influence the capital allocation's decision.

The split of the sample in various regional and various income per capita selections and the different outcomes explain partly the various results in the literature. Our results show that data selections matter. The impact of BITs on FDI stocks is larger if Middle and Eastern European countries and Asian countries are included as host countries while BITS have hardly an impact for host countries in Africa and Latin America and the Caribbean.

In addition, we paid particular interest on the effect of BITs on FDI in developing countries. Since those treaties were designed to facilitate the movement of capital from developed to developing countries, we examined the role of those treaties as substitute for political instability and weak institutions. The probit analysis showed that BITs and the overall quality of institutions (measured by the government effectiveness) are complements while that BITs and the indicator for the rule of law are substitutes. Investment treaties often can substitute national law where it is loose and weak.

References

Anderson, J.E. and E. van Wincoop, 2003, Gravity with Gravitas: A Solution to the Border Puzzle, *American Economic Review* 93(1), 170-192.

Aisbett, E., 2009, Bilateral Investment Treaties and Foreign Direct Investment: Correlation versus Causation, in: Sauvant, K. and L.E. Sachs (eds.), *The Effects of Treaties on Foreign Direct Investment: Bilateral Investment Treaties, Double Taxation Treaties and Investment Flows.* New York: Oxford University Press.

Banga, R., 2003, Impact of Government Policies and Investment Agreements on FDI Inflows. *Working Paper No. 116, November, Indian Council for Research on International Economic Relatio*ns, New Delhi.

Berger, A., M. Busse, P. Nunnenkamp and M. Roy, 2011, More Stringent BITs, Less Ambiguous Effects on FDI? Not a BIT!, *Economics Letters 112(3),* 270-272.

Busse, M, J. Koeniger and P. Nunnenkamp, 2010, FDI Promotion through Bilateral Investment Treaties: More Than a Bit?, *Review of World Economics 146(1)*, 147–177.

Carr, D., J. R. Markusen and K.E. Maskus, 2001, Estimating the knowledge capital model of the multinational enterprise, *American Economic Review, 91(3)*, 693-708.

Egger, P., M. Larch, M. Pfaffermayr and H. Winner, 2006, The impact of endogenous tax treaties on foreign direct investment: theory and evidence, *Canadian Journal of Economics 39(3),* 901-931.

Egger, P., & Merlo, V., 2007, The impact of bilateral investment treaties on FDI dynamics. *The World Economy*, *30*(10), 1536-1549.

Egger, P., & Merlo, V., 2012, BITs Bite: An Anatomy of the Impact of Bilateral Investment Treaties on Multinational Firms. *The Scandinavian Journal of Economics*, *114*(4), 1240-1266.

Egger, P., & Pfaffermayr, M., 2004. The impact of bilateral investment treaties on foreign direct investment. *Journal of Comparative Economics*, *32*(4), 788-804.

Gallagher, K.P. and M.B.I. Birch, 2006, Do Investment Agreements Attract Investment? Evidence from Latin America, *Journal of World Investment and Trade* 7(6), 961-974.

Gravelle, J.G., 2013, Tax Havens: International Tax Avoidance and Evasion, Congressional Research Service.

Hallward-Driemeier, M., 2003, Do Bilateral Investment Treaties Attract FDI?. Only a bit and they could bite. *World Bank Policy Research Paper*, WPS 3121 (Washington, D.C.: World Bank).

Ligthart, J.E., M. Vlachaki, and J. Voget, 2012, The Determinants of Double Tax Treaty Formation, CESIFO Public Sector Conference 2012.

Markusen, J. R. and K.E. Maskus, 2002, Discriminating among alternative theories of the multinational enterprise*, Review of International Economics 14*, 694-707.

Medvedev, D., 2012, Beyond Trade: The Impact of Preferential Trade Agreements on FDI Inflows, *World Development 40(1)*, 49–61.

Neumayer, E., 2007, Do double taxation treaties increase foreign direct investment to developing countries? *Journal of Development Studies 43 (8),* 1501-1519.

Neumayer, E. and L. Spess, 2005, Do bilateral investment treaties increase foreign direct investment to developing countries?, *World Development 33(10)*, 1567-1585.

