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No. 1403| February, 2008

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FDI Promotion through Bilateral Investment Treaties: More Than a Bit?*

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Abstract:
Policymakers in developing countries have increasingly pinned their hopes on bilateral investment treaties (BITs) in order to improve their chances in the worldwide competition for foreign direct investment (FDI). However, the effectiveness of BITs in inducing higher FDI inflows is still open to debate. It is in several ways that we attempt to clarify the inconclusive empirical findings of earlier studies. We cover a much larger sample of host and source countries by drawing on an extensive dataset on bilateral FDI flows. Furthermore, we account for unilateral FDI liberalization, in order not to overestimate the effect of BITs, as well as for the potential endogeneity of BITs. Employing a gravity-type model and various model specifications, including an instrumental variable approach, we find that BITs do promote FDI flows to developing countries. BITs may even substitute for weak domestic institutions, though not for unilateral capital account liberalization.

JEL classification: C 33, F21, F23

Keywords:FDI, Multinational Corporations, Bilateral Investment Treaties

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*We would like to thank Mariana Spatareanu for helpful comments and suggestions. Hiro Ito and Dennis Quinn generously shared their data on capital account restrictions with us. Signe Nelgen, Michaela Rank, and Wendy Soh provided excellent research assistance.

1. Introduction

Foreign direct investment (FDI) inflows are widely perceived to be superior to other types of capital inflows. Apart from offering additional investment resources, FDI may help host countries foster economic development by offering access to internationally available technologies and managerial know-how, rendering it easier for the host countries to penetrate foreign markets, and making them less prone to sudden reversal of flows in times of crisis. At the UN Conference on Financing for Development in Monterrey, Mexico, in March 2002, Heads of State and Government propagated the view that FDI provides an important means to eradicate poverty in developing countries. According to the Monterrey Consensus, the central challenge is to overcome the concentration of FDI in few (large and relatively advanced) developing countries so that poor countries would be able to reap the benefits of FDI (UN 2002).

Hence, it is not surprising that policymakers in almost all countries are engaged in fierce competition for FDI inflows. However, it has remained disputed as to how effective the means are that national policymakers have at their disposal when attempting to attract FDI. Major driving forces of FDI (e.g., the size and development of host country markets, the endowment of local factors of production, and geographical and cultural proximity to major source countries) are largely beyond the realm of short-term policymaking. This may explain why policymakers have increasingly pinned their hopes on two sets of measures: (i) unilateral regulatory changes and incentives such as opening up previously restricted industries, removing foreign ownership restrictions, promotional efforts, and tax and fiscal inducements; and (ii) bilateral agreements through which host country governments commit themselves to binding obligations, e.g., concerning the entry of foreign investors, post-entry regulations, profit remittances and dispute settlement.

In this paper, we focus on the effectiveness of bilateral investment treaties (BITs) in stimulating additional FDI inflows. The few empirical studies addressing this question have produced highly ambiguous results (Section 2). We suspect that this is at least partly due to the fairly small sample of host countries covered by most previous studies. We make use of the extensive data on bilateral FDI flows collected by UNCTAD (which is largely unpublished, but available from its Data Extract Service). In this way, we avoid a sample selection bias which is likely to arise when the sample is restricted to relatively advanced host countries. Moreover, this paper is the first to address the issue of isolating the effects of BITs from the effects of unilateral regulatory changes on FDI inflows.

After reviewing the results obtained by previous studies in Section 2, we illustrate some stylized facts on both BITs and unilateral measures to liberalize the capital account in Section 3. The gravity-type model applied is presented in Section 4, where we also discuss methodological choices (notably the use of bilateral FDI flows, compared to a non-dyadic approach) as well as the data employed. Section 5 reports our main results. We find that BITs are effective in promoting FDI inflows and may even substitute for weak domestic institutions, though not for unilateral regulatory measures to promote FDI. Various robustness checks are carried out in Section 6. Section 7 concludes.

