

Do Bilateral Investment Treaties Attract Foreign Direct Investment? The Role of International Dispute Settlement Provisions

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JEL-Classification: F02, F21, F23, F53, K33

Keywords: Bilateral Investment Treaties (BITs), State-State Dispute Settlement (SSDS), Investor-State Dispute Settlement (ISDS), Foreign Direct Investment (FDI)

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The Role of International Dispute Settlement Provisions

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December 21, 2017

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This paper studies the effect of the strength of Bilateral Investment Treaties (BITs) on FDI activity. We develop an index for the strength of international dispute settlement provisions included in BITs in order to examine the role the content of BITs plays in attracting FDI. To this end we make use of data from the UNCTAD's International Investment Agreement Mapping Project and measure the provision strength of 1,676 BITs. Using panel data of bilateral and total inward FDI flows and stocks we study the effect of BITs on FDI. Our main finding indicates that stronger international dispute settlement provisions in BITs are indeed associated with positive effects on FDI activity.

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1 Introduction

Bilateral Investment Treaties (BITs) have become the dominant legal instrument to regulate foreign direct investment (FDI). Since the first BIT between Germany and Pakistan was signed in 1959 (Yackee, 2008), their number has continuously increased and reached a total of 2,363 globally in 2017 (UNCTAD, 2017). Despite the popularity of BITs, the debate about their effectiveness is still ongoing and their provisions on international dispute settlement are controversy discussed. Most BITs include two forms of international dispute settlement: state–state and investor–state dispute settlement. Especially the role of Investor-State Dispute Settlement (ISDS) provisions in BITs is highly debated in policy debates. On the one hand, proponents argue that ISDS is a necessary component of BITs, because it allows investors to represent their rights independent from the local level of property rights protection. On the other hand, the critics of ISDS question whether the advantages actually outweigh the loss of policy autonomy that is associated with such provisions. Indeed, some countries even reconsidered their position concerning ISDS and started to withdraw from their BITs. South Africa serves as a prominent example (UNCTAD, 2017).

In the empirical literature, evidence on the effects of BITs on FDI is mixed and the role international dispute settlement provisions play in attracting FDI has hardly been analyzed. The question of whether BITs, and especially international dispute settlement provisions, are actually able to achieve their purpose and attract FDI is of high importance from both a political and an academic point of view. We try to shed some light on this question by accounting for the strength of international dispute settlement provisions in BITs. International dispute settlement constitutes the most distinguished feature of BITs. The literature argues that international dispute settlement clauses are a crucial component of BITs as they provide a way to sanction deviating behavior, determine the credibility of legal promises, and allow investors to enforce their rights independent of the local level of the rule of law (Allee and Peinhardt, 2010, Berger et al., 2013, Yackee, 2008). Thus, it can be presumed that BITs that grant extensive access to independent international arbitration have a different effect on FDI than BITs with weaker international dispute settlement provisions.

The paper proceeds as follows. Section 2 explains the relationship between BITs and FDI. Section 3 develops a new measure of the strength of the existing international dispute settlement provisions included in BITs. Section 4 describes the empirical model and the data. Section 5 presents the results of the empirical analysis. Section 6 summarizes the main findings and offers some conclusions.

2 Bilateral Investment Treaties and FDI

Figure 1 illustrates the increased popularity of BITs over the past decades. The graphs show the number of BITs in force during the period 1961-2016 for four country groups. First, graph (a) shows the total number of BITs in force for all countries. Second, graph (b) shows the number of BITs in force between developed and developing countries, according to the World Bank definition. Third, graph (c) shows the number of BITs for which both countries are developing countries. Finally, graph (d) shows the number of BITs in force between developed countries. In the late 1970s the number of ratified BITs started to increase and rose sharply in the 1990s and 2000s. During this period BITs proliferated especially due to increased competition between countries for FDI (UNCTAD, 2004). Around the year 2010 the number of new treaties began to stagnate and in recent years the number of ratified BITs remained almost constant. In most cases BITs are concluded between a developed and a developing country. BITs between developed countries and BITs between developing countries are far less common.

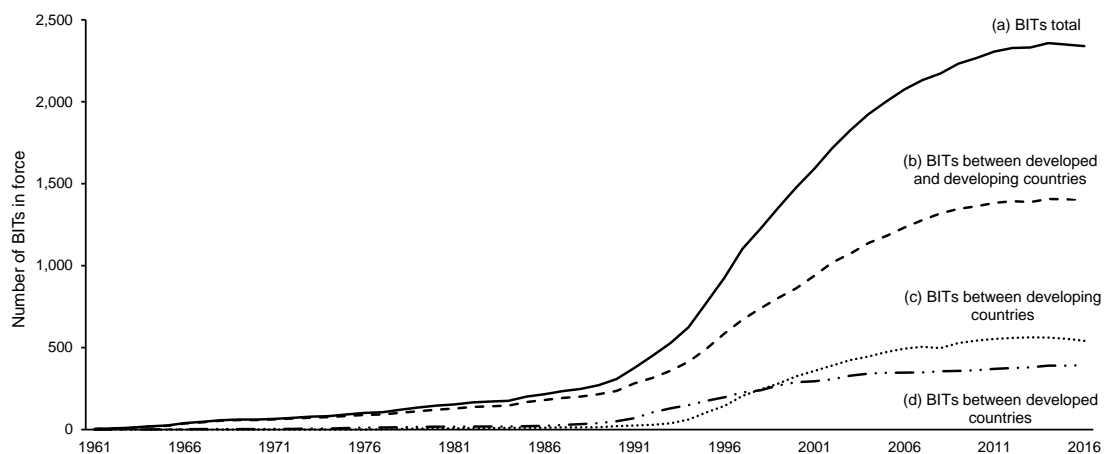


Figure 1: Number of BITs In Force, 1961-2016

With the rise in popularity of BITs the relationship between BITs and FDI gained considerable attention in the academic literature. The variety of studies, however, produced a mixed picture concerning an FDI-enhancing effect of BITs. Hallward-Driemeier (2003) was one of the first to analyze the relationship of BITs and FDI. She finds no effect of BITs on FDI using bilateral FDI flows from OECD countries to developing countries. This result holds for different apportionments of FDI, for example for FDI inflows as a share of GDP or FDI inflows as a share of total FDI. Tobin and Rose-Ackerman (2005) also fail to find an FDI-enhancing effect of BITs. By contrast, Egger and Pfaffermayr (2004) find a significant positive effect of BITs on outward FDI of the OECD countries. They distinguish between the signing and the ratification of BITs and find a positive effect of BITs on FDI even before the treaty legally enters into force. Egger and Pfaffermayr (2004) interpret this result as an effect caused by the anticipative behavior of investors. A recent study by Colen et al. (2016) analyzes the effect of BITs on FDI in different economic sectors. Their study takes into account sectoral disaggregated FDI in seven sectors of thirteen countries

from the former Soviet Union and Central and Eastern Europe. Their results suggest that with the signing of a BIT FDI increases in sectors with high capital intensity.

The rationale of a BIT is related to the sunk-cost characteristics of FDI. With FDI being long-run oriented, the cost for investors of removing assets can be substantial and can, thus, cause a considerable financial loss. This implies that there can be a shift in the bargaining power from the investor to the host country government, once an investment is realized. High sunk costs involved in FDI can create an incentive for the host country to change the terms of investment after the investment is established (Vernon, 1971). Such a change in the terms of investment can take different forms. While in the 1960s and 1970s direct expropriation was the most significant risk for foreign investment, today the means by which host countries discriminate or expropriate foreign investment are more subtle (Büthe and Milner, 2008). Changes in regulation and taxation or other discretionary measures as means to extract profits from foreign investors have become more common than plain expropriation. Changing the terms of investment after its realization creates a time-inconsistency problem. Even for governments willing to attract foreign investors and willing to treat foreign investors well, the incentives change, once the investment is completed. The short-run benefits of violating the rights of investors might exceed the cost associated with a loss of reputation among international investors caused by the government's measures (Büthe and Milner, 2008).

BITs as a commitment device can help overcome the described time-inconsistency problem. Especially, ISDS allows countries to credibly commit themselves not to change the terms of an investment after it is established (Colen et al., 2016, Elkins et al., 2006, Vandevelde, 1998). The possibility for investors to gain compensation through ISDS in case host countries pursue discriminatory or discretionary behavior decreases the incentives of governments to treat FDI unfavorably. Following this reasoning, one might expect that the effect of BITs on FDI is stronger if international dispute settlement provisions in BITs are stricter. Allee and Peinhardt (2010) claim that international dispute settlement clauses provide the pivotal legal characteristic of any BIT, as they determine the costs host countries face when violating a BIT. Stricter international dispute settlement provisions give investors a higher chance to get compensation when faced with a breach of a BIT. The consequences that can result from a breach of the treaty, enforced by the international dispute settlement mechanism, ensure that host countries will not expropriate or discriminate foreign investment (Büthe and Milner, 2008). This cost can either be financial or can be caused by a loss of reputation, when other investors realize that a host country is taking its promises not seriously.

BITs might also help attract FDI from third countries not part of the BIT. BITs are legally binding only to the contracting parties and only the investment from those states that have signed the treaty is protected by a BIT. However, BITs can act as a signal to investors from non-signatory countries.