Salacuse, J.W. and N.P. Sullivan, 2005, Do BITs really work?: An Evaluation of Bilateral Investment Treaties and Their Grand Bargain, *Harvard International Law Journal* 46, 67-130.

Tobin, J. and S. Rose-Ackerman, 2005, Foreign Direct Investment and the Business Environment in Developing Countries: the Impact of Bilateral Investment Treaties, Center for Law, Economics and Public Policy, Research Paper No. 293.

UNCTAD, 2013, Global Value Chains: Investment and Trade for Development, *World Investment Report*.

UNCTAD, 2014, The Impact of International Investment Agreements on Foreign Direct Investment: An Overview of Empirical Studies 1998–2014, IIA Issues Note September 2014.

Appendix A

Figure A1: The number of observations of the bilateral FDI stock, 1985 to 2011
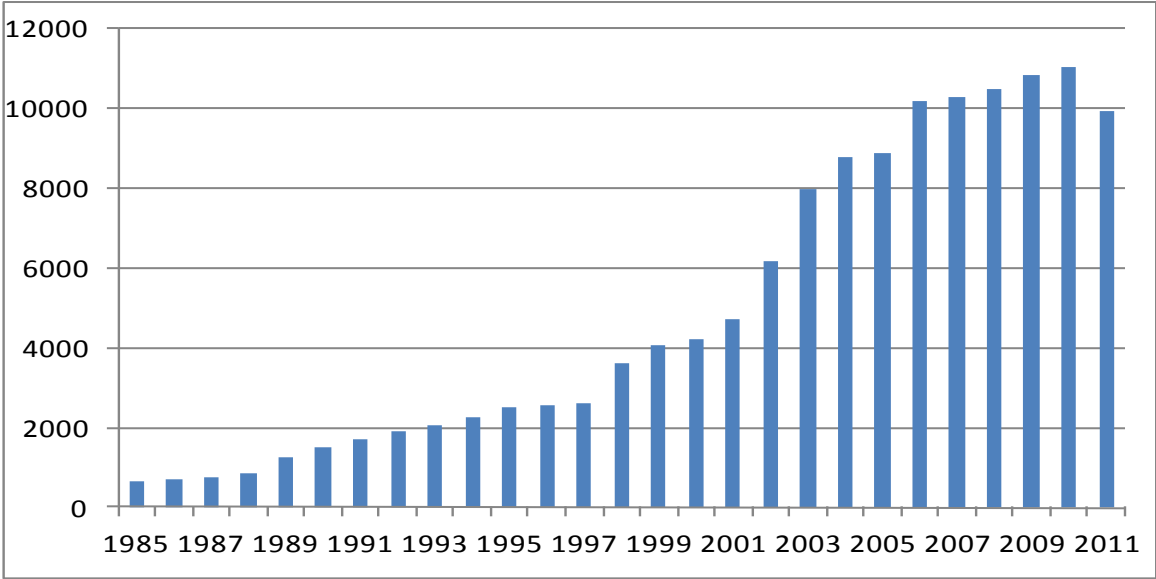
Source: OECD

Table A2: Variables description

Variable name	Description	Data base
Log(FDI)	Dependent variable. Bilateral Inward FDI stock.	OECD
BIT	Independent variable. Dummy which is 1 if two countries share a ratified BIT, otherwise it is zero.	UNCTAD
log(SUMGDP)	Sum of real GDP between two countries. Measured in log.	World Bank
log(GDPDIFFSQ)	Squared difference between two countries' real GDP. Measured in log.	World Bank
dum_EU	The dummy is 1 if both countries are part of the EU	
DTT	The dummy is 1 if two countries have a tax treaty in common.	UNCTAD
Pr(BIT)	Instrumented variable is 1 if two countries have a probability (larger than 0.5) of ratifying a bilateral treaty. Otherwise it is 0.	
OECD	The dummy is 1 if a country is a member of the OECD	OECD
GDP_capita	Gross Domestic Product per capita in current US dollar in logs	World Bank
#BITs	The number of bilateral investment treaties that a country has ratified over time	UNCTAD
WTO	dummy variable taking the value of 1 if a country is a Member of the World Trade Organization	WTO
Institutions	Average of the six worldwide governance indicators from 1996 to 2011: voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, control of corruption	Worldwide Governance Indicators
Governance effectiveness	Government effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.	Worldwide Governance Indicators
Rule of Law	Rule of law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.	Worldwide Governance Indicators