2. Analytical and Empirical Background

More than 20 years ago, Schneider and Frey (1985) found it surprising that two strands of the literature on the determinants of FDI had developed quite separately from each other: Studies stressing political factors had largely neglected economic factors, whereas studies stressing economic factors had largely neglected political factors. A similar dichotomy can still be observed even though the call by Schneider and Frey for a politico-economic model that accounts for both economic and political determinants is fairly common by now.

What recent studies tend to ignore is that policymakers in various countries have resorted to two sets of measures to attract more FDI inflows: (i) unilateral, i.e., non-binding changes in FDI-related regulations, most of which amount to a more favorable treatment of FDI, and (ii) bilateral (as well as plurilateral) treaties in which host countries have committed themselves in a legally binding way to grant foreign investors various rights that reduce uncertainty with respect to entry and exit conditions, post-entry operations as well as dispute settlement mechanisms.

Several empirical analyses focus on unilateral measures. Examples include Gastanaga et al. (1998), Asiedu and Lien (2004), Asiedu (2005), Pica and Rodríguez Mora (2005), and Desai et al. (2006). Gastanaga et al. examine the effects of various policy measures on FDI flows, including the role of investment regulations. They employ two indicators of the degree of openness to international capital flows, both of which are constructed from the IMF's Annual Report on Exchange Arrangements and Restrictions. Less restrictive capital controls are typically associated with higher FDI inflows (pooled data for 49 developing countries in the period 1970-1995). Asiedu and Lien (2004) refer to the same source, but consider three types of controls (multiple exchange rates, controls on capital account transactions, and controls with regard to export proceeds) for a broader panel of 96 developing countries in 1970-2000. The coefficients of all three dummy variables are statistically significant; the

absence of controls on capital account transactions increases the ratio of FDI to GDP by about 0.6 percent. In a paper on FDI in Africa, Asiedu (2005) refers to the International Country Risk Guide (ICRG) to assess the host countries' attitude towards inward FDI. The ICRG index comprises four components: risk of operations, taxation, repatriation of profits, and labor costs. Lagged openness to FDI according to this index is shown to have positive effects on FDI in Africa. However, the coverage of this index extends well beyond capital account restrictions. The same applies to the measures of "regulatory distance" employed by Pica and Rodríguez Mora (2005),[1] which they find to be negatively related to bilateral FDI flows. By contrast, Desai et al. (2006) focus on a more specific measure than the IMF's overall assessment of capital controls, i.e., restrictions on capital repatriation and profit remittances as provided by Shatz (2000). When using this more specific measure, the negative effects of capital controls on FDI by US-based companies become stronger.

The few studies addressing the question whether the recent surge of BITs has helped host countries attracting more FDI typically do not take into account that unilateral liberalization of FDI regulations has proceeded at the same time.[2] When discussed at all, unilateral measures are discounted as non-binding (e.g., Neumayer and Spess 2005). This reasoning is based on the presumption that bilateral contractual arrangements, in contrast to unilateral measures, provide a credible commitment through which time-inconsistency problems can be overcome (e.g., Vandevelde 1998; Hallward-Driemeier 2003; Elkins et al. 2006). Non-binding unilateral measures would be time inconsistent if the host country had an incentive to renege on earlier promises after the investment has been made.

Yet it is open to question whether the commitment through BITs is more effective than unilateral liberalization. Theoretically, BITs would be superior if attracting FDI were a one-time game. The host country could then easily renege on unilateral promises with regard to the treatment of FDI once the foreign investor realized the sunk costs associated with locating in the host country. In reality, however, attracting FDI amounts to a repeated game in which the host country strives for a continuous stream of FDI inflows from investors observing its behavior in the past. In other words, reversing unilateral liberalization once some FDI is "locked in" would come at the cost of deterring future inflows.

Moreover, Vandevelde (1998) argues that the bilateral commitment is often of limited value as BITs constitute "only a small part of a liberal investment regime" (page 515) and

[1] These authors use OECD data on product market regulations in OECD countries as well as the World Bank's *Doing Business* database.

[2] This is even though it is sometimes discussed whether BITs may substitute for weak local (political and economic) conditions; see below.