BITs might generally signal investors that the host country is willing to treat foreign investment well (Neumayer and Spess, 2005, Tobin and Rose-Ackerman, 2005). Neumayer and Spess (2005) argue that BITs indicate foreign investors that the host country pursues the objective to attract FDI and will follow, in general, liberal policies towards foreign investment. This signaling effect is independent of the existence of a BIT between the host and the source country. If this is indeed the case we would expect that BITs with strong international dispute settlement provisions send a stronger signal to non-contracting party investors than treaties with less strict provisions on international dispute settlement.

Although several studies - as shown above - analyze the effect of BITs on FDI, the actual content of international dispute settlement provisions has so far hardly been incorporated in the analyses. While on first sight the content of BITs may look very similar, a closer look reveals that BITs differ considerably in their provisions. Thus, regarding all treaties in such an analysis as identical, independent of the actual provisions included, might lead to biased results. There are only two papers that focus on the provisions included in the treaties, but they do not exclusively focus on international dispute settlement. In one paper, Berger et al. (2013) incorporate the actual treaty provisions into an analysis of BITs and Regional Trade Agreements on bilateral FDI from 28 source countries to 83 developing host countries. Considering international dispute settlement provisions, the authors differentiate only between three types of provisions, indicating the degree to which the contracting parties give their consent to an arbitration prior to an investment claim. Using bilateral FDI data the analysis finds weak evidence of a relationship between the international dispute settlement provisions included in a BIT and FDI. In another paper Dixon and Haslam (2016) use data on eighteen Latin American host countries and apply a more comprehensive measure incorporating different types of ISDS provisions. The authors find some evidence that the strength of provisions matters for the effect of BITs on FDI.

While the study by Berger et al. (2013) distinguishes only between three types of international dispute settlement provisions we develop a comprehensive measure of the international dispute settlement provision strength incorporating twelve types of provisions. To our knowledge this is the first detailed and comprehensive measure of the strength of international dispute settlement provisions. Compared to Dixon and Haslam (2016), we expand the sample of host countries beyond Latin America and use data on 177 countries from a very wide range of developing and developed countries. In addition, we contribute to the literature by using different FDI measures (bilateral and total FDI, as well as total inward FDI stocks) to validate our results.

3 Measuring the International Dispute Settlement Provisions Strength of BITs

In order to examine the effects of BITs and more specifically of international dispute settlement provisions on FDI, we first need to define stronger and weaker international dispute settlement provisions. To this end, our new measure of the strength of international dispute settlement provisions takes into account the methodology proposed by Leshner and Miroudot (2006). Specifically, we measure the provision strength by coding individual treaty provisions concerning international dispute settlement. We include 1,676 BITs, which cover the time span from 1959 to 2016. We aim at quantifying the qualitative information entailed in the treaty by coding the international dispute settlement provisions along two poles of which one end is the lowest possible provision strength and the other end is the highest provision strength. In most cases the different individual provisions are coded either with a value of zero (low provision strength) or with a value of one (high provision strength), but in some cases we assign a value of 0.5 to indicate a medium level. The overall score of the BIT index is the sum of the values assigned to the different provisions.

We make use of the data and the treaty classification from the UNCTAD's International Investment Agreement Mapping Project (UNCTAD, 2017). Based on these data, we assign points to an individual agreement on the basis of the following aspects of dispute settlement:

- **State-State Dispute Settlement (SSDS):** SSDS provisions provide only an indirect form for investors to represent their interests as they cannot directly sue host country authorities. However, in some cases states might act on behalf of investors and their interests might be represented through home state officials offering diplomatic protection (Sasse, 2011). Thus, treaties including an SSDS provision should provide a higher investment protection compared to treaties which do not include such provisions. Following this reasoning we assign a value of one to a treaty if it includes SSDS arbitration and a value of zero if it does not include such a provision.
- **Investor-State Dispute Settlement (ISDS):** Treaties that allow investors to take direct legal action against governments through ISDS should provide a higher investment protection as treaties which do not include ISDS arbitration. Thus, we assign a value of one to a treaty if it includes ISDS provisions and a value of zero otherwise.
- **Alternatives to arbitration:** In addition to formal arbitration panels, the rules of which are stipulated in the provisions on ISDS, some treaties allow for conciliation as an additional informal arbitration method. Instead of putting the focus on the strict application of legal rights, conciliation seeks a balanced non-binding solution which is acceptable for both disputing parties. Such conciliation provides a flexible and fast arbitration mechanism which we argue makes the investors better-off as he has an additional tool at his disposal to represent his interests. We assign a value

of one to treaties, which provide for the possibility of conciliation as an additional voluntary way of arbitration, and a value of zero if they do not provide for such a possibility.

- **Scope of claims:** BITs can be different with respect to what type of claims can be used for the ISDS arbitration. We assign a value of zero to a treaty if it covers only claims arising out of the direct violation of the treaty provisions and a value of one if it covers a broader concept that stipulates that “any dispute connected to investment” can be subject to ISDS arbitration. As a medium level of investor protection we assign a value of 0.5 to treaties that go beyond breaches of the treaty itself but do not cover any dispute related to investment. Such an extended base of claims is usually incorporated through an explicit list provided in the treaty text. We also assign a value of zero if the treaties cannot be categorized according to the above criteria.
- **Limitation of provisions subject to ISDS:** Some treaties limit the provisions that can be subject to ISDS. Usually such a limitation of provisions is done by explicitly listing the violations that can or cannot be submitted to ISDS. We incorporate this aspect of BITs into our measure of strength and assign a value of one if a treaty provides that all of its provisions are subject to ISDS and a value of zero if the treaty limits the scope of provisions which are subject to ISDS.
- **Exclusion of policy areas from ISDS:** Some BITs exclude certain policies or economic sectors from ISDS. Exclusions for example may rule out claims relating to investments in political sensitive sectors of the host state. We assign a value of zero to a treaty that excludes a policy area or investment in a particular economic sector from ISDS arbitration and assign a value of one if the BIT does not stipulate such an exclusion.
- **Consent to arbitration:** Usually the consent to arbitration is given by the contracting parties prior to the claim of an investor. Some BITs, however, stipulate that the consent to arbitration has to be given by the contracting parties on a case-by-case basis, i.e., the contracting parties need to submit their consent to arbitration for every case individually. We assign a value of zero to such treaties. If the contracting parties give their prior consent to ISDS arbitration of investor claims we assign a value of one.
- **Forum of arbitration:** There are a variety of forums by which ISDS arbitration can be conducted. As the decision which forum conducts the arbitration is usually taken by the investor we argue that the more options there are at the investor’s disposal the better he can pursue his interests. This argumentation assumes that the more forum options are available the more leverage is given to the investor and the higher is the investment protection. The two most common forum types are the International Center for the Settlement of Investment Disputes (ICSID) and the United Nations Commission on International Trade Law (UNCITRAL). We assign a value of one to a treaty that includes the option to submit claims to ICSID and the value of zero if no such option

is available. We proceed in the same way if a treaty allows for dispute settlement under the rules of the UNCITRAL. We also assign a value of one if the treaty allows by any other forum for investment dispute arbitration. This procedure ensures that the more forum options are available for the investor the higher the index.

- **Relationship between ISDS forums:** Some treaties include a so-called “fork in the road” or a “no U turn” clause. A “fork in the road” provision requires the investor to choose between local courts or ISDS arbitration prior to the court proceedings. For example, once a claim has been raised at the domestic court, the investor loses its right to seek arbitration on the international level. Similarly, a “no U turn” clause stipulates that, once a claim has been referred to international arbitration, the investor loses its rights to appeal to a local court. We assign a value of zero to a treaty which contains a “fork in the road” or a “no U turn” clause and a value of one if a treaty does not include such a provision. This coding implies that the more flexibility the investor has in his strategy to pursue his claims the higher is the investment protection. To indicate a medium level of investor protection we assign a the value of 0.5 to a treaty that either obliges the investor to go first through local court proceeding before international arbitration or preserves the right to international arbitration only as long as there is no final judgement by a local court.
- **Limitation period for submission of claims:** Treaties which stipulate a limited time period for the submission of claims to ISDS arbitration get a value of zero and treaties with no such limitation get a value of one.
- **Provisional measures:** We assign a value of one if the treaty includes a provision that allows for provisional or interim measures initiated by the arbitration tribunal in the interest of the investor and assign a value of zero if there is no such a provision. Such provisional measures may be intended to preserve the rights of investors or to preserve evidence while there is an ongoing arbitration.
- **Limited remedies:** Some BITs limit the potential remedies that an arbitration tribunal may award to monetary compensation excluding the restitution of property. For example, treaties that stipulate that only financial means can compensate for property right violations (instead of a restitution of property) should be ranked at a lower level of investor protection. Therefore, we assign a value of zero to a treaty that includes provisions that limit the available remedies and forms of compensation that can be awarded by the arbitration tribunal. We assign a value of one if the treaty does not include such a provision.