Table A3: Countries' classification by income following the World Bank income classification of 1987and the number of BITs

country	Rat BITs	country	Rat BITs	country	Rat BITs	country	rat BITs
high income		**upper middle income**		**lower middle income**		**low income**	
Germany	127	Korea, Rep.	83	Czech Republic	84	China	103
Switzerland	111	Romania	80	Egypt, Arab Rep.	73	India	69
United Kingdom	92	Hungary	58	Turkey	68	Indonesia	46
France	91	Argentina	55	Bulgaria	60	Vietnam	43
Netherlands	90	Lithuania	51	Poland	58	Pakistan	25
Italy	81	Russian Fed.	51	Ukraine	56	Sri Lanka	23
Spain	72	Belarus	49	Malaysia	51	Bangladesh	23
Belgium	67	Iran, Isl. Rep.	48	Slovak Republic	49	Ethiopia	22
Luxem.	67	Latvia	45	Croatia	48	Mozambique	19
Sweden	67	Portugal	41	Uzbekistan	46	Lao PDR	19
Finland	65	Serbia	41	Morocco	45	Tajikistan	17
Austria	60	Greece	39	Cuba	41	Nigeria	13
Denmark	47	Slovenia	37	Lebanon	40	Sudan	12
U.S.	41	Uruguay	27	Bosnia & Herzeg.	39	Cambodia	11
Kuwait	40	Venezuela, RB	27	Chile	39	Tanzania	9
Singapore	35	Algeria	25	Jordan	39	Ghana	8
Israel	32	Estonia	25	Moldova	37	Uganda	7
UAE	29	Oman	24	Mongolia	37	Mauritania	6
Canada	28	**Cyprus**	20	Macedonia, FYR	35	Mali	6
Australia	21	**Malta**	20	Thailand	34	Madagascar	6
Bahrain	20	**Panama**	20	Albania	33	Burkina Faso	6
SaudiArabia	18	Libya	16	Tunisia	32	Guinea	5
Qatar	17	Trin.&Tobago	12	Armenia	31	Burundi	5
Norway	16	Barbados	9	Peru	31	Benin	5
Taiwan	16	Gabon	8	Syrian Arab Republic	31	Nepal	4
Hong Kong	15	**Antigua&Barb.**	2	Philippines	30	Kenya	4
Japan	15	Macao SAR,	2	Georgia	29	Guyana	4
Iceland	8	Iraq	1	Kazakhstan	29	Congo, Dem. Rep.	4
Brunei Darus.	5	Suriname	1	Azerbaijan	28	Rwanda	3
San Marino	5	**Seychelles**	1	Mexico	28	Myanmar	3
New Zealand	2	**Neth. Antilles**		Ecuador	24	**Liberia**	3
Ireland	1	Brazil		Yemen, Rep.	23	Lesotho	3
Andorra		**Gibraltar**		South Africa	23	Haiti	3
Am. Samoa		St. Kitts & Nevis		Kyrgyz Republic	22	Chad	3
Bahamas		Mayotte		Paraguay	22	Afghanistan	3
Bermuda		New Caledonia		**Mauritius**	21	Togo	2
Channel Islands		Palau		Bolivia	20	Somalia	2
Curaçao		Puerto Rico		El Salvador	20	Niger	2
Cayman Islands				Guatemala	17	Malawi	2
Faeroe Islands				Turkmenistan	17	Gambia, The	2
Greenland				Costa Rica	13	Equatorial Guinea	2