"allow the host state considerable discretion" (page 517). Most BITs share important features: "The majority of existing BITs have very similar provisions based as they are on the model treaties developed by the home countries of the major MNCs" (Tobin and Rose-Ackerman 2006: 8). In particular, BITs typically include a guarantee of national treatment as well as most-favored-nation (MFN) treatment for FDI projects. In the "traditional admission model" (UNCTAD 2007c), however, these guarantees apply only after FDI has been approved (post establishment). Consequently, unilateral FDI liberalization going beyond the traditional BIT model may offer more in terms of substance, even if BITs are superior in terms of commitment.[3]

Apart from being used deliberately as a commitment device, Elkins et al. (2006) present a "competitive model" to explain why it is rational for a host country to expect higher FDI inflows through signing BITs. Host countries face a collective action problem once it is taken into account that the conclusion of BITs involves costs for them, e.g., by relegating adjudicative authority to foreign tribunals (sovereignty costs). Host countries may be better off when collectively resisting the demand of foreign investors for BITs. For the individual host country, however, it is rational to sign BITs in order to gain reputational advantage and thereby, divert FDI away from competing host countries.[4] Especially countries competing for similar types of FDI are expected to sign BITs, in order not to place themselves at a disadvantage (see also Tobin and Rose-Ackerman 2005). However, this line of reasoning not only applies to BITs but also to unilateral FDI liberalization.

While previous empirical studies on the effects of BITs have largely in common that they do not account for unilateral FDI liberalization, their research design as well as the data used and the sample of host and source countries differ significantly.[5] Hence, it is not surprising that empirical findings have remained highly ambiguous. Hallward-Driemeier (2003) is the only study that employs bilateral FDI flows for more than one source country, as

[3] Note, however, that "another – relatively small – category of BITs imposes a higher degree of discipline on the contracting parties" (UNCTAD 2007c: 155). We return to this issue in Section 4 and discuss the resulting limitations of the dummy variable on BITs used here and in previous literature.

[4] As discussed in more detail in Section 4, this argument leads us to consider the share of host country *j* in total FDI flows from source country *i* to be our preferred FDI measure when specifying the empirical model.

[5] The short review of previous empirical literature is restricted to studies that focus on the effects of BITs on FDI flows to developing countries, where this issue appears to be most relevant. Some other studies concentrate on FDI relations within the OECD, or between OECD countries and a small number of East and Central European transition countries; see Egger and Merlo (2007) for a recent example. Arguably, these studies offer limited insights for policymakers in developing countries. They exclude "the very set of poor to lower middle-income and small to medium-sized developing countries, for which the conclusion of a DTT (or BIT, for that matter) can be an important instrument to woo foreign investors" (Neumayer 2007: 1506; see also Section 4 below).

we do in this paper.[6] She finds little evidence that BITs have stimulated FDI flows from OECD countries to developing host countries. However, the study covers just 31 host countries. While Hallward-Driemeier does not provide details on the sample, this is likely to bias results as minor hosts of FDI typically go unreported in published OECD statistics on FDI outflows.

Neumayer and Spess (2005) suspect that the dyadic approach of Hallward-Driemeier underestimates the effects of BITs on FDI, and argue in favor of a non-dyadic approach instead, since published data on aggregate FDI flows from all sources are available for a much larger sample of host countries. Moreover, the non-dyadic approach may capture spillover effects that BITs with important source countries may have on FDI flows from other source countries. Indeed, Neumayer and Spess find that developing host countries which have agreed to a larger number of BITs have attracted higher FDI inflows. By contrast, Tobin and Rose-Ackerman (2005: 23) conclude that "BITs do not seem to encourage FDI except at low levels of political risk", even though their analysis, too, is non-dyadic. In particular, Tobin and Rose-Ackerman reject the view that BITs are a substitute for a favorable local business environment, whereas Neumayer and Spess report some evidence to this effect.[7] In another paper, Tobin and Rose-Ackerman (2006) focus on political and economic factors as complements to BITs. It turns out that the positive impact of BITs on FDI inflows strongly depends on a supportive political-economic environment.