The sum of the values we assign to the different aspects of a BIT is the BIT index score. The coding implies that the index ranges from a minimum of zero to a maximum of 15 with a higher score indicating a higher provision strength. Figure 2 shows the distribution of the BIT index. The distribution is left skewed (-2.6) and the score with the most BITs is 11 (437 out of 1,676). More than 60 percent of all

BITs have an index score of 11 and higher. Only two have the lowest index level of zero (Libya - Malta BIT of 1973 and Liberia - Switzerland BIT of 1963). There is one treaty that has the maximum score of 15 (China - India BIT of 2007). The average index score is 10.5.

Table 1 gives an overview of the provisions include in the coded BITs. The vast majority of treaties include SSDS and ISDS provisions, only ten BITs do not include SSDS and 74 do not include ISDS. When it comes to voluntary alternative methods of arbitration, a quarter of the coded BITs allows for conciliation. Also, about a quarter of the BITs only covers claims arising out of the direct violation of treaty provisions, while the majority of treaties does not limit the scope of claims. Only 200 out of 1,676 coded treaties limit the scope of provisions which are subject to ISDS and only 115 exclude certain policy areas from ISDS. In most cases a general consent to arbitration is given prior to a dispute (1,507 BITs). Concerning the available arbitration forum, for which multiple options are possible, about 86 per cent of the BITs include a reference to the ICSID, about 61 per cent to UNCITRAL and 60 per cent to domestic courts of the host state. 30.6 per cent of the BITs include other forum options. Most treaties do not include a provisions on the relationship between ISDS forums but a considerable amount of 32.2 per cent of all BITs mention a “fork in the road” or a “no U turn” clause. Only a small number of treaties limit the time period in which claims have to be raised (175 BITs) and the remedies available to the court (138 BITs).

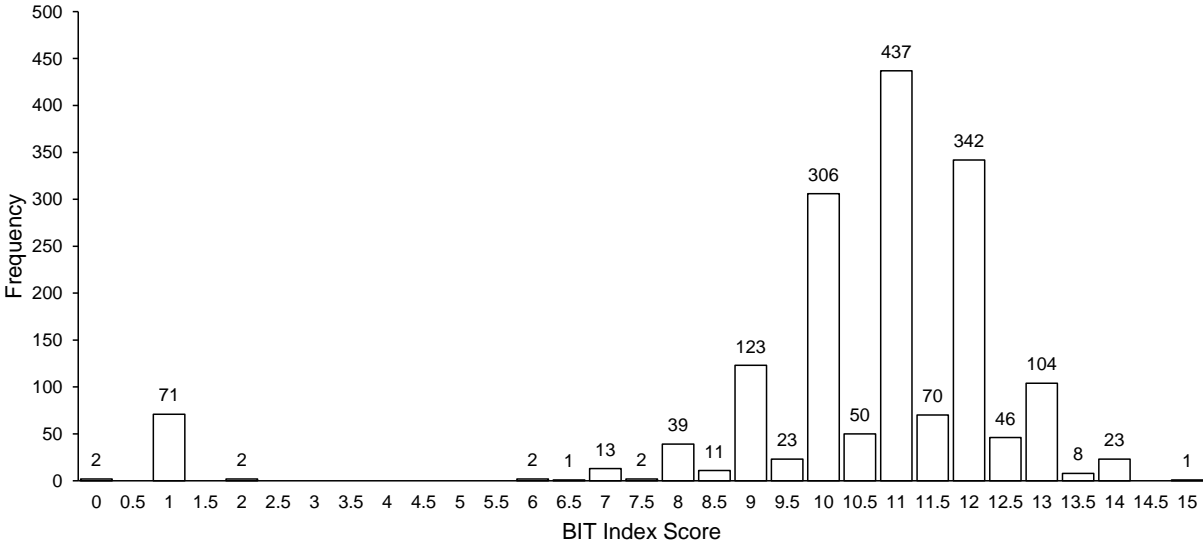


Figure 2: BIT Index Scores

Table 1: Overview of International Dispute Settlement Provisions in BITs

Provision Type	Frequency
State-State Dispute Settlement (SSDS):	
<i>BIT includes SSDS</i>	1,666
<i>BIT does not include SSDS</i>	10
Investor-State Dispute Settlement (ISDS)	
<i>BIT includes ISDS</i>	1,602
<i>BIT does not include ISDS</i>	74
Alternatives to Arbitration	
<i>BIT allows for voluntary conciliation</i>	419
<i>BIT does not allow for voluntary conciliation</i>	1,257
Scope of Claims	
<i>Covers only treaty claims</i>	420
<i>Covers any dispute connected to investment</i>	1,198
<i>Lists specific bases of claim beyond treaty</i>	58
Limitation of Provisions Subject to ISDS	
<i>All provisions are subject to ISDS</i>	1,476
<i>Treaty limits the scope of provisions</i>	200
Exclusion of Policy Areas from ISDS	
<i>Excludes policy area from ISDS</i>	115
<i>Does not exclude policy area from ISDS</i>	1,561
Consent to Arbitration	
<i>Consent on a case-by-case basis</i>	169
<i>Provides prior consent</i>	1,507
Forum of Arbitration*	
<i>ICSID</i>	1,439
<i>UNCITRAL</i>	1,039
<i>Other</i>	514
<i>Domestic court of host state</i>	1,004
Relationship between ISDS Forums	
<i>Fork in the road/No U turn</i>	539
<i>Primacy of local courts</i>	157
<i>No reference</i>	980
Limitation Period for Submission of Claims	
<i>Limited time period</i>	175
<i>No limitation</i>	1,501
Provisional Measures	
<i>Allows for provisional or interim measures</i>	52
<i>Does not allow for provisional or interim measures</i>	1,624
Limited Remedies	
<i>Limited available remedies</i>	138
<i>No limitation on available remedies</i>	1,538

Note: The coded provisions refer to a total number of 1,676 BITs, *The same treaty can include one or more options.

4 The Empirical Model

Developments of FDI inflows of a country can be examined in different ways. One might either focus on the total FDI activity towards a country, irrespectively of the source country, or study FDI activities coming from a specific country or country group in order to examine the importance of different FDI sources. Furthermore, FDI activity towards a country can be measured either as inward FDI flows or as inward FDI stocks. When studying FDI activities towards a country one may focus on developed or developing countries or on countries of a specific geographical region. We begin our analysis with a broad approach that uses total inward FDI flows and stocks, i.e., FDI activity from all source countries combined, to examine the effect that BITs have on FDI. We then continue by focusing on total FDI flows and total FDI stocks in developing countries as host countries. For our analysis of total FDI we use annual data on 177 host countries between 1970 to 2015.¹ Finally, we estimate the effects of BITs on FDI activity in a panel data model using bilateral FDI flows. This allows us to distinguish FDI inflows from countries with which a country has a BIT and those with which it does not. Here we use data of 152 host countries and 4,299 country-pairs for the years 2001 to 2012.²

We apply the following general structure of the estimation model:

$$FDI_{it}^h = \alpha + \beta_1 \ln_BIT_{i,t-1} + \beta_2 BIT_index_average_{i,t-1} + \mu' \mathbf{X}_{i,t-1} + \eta_i + \lambda_t + \epsilon_{it}. \quad (1)$$

The dependent variable FDI_{it}^h represents total inward FDI flows or, alternatively, the total inward FDI stock of country i in year t . We define two variables intended to measure the effect of all BITs a country has in force on total FDI. First, $\ln_BITs_{i,t-1}$ is the (log) number of BITs of country i . This variable captures the aggregated effect of all BITs and can be described as the quantitative measure of BITs.³ Second, we include the explanatory variable $BITs_index_average_{i,t-1}$ which captures the average international dispute settlement provisions strength of all BITs a country has signed. As a country typically has more than one BIT in force, we apply the arithmetic average of the individual BIT index scores of the BITs we have coded for country i . In essence, this variable measures the average strength of international dispute settlement provisions in all BITs and can be understood as the qualitative measure of BITs. $\mathbf{X}_{i,t-1}$ is a vector of five control variables. First, we use the logarithm of real GDP per capita of the host country to control for income effects ($\ln_GDP_pc_host_{t-1}$). Second, we include real GDP growth ($GDP_growth_host_{t-1}$) of the host country to take into account the growth dynamics of the host country. Third, we include an indicator for the host countries openness to trade defined as total trade (imports plus exports) divided by GDP ($openness_{t-1}$). Fourth, in order to control for resource seeking FDI

¹Appendix Table 5 lists the countries included.

²Appendix Table 6 lists the countries included in the bilateral analysis.

³To circumvent the problem of an undefined logarithm for cases where the sum of BITs is zero we add the value of one to all observations to obtain strictly positive values for which we then take the natural logarithm.

activity we include a measure for natural resource dependence ($natural_resources_{t-1}$). This indicator is operationalized as total natural resource rents as a share of GDP. Resource rents are estimated by the World Bank (2017) as the price of the resource minus the average cost multiplied by the amount of resources extracted. Fifth, we add an institutional index of property rights to account for the local level of property right protection of the host country ($property_rights_{t-1}$). As a measure of property rights we use the Heritage Foundation’s Property Rights Index (Heritage Foundation, 2016) which is based on surveys and expert assessments. The index ranges from 0 to 100, where 100 indicates a maximum degree of property rights protection. All right-hand side variables in equation (1) are lagged by one year to account for the time it might take for FDI to adjust to changes in the independent variables and to reduce simultaneity problems. A table of summary statistics can be found in Appendix Table 1.