Guam		Nicaragua	13	Central African Rep.	2
Isle of Man		Korea, Dem. Rep.	13	Timor-Leste	1
Liechtenstein		Dominican Republic	12	Sierra Leone	1
St. Martin (French)		Jamaica	10	Guinea-Bissau	1
Monaco		Senegal	10	Eritrea	1
Fr. Polynesia		Honduras	9	Comoros	1
Sint Maarten (Dutch)		Cameroon	8	Solomon Islands	
Turks&Caicos Islands		Cape Verde	8	**SãoTom.**	
Virgin Islands (U.S.)		Montenegro	7	Maldives	
		Namibia	7	Bhutan	
		Zimbabwe	6		
		Côte d'Ivoire	5		
		Congo, Rep.	5		
		Colombia	5		
		Angola	4		
		Belize	4		
		Papua New Guinea	4		
		Botswana	2		
		Dominica	2		
		Grenada	2		
		St. Lucia	2		
		Swaziland	2		
		St. Vincent &Grenadines	2		
		Zambia	2		
		Djibouti	1		
		Tonga	1		
		West Bank and Gaza	1		
		Fiji			
		Micronesia, Fed. Sts.			
		Kiribati			
		Kosovo			
		Marshall Islands			
		Northern Mariana Islands			
		South Sudan			
		Tuvalu			
		Vanuatu			
		Samoa			

Tax havens countries highlighted in bold. There are 2233 ratified treaties. All are double counted in this table. The treaties with the bel-lux economic union are even counted triple: for Belgium, Luxembourg and the treaty partner.

Appendix B

Table B1: Probit regression for the probability of forming a BIT (marginal results)

	(1)	(2)	(3)	(4)
log(SUMGDP)	0.0371	(0.0013)	0.0418	(0.0014)
log(GDPDIFFSQ)	0.0298	(0.0008)	0.0325	(0.0008)
log(GDPcapita_origin)	0.4445	(0.0085)	0.4850	(0.0092)
log(GDPcapita_destination)	0.4484	(0.0087)	0.4884	(0.0094)
OECD_origin (dummy)	0.0456	(0.0060)	0.0574	(0.0066)
OECD_destination (dummy)	0.0362	(0.0059)	0.0501	(0.0066)
#BITs_origin	0.0041	(0.0001)	0.0042	(0.0001)
#BITs_destination	0.0041	(0.0001)	0.0042	(0.0001)
log(GDPcapita_orig)*log(GDPcapita_dest)	-0.0469	(0.0008)	-0.0509	(0.0009)
OECD_org.* OECD_des (dummy)	-0.2669	(0.0063)	-0.2915	(0.0071)
EU (dummy)	-0.0178	(0.0047)	-0.0237	(0.0050)
DTT (dummy)	0.1557	(0.0023)	0.1684	(0.0025)
WTO (dummy)	0.0382	(0.0029)	0.0426	(0.0032)
rule of law_destination	0.0245	(0.0044)	0.0177	(0.0049)
government effectiveness_destination	-0.0190	(0.0043)	-0.0131	(0.0047)
Constant				
Years	all		From 1996	
Observations	105695		92475	
pseudo r2	0.386		0.385	
Wald test on region-year dummies (381)	6834.2		6304.7	
Wald test on instruments (11)	11390.8		10428.3	

All coefficients in columns (1) and (3) are statistically significant at the 99% level. The standard errors are reported in columns (2) and (4). Regional time dummies are included and are jointly significant, see Wald test.

Table B2: Coefficients in regressions

Table, Column	T4, C1	T4, C3	T3, C1	T3, C2	T3, C3
log(SUMGDP)	0.260***	0.251***	0.268***	0.269***	0.266***
	(0.0855)	(0.0853)	(0.0857)	(0.0858)	(0.0856)
log(GDPDIFFSQ)	0.160***	0.158***	0.161***	0.162***	0.162***
	(0.0347)	(0.0345)	(0.0345)	(0.0344)	(0.0344)
EU	0.650***	0.649***	0.630***	0.627***	0.626***
	(0.101)	(0.101)	(0.102)	(0.102)	(0.102)
DTT	0.305***	0.292***	0.295***	0.299***	0.300***
	(0.0529)	(0.0527)	(0.0529)	(0.0528)	(0.0527)
Constant	-6.035***	-5.783***	-6.252***	-6.281***	-6.203***
	(2.194)	(2.190)	(2.200)	(2.201)	(2.197)
Observations	73930	73930	73930	73930	73930
R-squared	0.350	0.352	0.351	0.352	0.352
Number of pairs	7167	7167	7167	7167	7167