The striking differences between previous studies may be partly due to sample size. For instance, Neumayer and Spess (2005) cover a broader sample than Tobin and Rose-Ackerman (2005). Results may also depend on whether (and in which way) the possible endogeneity of BITs is taken into account.[8] Salacuse and Sullivan (2005) add another dimension to the debate. These authors find that BITs concluded by developing countries with the United States lead to higher FDI inflows, whereas BITs with other source countries do not.[9]

The gravity model results of Daude and Fratzscher (2006) provide further reason to carefully test for the robustness of empirical estimates on the impact of BITs on FDI inflows.

[6] Blonigen and Davies (2005) use bilateral FDI data to evaluate the effects of double taxation treaties.
[7] Similar to Tobin and Rose-Ackerman (2005), Hallward-Driemeier (2003: 22) concludes: "A BIT has not acted as a substitute for broader domestic reform." Note, however, that none of the three studies employs FDI-specific regulations as a control variable which with the BITs variable is interacted, as we do in the following.
[8] See Section 4 on how we deal with endogeneity.
[9] By contrast, Tobin and Rose-Ackerman (2005) do not find that US FDI is directed to host countries that concluded BITs with the United States. Gallagher and Birch (2006) focus on Latin America. They show that the total number of BITs had a positive effect on aggregate FDI flows to South America, whereas having a BIT with the United States did not attract US FDI.

Daude and Fratzscher focus on information frictions as determinants of (bilateral) FDI stocks (and other types of foreign capital), but include BITs as a control variable. The effect of BITs on FDI proves to be highly sensitive to the size of the sample.[10] The analysis of these authors is purely cross-sectional so that the effects BITs may have over time remain open to question. Yet, this study provides an important insight. In addition to their gravity model, Daude and Fratzscher assess various factors that may explain the host country fixed effects emerging from this model. Inter alia, they consider a dummy on capital account openness as well as institutional indicators related to investor protection (risk of expropriation, risk of repudiation and time of dispute settlement) as possible determinants of FDI. Even though FDI is found to be relatively insensitive to these factors across host countries, especially compared to portfolio investment, their analysis stands out in that it takes account of the bilateral dimension of FDI determinants *and* host country effects resulting from unilateral measures.

3. Stylized Facts on BITs and Unilateral FDI Liberalization

The conclusion of BITs and unilateral FDI liberalization developed in unison with each other. It is in both ways that host countries increasingly attempted to attract FDI inflows, notably since the early 1990s. The number of BITs remained fairly limited until the late 1970s. The conclusion of BITs gathered considerable momentum during the last 15 years when the number of BITs soared from about 400 to almost 2,500 at the end of 2005 (Figure 1).

Considering the contractual parties that have concluded BITs, Figure 2 reveals that developed countries are involved as a signatory in 60 percent of all BITs in force at the end of 2005, with either developing countries (39 percent), transition countries (13 percent) or another developed country (8 percent) representing the second signatory. Neumayer and Spess (2005: 1573) argue that it is mainly BITs concluded between a developed and a developing (or transition) country that can be expected to have significant effects on FDI flows from the former to the latter. It should be noted, however, that various developing countries account for a rising share of worldwide FDI *out*flows. Taken together, developing source countries accounted for 12 percent of total outward FDI stocks in 2005 (UNCTAD, 2006).[11] At the same time, an increasing number of BITs have been concluded among developing countries. Hence, it makes sense to account for developing countries as source

[10] The number of observations varies considerably depending on the specification of the model, i.e., the use of alternative indicators on information frictions.
[11] Major developing source countries include Brazil, China, Hong Kong, Rep. of Korea, Singapore, and Taiwan.

countries, too, as well as for BITs concluded among developing countries. We will test for the robustness of our results by running separate estimates for developed and developing source countries.

Similar to the time pattern observed for BITs, unilateral capital account liberalization gathered momentum only in the 1990s. Figure 3 portrays the Chinn-Ito index on financial openness (Chinn and Ito 2005).[12] The index is based on several dummy variables, including the presence of multiple exchange rates, restrictions on capital account transactions and requirements to surrender export proceeds. Unilateral liberalization in these respects can reasonably be expected to help attract higher FDI inflows. The index is calculated so that higher index values indicate greater openness to cross-border capital transactions (with a mean of zero).