The error terms components η_i and λ_t in equation (1) represent the country specific and time specific error terms (fixed effects), respectively. η_i controls for all effects specific to country i that are not changing over time (for example, cultural factors or the geographical conditions). λ_t captures all time specific shocks that affect all countries in a similar manner (for example, global economic shocks). ϵ_{it} is the error term component varying over time and for different countries. Data on total inward FDI flows and total inward FDI stocks are taken from the UNCTAD FDI Database (UNCTAD, 2016) and converted to constant US dollar prices of 2010 using the US GDP deflator. Data for GDP, exports, imports, and natural resource dependence are from the World Bank World Development Indicators Database (World Bank, 2017).

A well-known problem in studies that use FDI flows as a dependent variable is that the distribution of FDI flows is highly skewed. This can lead to biased estimation results as the distribution of FDI has a long right-hand side tail, i.e, some countries have extraordinary high FDI activity. In regressions with FDI as the dependent variable, these extreme values will bias the results. A solution to this problem is to simply take the logarithm of FDI as a dependent variable, which brings this outliers closer to the middle of the distribution (see for example, Berger et al. (2013), Colen et al. (2016), Neumayer and Spess (2005)). However, this requires either that negative observations are deleted, which might cause a selection bias, or that they have to be substituted by some other strict positive value. Neumayer and Spess (2005), for example, avoid the loss of observations by setting negative FDI flows equal to one US dollar. We take a different approach and make use of a hyperbolic sine (HS) transformation of the FDI variable. The hyperbolic sine transformation of the variable FDI_{it} is defined as

$$FDI_{it}^h = \ln[FDI_{it} + (FDI_{it}^2 + 1)^{(1/2)}]. \quad (2)$$

This transformation method has gained popularity in the literature, because it has the advantage that values of zero and negative values can be included in the sample, unlike in a simple logarithmic transforma-

tion (Pence, 2006).⁴ Figure 3 shows on the horizontal axis the variable FDI_{it} and on the vertical axis the hyperbolic sine and logarithmic transformed values of FDI_{it} . The graphs show that the HS transformed variable is monotonically increasing and approximates $\ln(FDI_{it})$ for positive values. The hyperbolic sine transformation has been applied, for example, by Pence (2006) and more recently by Aisbett et al. (2017). In addition to the hyperbolic sine transformation, we validate the robustness of our results with regard to the transformation method using a logarithmic transformation of the dependent variable as an alternative specification. We follow Neumayer and Spess (2005) and use a log-transformation of FDI_{ijt} for which we set all negative observations equal to positive values of one US dollar.

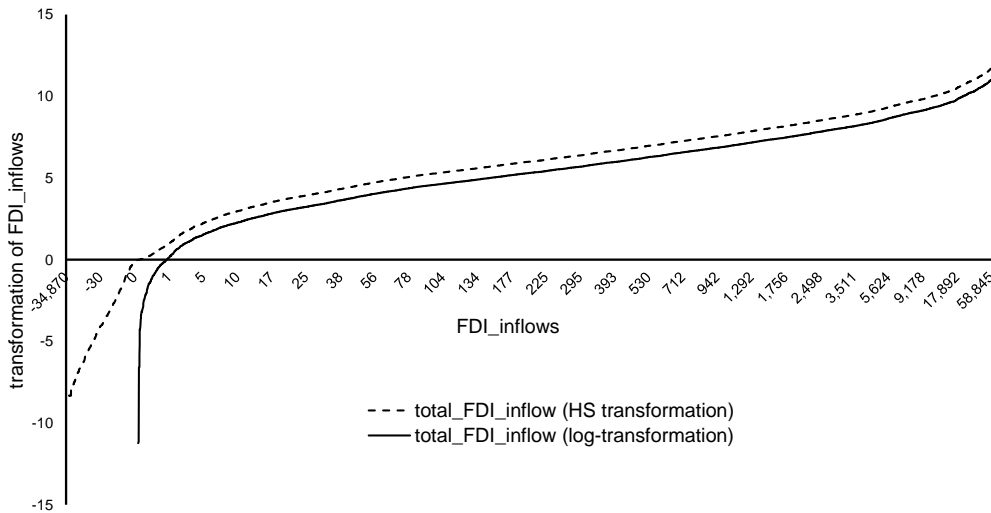


Figure 3: Hyperbolic Sine and Logarithmic Transformation of Total FDI Inflows

5 Estimation Results

5.1 Quantity and the Quality of BITs as Alternative Drivers of FDI

Table 2 shows the results of estimating equation (1). The specification in column 1 uses total annual FDI inflows as the dependent variable. Alternatively, the specification in column 2 uses total inward FDI stock of year t as the dependent variable. The analyses shown in columns 1 and 2 capture the effects of the investment treaties only through the quantitative measure ($\ln_BITs_{i,t-1}$) and, thus, leave out the qualitative measure. Using total annual FDI inflows of a country as a dependent variable, we find an insignificant coefficient for $\ln_BITs_{i,t-1}$ (column 1). When using total annual inward FDI stocks as a dependent variable, however, the coefficient becomes significant on a 1 per cent significance level (column 2). The positive coefficient implies that the more BITs a country has in force the higher is its total FDI

⁴Burbidge et al. (1988) provide an extensive explanation of the advantages associated with the hyperbolic sine transformation.

Table 2: Estimates of the Effects of Bilateral Investment Treaties on Total Foreign Direct Investment Activity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables	All countries				Developing countries			
	Inward FDI flows	Inward FDI stocks	Inward FDI flows	Inward FDI stocks	Inward FDI flows	Inward FDI stocks	Inward FDI flows	Inward FDI stocks
\ln_BIT_{st-1}	-0.0151 (0.207)	0.310*** (0.0916)			-0.131 (0.196)	0.245** (0.100)		
$BIT_index_average_{i,t-1}$			0.134** (0.0534)	0.0379** (0.0163)			0.0942* (0.0535)	0.0336* (0.0180)
$\ln_GDP_pc_host_{t-1}$	0.514 (0.705)	0.704*** (0.264)	0.538 (0.665)	0.763*** (0.267)	-0.517 (0.790)	0.632* (0.344)	-0.438 (0.733)	0.709** (0.346)
$GDP_growth_host_{t-1}$	0.0388** (0.0188)	0.00400 (0.00423)	0.0390** (0.0184)	0.00285 (0.00424)	0.0267 (0.0194)	0.000307 (0.00411)	0.0294 (0.0197)	-0.000682 (0.00415)
$openness_{t-1}$	-0.00162 (0.00584)	0.00230 (0.00179)	-0.000867 (0.00548)	0.00192 (0.00183)	0.00598 (0.00613)	0.00297 (0.00199)	0.00606 (0.00595)	0.00268 (0.00202)
$natural_resources_{t-1}$	0.0161 (0.0188)	0.00644 (0.00556)	0.0118 (0.0193)	0.00573 (0.00531)	-0.000917 (0.0202)	0.00789 (0.00562)	-0.00340 (0.0207)	0.00740 (0.00544)
$property_rights_{t-1}$	-0.00811 (0.00784)	0.00782** (0.00313)	-0.00743 (0.00761)	0.00762** (0.00320)	0.0121 (0.0106)	0.00943** (0.00371)	0.0102 (0.00967)	0.00913** (0.00369)
<i>constant</i>	3.079 (6.521)	3.188 (2.270)	1.412 (5.838)	3.300 (2.286)	10.81 (6.606)	3.884 (2.675)	8.978 (5.674)	3.675 (2.674)
Number of observations	2,461	2,467	2,461	2,467	1,625	1,618	1,625	1,618
Number of countries	159	160	159	160	110	111	110	111
R-squared	0.061	0.729	0.069	0.724	0.136	0.738	0.142	0.735

Note: The table shows the results of estimating the equation: $FDI_{it}^h = \alpha + \beta_1 \ln_BIT_{i,t-1} + \beta_2 BIT_index_average_{i,t-1} + \mu' \mathbf{X}_{i,t-1} + \eta_i + \lambda_i + \epsilon_{it}$. The dependent variables are the hyperbolic sine (HS) transformed variable of total FDI inflows and inward FDI stocks of country i at time t . The independent variables are lagged by one year. All regressions include time and country fixed effects. Robust standard errors clustered at the country level in parentheses. ***, **, and * indicate significance levels at the 1%, 5% and 10% level, respectively.

stock. As the independent variable is log-transformed and our dependent variable is transformed using a hyperbolic sine transformation (which closely approximates a log-transformation), the marginal effect of BITs on FDI can be interpreted similarly to a log-log model. Thus, we estimate that a 100 per cent increase in the number of BITs increases the FDI stock by 31 per cent.

In the next step, we use $BIT_index_average_{i,t-1}$ as an explanatory variable in order to capture the quality rather than the quantity of BITs in place. In column 3 we again first look at total FDI inflows and find a significantly positive coefficient. This result stands in contrast to the results in column 1, where we applied the quantitative measure of BITs. As explained by Pence (2006) and Aisbett et al. (2017), the marginal effect on a hyperbolic sine transformed variable can be approximated by $e^\beta - 1$, where β is the estimated coefficient. We therefore estimate that an increase in the average BIT index by one unit raises annual FDI inflows by 14.3 per cent ($e^{0.134} - 1 = 0.143$). This result provides a first indication that stricter international dispute settlement provisions in BITs are associated with higher FDI inflows. Column 4 shows the effects of $BIT_index_average_{i,t-1}$ on the total inward FDI stock. We again find a positive and significant coefficient and estimate that a one point increase of the average BIT index of a country is associated with a 3.86 per cent ($e^{0.0379} - 1 = 0.0386$) increase of the total inward FDI stock. These results for the average BIT index suggest that countries with on average stricter international dispute settlement provisions in their BITs observe higher total FDI inflows and consequently host higher FDI stocks.

We continue our analysis by exclusively studying FDI of developing countries as host countries (following the World Bank classification⁵). Columns 5 to 8 show the results.⁶ Remarkably, the results we find for the sample of developing countries are similar to those of the full country sample. We again start with the variable $ln_BITs_{i,t-1}$ which we include in the regressions together with the control variables (columns 5 and 6). Again, we find no significant effect of the number of BITs on inward FDI flows (column 5). However, for the FDI stock the coefficient on $ln_BITs_{i,t-1}$ is positive and significant on a 5 per cent level (column 6). The estimated coefficient implies that a 100 per cent increase in the number of BITs that a developing country has ratified is estimated to increase, the inward FDI stock by about 25 per cent. The order of magnitude of this coefficient is similar to the one we find when looking at the full sample of countries in our data set. Columns 7 and 8 of Table 2 list the results of the estimation, in which we again replace the number of BITs by the average strength of the BIT index in the host country i ($BIT_index_average_{i,t-1}$). The coefficient of $BIT_index_average_{i,t-1}$ in the case of inward FDI flows (column 7) is 0.0942 and implies that an increase of one index point in the average BIT index raises total inflows by 9.9 per cent annually ($e^{0.0942} - 1 = 0.0988$). The result in column 8 suggests that the effect of an increase in the average BIT index by one unit on the FDI stock is an increase of about 3.4 per cent.

⁵We use a broad definition of developing countries and include all countries that are not high income countries. The World Bank defines high income countries as countries with a gross national income per capita of \$12,476 or more in 2015.

⁶Note, that when we split the sample the number of observations that are used for the estimation of inward FDI flows drops from 2,461 to 1,625 observations and for the estimation of inward FDI stocks from 2,467 to 1,618 observations.

Table 3: Estimates of the Effects of Bilateral Investment Treaties on Total Foreign Direct Investment Activity

	(1)	(2)	(3)	(4)
Variables	All countries		Developing countries	
	Inward FDI flows	Inward FDI stocks	Inward FDI flows	Inward FDI stocks
$BIT_index_average_{i,t-1}$	0.185*** (0.0678)	-0.00811 (0.0181)	0.135** (0.0645)	-0.00822 (0.0196)
$ln_BIT_{i,t-1} \cdot BIT_index_average_{i,t-1}$	-0.0318 (0.0209)	0.0292*** (0.00801)	-0.0250 (0.0178)	0.0257*** (0.00828)
$ln_GDP_pc_host_{t-1}$	0.630 (0.660)	0.680** (0.274)	-0.317 (0.710)	0.582 (0.354)
$GDP_growth_host_{t-1}$	0.0372** (0.0183)	0.00455 (0.00394)	0.0276 (0.0194)	0.00129 (0.00380)
$openness_{t-1}$	-0.00111 (0.00550)	0.00215 (0.00178)	0.00580 (0.00596)	0.00296 (0.00197)
$natural_resources_{t-1}$	0.0124 (0.0191)	0.00503 (0.00552)	-0.00237 (0.0205)	0.00624 (0.00568)
$property_rights_{t-1}$	-0.00752 (0.00768)	0.00769** (0.00308)	0.00987 (0.00980)	0.00944*** (0.00360)
<i>constant</i>	1.156	3.523	8.370	4.321
Number of observations	2,461	2,467	1,625	1,618
Number of countries	159	160	110	111
R-squared	0.071	0.733	0.144	0.743

Note: The table shows the results of estimating the equation: $FDI_{it}^h = \alpha + \beta_1 BITs_index_average_{i,t-1} + \beta_2 ln_BIT_{i,t-1} \cdot BITs_index_average_{i,t-1} + \mu' \mathbf{X}_{i,t-1} + \eta_i + \lambda_t + \epsilon_{it}$. The dependent variables are the hyperbolic sine (HS) transformed variable of total FDI inflows and inward FDI stocks of country i at time t . The independent variables are lagged by one year. All regressions include time and country fixed effects. Robust standard errors clustered at the country level in parentheses. ***, **, and * indicate significance levels at the 1%, 5% and 10% level, respectively.

The last two results confirm the idea that for the effect of BITs on FDI quality matters and that the qualitative effect is empirically even more robust.

The results for the control variables imply that higher income of the host country is associated with a higher FDI stock (columns 2, 4, 6 and 8). However, we fail to find a significant relationship in the case of total FDI flows. In addition, the relationship between FDI and the growth rate of the host country is only significant in the regressions using the full sample of countries and FDI inflows as the depended variable (columns 1 and 3). The property rights index, $property_rights_{t-1}$, is only significant and positive related to FDI stocks. It should be noted that R-squared values are higher in the model using FDI stocks rather than flows as a dependent variable. This is not surprising because annual flows are more volatile, reflecting often other factors, for example whether big FDI projects are concentrated in one year or spread out over several years.

5.2 Testing for the Interaction Between the Quality and the Quantity of BITs

The estimated model (1) analyzes the quantitative and qualitative measure of BITs separately, i.e., it includes $\ln_BIT_{i,t-1}$ and $BITs_index_average_{i,t-1}$ alternatively in the regressions. However, one may argue that the quantity of BITs only has an effect on FDI if the quality of BITs is sufficiently high. Likewise, the quality of BITs can perhaps only be effective if it is associated with a sufficiently high number of BITs. To analyze such possible interactive effects we now include the interaction term of both variables ($\ln_BIT_{i,t-1} \cdot BITs_index_average_{i,t-1}$) as an explanatory variable. In general, regression models with interaction terms should include both constitutive terms of the interaction, too. This means that when the model includes the interaction term $\ln_BIT_{i,t-1} \cdot BITs_index_average_{i,t-1}$, it should also include the variables $\ln_BIT_{i,t-1}$ and $BITs_index_average_{i,t-1}$ separately. However, as noted by Brambor et al. (2005), once in a fully specified model the coefficient of one constitutive term is found not to be significant this term might be omitted. In fact, if we specify the model including both constitutive terms and the interaction term, we find insignificant results for the coefficient of the variable $\ln_BIT_{i,t-1}$ and therefore omit this variable in our regressions.⁷ Therefore, our model takes the following form:

$$FDI_{it}^h = \alpha + \beta_1 BITs_index_average_{i,t-1} + \beta_2 \ln_BIT_{i,t-1} \cdot BITs_index_average_{i,t-1} + \mu' \mathbf{X}_{i,t-1} + \eta_i + \lambda_t + \epsilon_{it}. \quad (3)$$

The interaction term captures the effect of the average BIT provision strength on FDI dependent on the number of BITs ratified by a country. In other words, the marginal effect of $BITs_index_average_{i,t-1}$ on FDI_{it}^h in equation (3) is $\frac{\partial FDI_{it}^h}{\partial BITs_index_average_{i,t-1}} = \beta_1 + \beta_2 \ln_BIT_{i,t-1}$.

Table 3 shows the results of estimating equation (3) for the full sample and for the sample of developing countries. The estimated coefficients of the interaction term in columns 2 and 4, which represent the results using inward FDI stock as the dependent variable, show a significantly positive coefficient of the interaction term. The estimates imply that the marginal effect of $BITs_index_average_{i,t-1}$ on the dependent variable becomes stronger the more BITs a country has in force. For example, for the regression depicted in column 2 the marginal effect of $BITs_index_average_{i,t-1}$ on FDI_{it}^h can be calculated as $\frac{\partial FDI_{it}^h}{\partial BITs_index_average_{i,t-1}} = -0.00811 + 0.0292 \cdot \ln_BIT_{i,t-1}$. Figure 4 illustrates the estimated marginal effects of $BITs_index_average_{i,t-1}$ on total inward FDI stocks dependent on different values of the variable $\ln_BIT_{i,t-1}$ for all countries in the sample and for the sample of developing countries. The horizontal axis shows the variable $\ln_BIT_{i,t-1}$, while the vertical axis depicts the marginal effect of $BITs_index_average_{i,t-1}$ on total FDI stocks. The dashed lines indicate the 95 per cent confidence intervals. Figure 4 illustrates that $BITs_index_average_{i,t-1}$ has a significantly positive effect on inward

⁷Concerning the sign, magnitude and significance of the variables the results of the full model do not substantially differ from the results we obtain when omitting the variable $\ln_BIT_{i,t-1}$. The results for the fully specified model can be provided upon request from the authors.

FDI stocks for $\ln_BITs_{i,t-1}$ values higher 1.5, which corresponds to about 5 BITs. This result implies that the effect of the average BIT provision strength on inward FDI stocks becomes stronger the more BITs a country has in force. The qualitative effect is amplified with an increase in the quantitative effect: the more BITs a country has ratified, i.e, the wider the coverage of the BITs is, the stronger is the effect of the average international dispute settlement provisions strength on inward FDI stock.

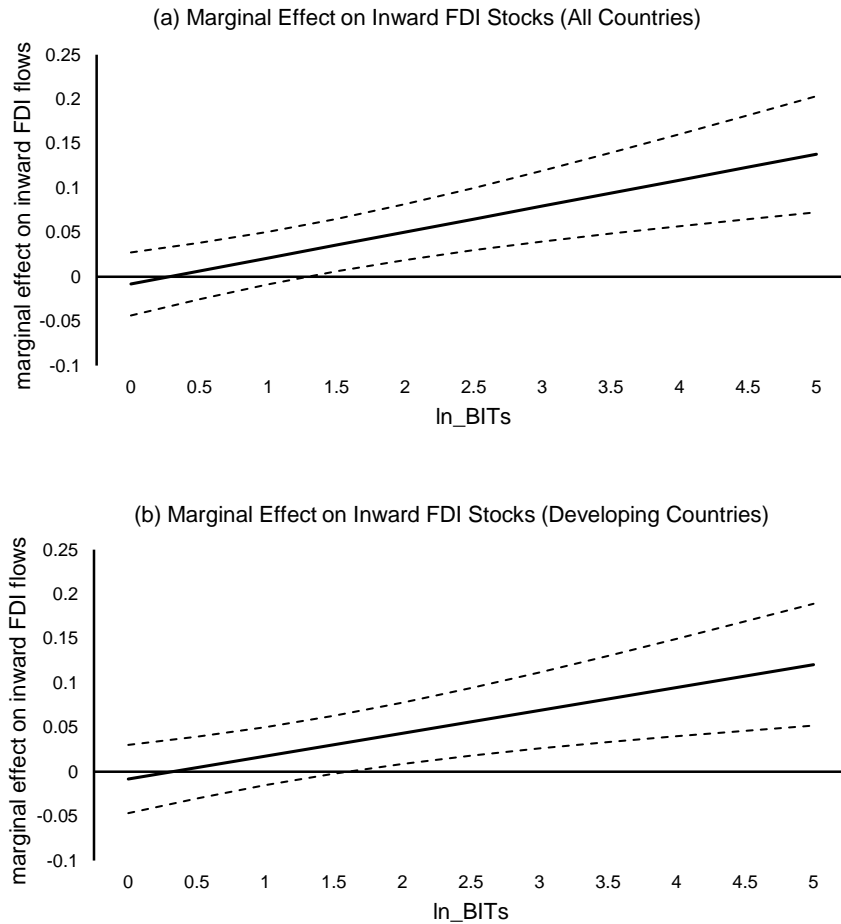


Figure 4: Marginal Effect of the Average BIT Index on Inward FDI Stocks. *Note: The dashed lines indicate 95 per cent confidence intervals.*

5.3 Examining Bilateral FDI Flows

The analyses in the previous two sections suggest a positive relationship between BITs and FDI, but this relationship is more robust if we take into account the provision strength of BITs. However, using total FDI flows is just one possibility to empirically analyze the effect of BITs on FDI. It is still a very general approach to look at the international investment relations of a country, because it does not differentiate between FDI inflows from different countries. We therefore extend our analysis by applying a more detailed approach and analyze the effect of BITs on FDI using bilateral FDI data.⁸ This allows us to

⁸We focus on bilateral FDI flows as limited data availability does not allow us to analyze bilateral FDI stocks.

differentiate between FDI inflows from countries with which the host country has a BIT and others.

We estimate the following panel data model:

$$FDI_{ijt}^h = \alpha + \beta_1 BIT_index_{ij,t-1} + \beta_2 BIT_{ij,t-1} + \mu' \mathbf{X}_{ij,t-1} + \eta_{ij} + \lambda_t + \epsilon_{ijt}. \quad (4)$$

Here, FDI_{ijt}^h is the hyperbolic sine transformed variable of bilateral FDI inflows from country j to i at time t . Similarly to the case of total FDI, we use two variables that measure BITs. First, we use $BIT_{ij,t-1}$, which is a dummy variable indicating if a BIT between country i and j was in force at time $t - 1$. Again this is a very rough approach that does not incorporate the actual international dispute settlement provisions in BITs. Therefore we alternatively use a second variable, $BIT_index_{ij,t-1}$, which is the lagged BIT index score of the BIT in force between country i and country j as developed in Section 3. This variable is intended to account for international dispute settlement provision strength in a BIT.

The vector of control variables $\mathbf{X}_{i,t-1}$ includes in addition to the five variables that we use in the equations (1) and (3), the logarithm of real GDP per capita in the source country ($\ln_GDP_pc_source_{t-1}$) to account for the economic weight of the investors' home country. Data on bilateral inward FDI flows are again taken from UNCTAD (2016).

Table 4 shows the results of estimating equation (4). Using the simple dummy BIT_{t-1} we find a positive coefficient for BIT_{t-1} significant on a 10 per cent level (column 1). The estimate of 0.418 suggests that a BIT increases on average the annual FDI inflow from the country with which the BIT was concluded by about 52 per cent ($e^{0.418} - 1 = 0.518$). This effect is somewhat higher than what is found in other studies of BITs on bilateral FDI flows. Aisbett et al. (2017) find a marginal effect of BITs on bilateral FDI flows between 18 per cent and 52 per cent, depending on the specification. Berger et al. (2013) estimate the effect of a BIT between 23 per cent and 34 per cent.

In the next step, we include BIT_index_{t-1} as a more sophisticated measure of BITs that incorporates the provision strength of a BIT. Since the focus of our study is on the strength of BIT provisions, we perform the same estimation as in column 1 with our BIT index rather than a BIT dummy. Unlike in our more general analyses in the previous sections we can now take into account the index score of the BIT between the two countries for which we estimate the bilateral FDI flows. Column 2 of Table 4 shows the results. The estimated coefficient of the variable BIT_index_{t-1} is 0.039 and significant on a five per cent level. This implies that an increase in the BIT index by one unit is associated with an increase of FDI inflows by about 4 per cent.

We repeat the same regressions as in columns 1 and 2 for a sample of developing countries as host countries. Columns 3 and 4 show the results. For the sample of developing countries we find the expected signs for the coefficient of BIT_{t-1} and BIT_index_{t-1} with a significance level of 5 per cent. The estimate in

Table 4: Estimates of the Effects of Bilateral Investment Treaties on Bilateral Foreign Direct Investment Activity

Variables	(1)	(2)	(3)	(4)
	All countries		Developing countries	
	Bilateral FDI inflow	Bilateral FDI inflow	Bilateral FDI inflow	Bilateral FDI inflow
<i>BIT</i> _{<i>t</i>-1}	0.418* (0.218)		0.567** (0.267)	
<i>BIT_index</i> _{<i>t</i>-1}		0.0392** (0.0192)		0.0418** (0.0195)
<i>ln_GDP_pc_host</i> _{<i>t</i>-1}	1.929*** (0.456)	1.926*** (0.455)	1.516*** (0.452)	1.509*** (0.452)
<i>ln_GDP_pc_source</i> _{<i>t</i>-1}	2.549*** (0.452)	2.548*** (0.452)	2.081*** (0.530)	2.086*** (0.531)
<i>GDP_growth_host</i> _{<i>t</i>-1}	0.00595 (0.00851)	0.00592 (0.00852)	-0.00260 (0.00971)	-0.00267 (0.00971)
<i>openness</i> _{<i>t</i>-1}	-0.000748 (0.00362)	-0.000752 (0.00361)	0.000233 (0.00483)	0.000271 (0.00483)
<i>natural_resources</i> _{<i>t</i>-1}	0.0260* (0.0151)	0.0260* (0.0151)	-0.00325 (0.0161)	-0.00323 (0.0161)
<i>property_rights</i> _{<i>t</i>-1}	0.00525 (0.00573)	0.00526 (0.00574)	0.000585 (0.00690)	0.000576 (0.00690)
<i>constant</i>	-41.88*** (6.620)	-41.84*** (6.619)	-30.67*** (6.334)	-30.60*** (6.328)
Observations	20,178	20,178	9,161	9,161
Number of country-pairs	3,238	3,238	1,583	1,583
R-squared	0.008	0.008	0.021	0.021

Note: The table shows the results of estimating the equation: $FDI_{ijt}^h = \alpha + \beta_1 BIT_index_{ij,t-1} + \beta_2 BIT_{ij,t-1} + \mu' \mathbf{X}_{ij,t-1} + \eta_{ij} + \lambda_t + \epsilon_{ijt}$. The dependent variable is the hyperbolic sine (HS) transformed variable of bilateral FDI inflow to country *i* from country *j* at time *t*. The independent variables are lagged by one year. All regressions include year and country-pair fixed effects. Robust standard errors clustered at the country level in parentheses. ***, **, and * indicate significance levels at the 1%, 5% and 10% level, respectively.

column 3 implies that a BIT concluded by a developing country increases the bilateral FDI inflow from the partner country by about 76 per cent ($e^{0.567} - 1 = 0.763$). When we take into account the strength of the BIT provisions, our estimates (column 4) suggest that on average an increase of the BIT index by one unit leads to a 4.27 per cent ($e^{0.0418} - 1 = 0.0427$) increase in FDI inflow from the partner country.

Concerning the control variables we find that income levels in the host and the source country are highly correlated with the FDI inflow from the BIT partner country. The coefficients of the host country's GDP ($\ln_GDP_pc_host_{t-1}$) and the home country's GDP ($\ln_GDP_pc_source_{t-1}$) have the expected positive sign and are highly significant. The coefficients on GDP per capita are similar to those found by Neumayer and Spess (2005). The indicator for natural resources is positive and significant on a 10 per cent significance level for the full sample.

To test the robustness of these results we use a log-transformation of FDI_{ijt} as an alternative method to transform the dependent variable. We follow Neumayer and Spess (2005) and use a log-transformation of FDI_{ijt} for which we set all negative observations equal to positive values of one US dollar. The significance level and the magnitude the results are not substantially different than the results we find when using a hyperbolic sine transformation. This finding should be no surprise, as the hyperbolic sine transformation approximates the log-transformation for large negative and positive values of the dependent variables but, as explained, has the advantage that it allows to include observations smaller or equal to zero.⁹

Overall, our findings based on using bilateral FDI flows confirm the results of the analysis that uses total FDI flows: BITs, especially when we take into account their provision strength, are positively correlated with FDI activity.

6 Summary and Conclusions

The increased importance of foreign direct investment over the past few decades was accompanied by a rise in the popularity of BITs. While the number of new BITs continuously increased in the 1990s and 2000s, their number has recently stagnated. Responding to an intense political debate, some countries even started to withdraw from such treaties. This development goes hand in hand with a vivid discussion on the effectiveness of BITs in attracting FDI. Especially the advantages of ISDS are heavily disputed. Remarkably high compensation claims in some arbitration cases have also increased the awareness of host countries of the risk of high cost associated with ISDS. In addition, countries have become increasingly aware of the downsides associated with the restriction of policy autonomy when signing a BIT. Furthermore, the empirical evidence on the BIT effects on FDI activity has so far been weak and there has so

⁹The estimation results, using a log-transformed dependent variable, can be found in Appendix Table 4.

far been hardly any evidence on a relationship between the strength of international dispute settlement provisions in BITs and FDI activity. We address this issue by directly analyzing the effect of a BIT's international dispute settlement provision strength on FDI. Against this background we use data from the UNCTAD's International Investment Agreement Mapping Project (UNCTAD, 2017) and develop an index measuring the international dispute settlement provisions strength of 1,676 BITs. We apply this new index to the question whether BITs positively affect FDI activity. More specifically, we use a panel data model for bilateral and total FDI inflows and inward FDI stocks to empirically examine the effect of international dispute settlement provisions in BITs on FDI.

Our main findings indicate that stronger international dispute settlement provisions in BITs are indeed associated with more FDI activity. In a bilateral setting, we estimate that on average a one-point increase in the new index is associated with a 3.9 per cent increase in FDI inflows from the partner country. We also show that this relationship between international dispute settlement provisions and BITs holds, when we use FDI stock as a dependent variable instead of FDI inflows. Moreover, if we restrict the sample of host countries to developing countries the effects of BITs on FDI activity increase slightly. We estimate that for developing host countries on average an increase of the BIT index of one point leads to a 4.3 per cent increase of FDI inflow from the partner country.

On the basis of our analysis we conclude that international dispute settlement provisions indeed play a crucial role in the FDI-enhancing effect of BITs. The stricter the rules on international dispute settlement provisions are, and thus the better the possibilities for investors to represent their rights, the higher is the effectiveness of BITs in attracting FDI. However, there seems to also be some evidence that already the sheer existence of BITs attract foreign investors. We estimate that a BIT on average increases inward FDI inflows from the respective partner country by 52 per cent.

From a policy point of view our results support the argument that international dispute settlement provisions are a key component of BITs and should play an important role in the design of BITs. Stricter international dispute settlement provisions in BITs are better suited to fulfill their purpose in attracting FDI. Hence, governments looking for a way to foster the inflow of FDI should be aware of the importance of international dispute settlement provisions. Notwithstanding the individual preferences of countries regarding the degree by which they are willing to "tie their hands" through BITs and international dispute settlement provisions, policy makers should be aware of the fact that the incentive for foreign investors to invest abroad is strongly connected with international dispute settlement provisions.

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Appendix

Table 1 Appendix: Summary Statistics

Variable	Mean	Std. Dev.	Min	Max	Obs.
Dependent Variables					
<i>total_FDI_inflow</i>	4,013	16,816	-34,870	388,145	6,984
<i>total_FDI_inflow (HS transformed)</i>	5.54	3.75	-8.32	13.56	6,960
<i>total_FDI_stock</i>	58,290	244,290	0	5,142,087	5,699
<i>total_FDI_stock (HS transformed)</i>	8.76	2.73	0	16.15	5,699
<i>bilateral_FDI_inflow</i>	427	3,184	-60,785	115,238	28,133
<i>bilateral_FDI_inflow (HS transformed)</i>	2.46	4.01	-8.32	12.35	27,989
<i>bilateral_FDI_inflow (log-transformed)</i>	1.10	4.87	-9.145	11.66	28,133
Independent Variables					
<i>BIT_index</i>	4.37	5.37	0	15	28,133
<i>BITs_index_average</i>	3.67	4.80	0	13	11,859
<i>BIT</i>	0.42	0.49	0	1	28,133
<i>ln_BITs</i>	1.07	1.35	0	4.91	11,859
<i>ln_GDP_pc_host</i>	9.29	1.37	5.27	11.61	28,009
<i>ln_GDP_pc_source</i>	9.90	1.18	5.27	11.61	27,750
<i>GDP_growth_host</i>	3.43	4.10	-15.01	38.00	27,868
<i>openness</i>	88.26	61.31	0.18	400.30	26,720
<i>natural_resources</i>	5.02	9.23	0	74.30	28,028
<i>property_rights</i>	56.30	24.52	0	95	28,039

Notes: *bilateral_FDI_inflow* is the FDI inflow to country *i* from country *j* in millions of constant US dollars in prices of 2010. *total_FDI_inflow* denotes total FDI inflow to country *i* in millions of constant US dollars in prices of 2010. *total_FDI_stock* is the total inward FDI stock of country *i* in millions of constant US dollars in prices of 2010. *bilateral_FDI_inflow (HS transformed)*, *total_FDI_inflow (HS transformed)* and *total_FDI_stock (HS transformed)* are the hyperbolic sine (HS) transformed variables of bilateral FDI inflow, total FDI inflow and total inward FDI stock (see the text for details on the transformation). *bilateral_FDI_inflow (log-transformed)* is the log-transformed variable *bilateral_FDI_inflow*. *BIT_index* is the BIT index score of the BIT in force between country *i* and country *j*. *BITs_index_average* is the sum of individual BIT index scores of all BITs coded for country *i* divided by the number of coded BITs. *BIT* is a dummy variable that takes the value of unity if there is a BIT in force between country *i* and country *j*. *ln_BITs* is the (log) number of BITs in force of country *i*. *ln_GDP_pc_host* and *ln_GDP_pc_source* are the real (log) GDP per capita of the country *i* and *j*. *GDP_growth_host* is the real GDP growth rate of country *i* (annually in per cent). *openness* denotes total trade (imports plus exports) of country *i* divided by GDP. *natural_resources* is a indicator for natural resource dependence operationalized as the total natural resource rents as share of GDP. Rents are estimated as price minus average cost multiplied by the amount of resource extracted by the World Bank (World Bank, 2017), *property_rights* stands for the Heritage Foundation's Property Rights Index. The index ranges from 0 to 100, where 100 indicates a maximum degree of property rights protection (Heritage Foundation, 2016).

Table 2 Appendix: Cross-Correlation Table Bilateral FDI

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) <i>BIT_index</i>	1.000							
(2) <i>BIT</i>	0.960	1.000						
(3) <i>ln_GDP_pc_host</i>	-0.056	-0.063	1.000					
(4) <i>ln_GDP_pc_source</i>	-0.062	-0.066	-0.069	1.000				
(5) <i>GDP_growth_host</i>	0.020	0.020	-0.243	0.026	1.000			
(6) <i>openness</i>	0.037	0.033	0.272	-0.046	0.016	1.000		
(7) <i>natural_resources</i>	-0.027	-0.033	-0.263	0.030	0.138	-0.098	1.000	
(8) <i>property_rights</i>	-0.069	-0.066	0.526	-0.064	-0.325	0.148	-0.246	1.000

Notes: The variable *BIT_index* is the BIT index score of the BIT in force between country *i* and country *j*. *BIT* is a dummy variable that takes the value of one if there is a BIT in force between country *i* and country *j*. *ln_GDP_pc_host* and *ln_GDP_pc_source* are the real (log) GDP per capita of country *i* and *j*. *GDP_growth_host* is the real GDP growth rate of country *i*. *openness* denotes total trade (imports plus exports) of country *i* divided by GDP. *natural_resources* is an indicator for natural resource dependence operationalized as the total natural resource rents as share of GDP. The variable *property_rights* stands for the Heritage Foundation's Property Rights Index.

Table 3 Appendix: Cross-Correlation Table Total FDI

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) <i>BITs_index_average</i>	1.000						
(2) <i>ln_BITs</i>	0.842	1.000					
(3) <i>ln_GDP_pc_host</i>	0.251	0.313	1.000				
(4) <i>GDP_growth_host</i>	0.013	-0.030	-0.025	1.000			
(5) <i>openness</i>	0.245	0.204	0.180	0.064	1.000		
(6) <i>natural_resources</i>	-0.011	-0.096	-0.142	0.101	0.051	1.000	
(7) <i>property_rights</i>	0.128	0.233	0.698	-0.179	0.220	-0.324	1.000

Notes: *BITs_index_average* is the sum of individual BIT index scores of all BITs coded for country i divide by the number of coded BITs. *ln_BITs* is the (log) number of BITs in force of country i . *ln_GDP_pc_host* is the real (log) GDP per capita of the country i . *GDP_growth_host* is the real GDP growth rate of country i . *openness* denotes total trade (imports plus exports) of country i divided by GDP. *natural_resources* is a indicator for natural resource dependence operationalized as the total natural resource rents as share of GDP. *property_rights* stands for the Heritage Foundation's Property Rights Index.

Table 4 Appendix: Estimates of the Effects of Bilateral Investment Treaties on Bilateral Foreign Direct Investment Activity: Estimation Based on Logarithmic Transformation of Bilateral FDI Inflow

Variables	(1)	(2)	(3)	(4)
	All countries		Developing countries	
	Bilateral FDI inflow	Bilateral FDI inflow	Bilateral FDI inflow	Bilateral FDI inflow
BIT_{t-1}	0.453* (0.244)		0.667** (0.304)	
BIT_index_{t-1}		0.0469** (0.0224)		0.0559** (0.0251)
$\ln_GDP_pc_host_{t-1}$	2.095*** (0.524)	2.087*** (0.524)	1.606*** (0.583)	1.596*** (0.583)
$\ln_GDP_pc_source_{t-1}$	3.078*** (0.515)	3.075*** (0.515)	2.357*** (0.658)	2.365*** (0.659)
$GDP_growth_host_{t-1}$	0.00172 (0.0102)	0.00168 (0.0102)	-0.00409 (0.0124)	-0.00414 (0.0124)
$openness_{t-1}$	-0.000533 (0.00410)	-0.000519 (0.00410)	0.00297 (0.00613)	0.00304 (0.00613)
$natural_resources_{t-1}$	0.0321* (0.0182)	0.0321* (0.0182)	-0.00286 (0.0199)	-0.00287 (0.0199)
$property_rights_{t-1}$	0.00618 (0.00684)	0.00621 (0.00685)	-0.000867 (0.00838)	-0.000830 (0.00838)
<i>constant</i>	-50.22*** (7.468)	-50.13*** (7.465)	-35.51*** (7.931)	-35.49*** (7.923)
Observations	20,311	20,311	9,162	9,162
Number of country-pairs	3,238	3,238	1,583	1,583
R-squared	0.009	0.009	0.019	0.019

Note: The table shows the results of estimating the equation: $FDI_{ijt} = \alpha + \beta_1 BIT_{ij,t-1} + \beta_2 BIT_index_{ij,t-1} + \mu' \mathbf{X}_{ij,t-1} + \eta_{ij} + \lambda_t + \epsilon_{ijt}$. The dependent variable is the log-transformed variable of bilateral FDI flow from country j to country i at time t . We follow Neumayer and Spess (2005) and use a log-transformation of FDI_{ijt} for which we set all negative observations equal to positive values of one US dollar. The independent variables are lagged by one year. All regressions include year and country-pair fixed effects. Robust standard errors clustered at the country level in parentheses. ***, **, and * indicate significance levels at the 1%, 5% and 10% level, respectively.

Table 5 Appendix: List of Host Countries Used in the Total FDI Analysis

High income countries		
Antigua and Barbuda	Hong Kong	Poland
Australia	Hungary	Portugal
Austria	Iceland	Qatar
Bahrain	Ireland	San Marino
Barbados	Israel	Saudi Arabia
Belgium	Italy	Seychelles
Brunei	Japan	Singapore
Canada	Korea, South	Slovakia
Chile	Kuwait	Slovenia
Croatia	Latvia	Spain
Cyprus	Lithuania	Sweden
Czech Republic	Luxembourg	Switzerland
Denmark	Macao	Taiwan
Estonia	Malta	Trinidad and Tobago
Finland	Netherlands	United Arab Emirates
France	New Zealand	United Kingdom
Germany	Norway	United States
Greece	Oman	Uruguay
Developing countries		
Afghanistan	Gambia	Nicaragua
Albania	Georgia	Niger
Algeria	Ghana	Nigeria
Angola	Grenada	Pakistan
Argentina	Guatemala	Panama
Armenia	Guinea	Papua New Guinea
Azerbaijan	Guinea-Bissau	Paraguay
Bangladesh	Guyana	Peru
Belarus	Haiti	Philippines
Belize	Honduras	Romania
Benin	India	Russia
Bolivia	Indonesia	Rwanda
Bosnia and Herzegovina	Iran	Saint Lucia
Botswana	Iraq	Saint Vincent and the Grenadines
Brazil	Jamaica	Senegal
Bulgaria	Jordan	Serbia
Burkina Faso	Kazakhstan	Sierra Leone
Burundi	Kenya	Somalia
Cabo Verde	Korea, North	South Africa
Cambodia	Kyrgyzstan	Sri Lanka
Cameroon	Laos	Sudan
Central African Republic	Lebanon	Suriname
Chad	Lesotho	Swaziland
China	Liberia	Syria
Colombia	Libya	Tajikistan
Comoros	Macedonia	Tanzania
Congo	Madagascar	Thailand
Congo, Dem. Rep.	Malawi	Timor-Leste
Costa Rica	Malaysia	Togo
Cuba	Mali	Tonga
Côte d'Ivoire	Mauritania	Tunisia
Djibouti	Mauritius	Turkey
Dominica	Mexico	Turkmenistan
Dominican Republic	Moldova	Uganda
Ecuador	Mongolia	Ukraine
Egypt	Montenegro	Uzbekistan
El Salvador	Morocco	Venezuela
Equatorial Guinea	Mozambique	Viet Nam
Eritrea	Myanmar	Yemen
Ethiopia	Namibia	Zambia
Gabon	Nepal	Zimbabwe

Notes: Developing countries following the World Bank classification (World Bank, 2017).

Table 6 Appendix: List of Host Countries Used in the Bilateral FDI Analysis

High income countries		
Australia	Iceland	Portugal
Austria	Ireland	Qatar
Bahrain	Israel	Saudi Arabia
Belgium	Italy	Singapore
Canada	Japan	Slovakia
Chile	Korea, South	Slovenia
Croatia	Kuwait	Spain
Cyprus	Latvia	Sweden
Czech Republic	Lithuania	Switzerland
Denmark	Luxembourg	Trinidad and Tobago
Estonia	Malta	United Arab Emirates
Finland	Netherlands	United Kingdom
France	New Zealand	United States
Germany	Norway	Uruguay
Greece	Oman	
Hungary	Poland	
Developing countries		
Albania	Gabon	Myanmar
Algeria	Gambia	Namibia
Angola	Georgia	Nepal
Argentina	Ghana	Nicaragua
Armenia	Guatemala	Niger
Azerbaijan	Guinea	Nigeria
Bangladesh	Haiti	Pakistan
Belarus	Honduras	Panama
Belize	India	Papua New Guinea
Benin	Indonesia	Paraguay
Bhutan	Iran	Peru
Bolivia	Iraq	Philippines
Bosnia and Herzegovina	Jamaica	Romania
Botswana	Jordan	Russia
Brazil	Kazakhstan	Rwanda
Bulgaria	Kenya	Senegal
Burkina Faso	Kyrgyzstan	Sierra Leone
Burundi	Laos	South Africa
Cabo Verde	Lebanon	Sri Lanka
Cambodia	Lesotho	Suriname
Cameroon	Liberia	Swaziland
Central African Republic	Libya	Syria
Chad	Macedonia	Tajikistan
China	Madagascar	Tanzania
Colombia	Malawi	Thailand
Costa Rica	Malaysia	Togo
Côte d'Ivoire	Maldives	Tunisia
Djibouti	Mali	Turkey
Dominican Republic	Mauritania	Uganda
Ecuador	Mauritius	Ukraine
Egypt	Mexico	Venezuela
El Salvador	Micronesia	Yemen
Equatorial Guinea	Moldova	Zambia
Eritrea	Mongolia	Zimbabwe
Ethiopia	Morocco	
Fiji	Mozambique	

Notes: Developing countries following the World Bank classification (World Bank, 2017).