Prior to 1990, unilateral capital account liberalization according to the Chinn-Ito index was largely confined to high-income OECD countries. By contrast, the 1990s witnessed a major change in capital account regulations by non-OECD countries, i.e., the host countries of FDI on which we focus in the following. Capital account liberalization in this broadly defined group of countries continued in most recent years. However, recent liberalization was restricted to the sub-group of middle-income countries. Unilateral liberalization was discontinued by the sub-group of low-income countries which, on average, still have much stricter capital account restrictions.

Taken together, the short account of trends with respect to the conclusion of BITs and unilateral regulatory changes that may help attract FDI inflows strongly suggests accounting for both sets of policy measures when assessing the effectiveness of BITs.

4. Method and Data

We follow large parts of the relevant literature and estimate a gravity-type model on the determinants of FDI. As noted by Deardorff (1998), this class of models first appeared in the empirical literature on bilateral trade flows without much serious attempt to justify them theoretically. However, Deardorff shows that even simple gravity models can be derived from standard trade theories. More recently, gravity models have also been applied to analyze bilateral FDI; prominent examples include: Shatz (2003), Mutti and Grubert (2004), Martin and Rey (2004), as well as Portes and Rey (2005).[13] It typically turns out that the gravity

[12] We would like to thank Hiro Ito for providing access to these data. See Section 4 for a short discussion of alternative indicators of unilateral capital account liberalization.
[13] However, none of these studies considers BITs to be a possible determinant of FDI.

equations for financial flows are comparable in terms of explanatory power to those for trade flows (Martin and Rey 2004: 338). According to Portes and Rey (2005: 275), this is hardly surprising as the gravity approach "emerges naturally" from theories of asset trade. At the same time, Shatz' (2003) analysis of US FDI reveals that sample selection matters for empirical results.[14]

The basic specification of our gravity model reads as follows:[15]

$$\ln\left(\frac{FDI_{ijt}}{FDI_{it}}\right) = \alpha_0 + \alpha_1 \ln\left(\frac{FDI_{ijt-1}}{FDI_{it-1}}\right) + \gamma' X_{jt} + \varphi' Y_{ijt} + \alpha_2 BIT_{ijt} + \lambda_t + \varepsilon_{ijt} \qquad (1)$$

where FDI_{ijt} stands for foreign direct investment of country i in country j in period t, FDI_{it} for total FDI of country i in all (developing) countries included in our sample, X_{jt} represents a set of host country control variables, Y_{ijt} denotes the difference between source and host country characteristics, λ_t is a set of year dummies, and BIT_{ijt} corresponds to a ratified bilateral investment treaty.

We follow Hallward-Driemeier (2003) in that we use *bilateral* FDI flows. We overcome the critique of Neumayer and Spess (2005) concerning the limited host country coverage of previous dyadic analyses by fully exploiting the (largely unpublished) data on bilateral FDI flows available upon request from UNCTAD's Data Extract Service. As discussed in Section 2, the dyadic approach may underestimate the impact of BITs if the host country, by concluding a BIT with one source country, signals to other source countries that their FDI will be protected in the same way. However, signaling effects cannot necessarily be attributed to BITs once it is taken into account that host countries have followed a two-pronged approach of unilateral FDI liberalization and bilateral commitments through BITs (Section 3). Any BIT-related signaling to third parties is no more credible than non-binding unilateral liberalization. Hence, we control for unilateral liberalization in our dyadic approach in order not to overestimate the effects of BITs on FDI inflows.

[14] As noted by Shatz (2003: 118), "national statistical agencies publish bilateral data about the investment activities of their multinationals only for host countries that have sizeable inflows of FDI. This means that nearly all research on foreign direct investment focuses on the winners, countries that have achieved at least some success in attracting FDI. This is a significant problem since policy advice is most often sought by the countries that are excluded from analysis."

[15] In our empirical approach, we principally follow Carr et al. (2001), who estimate the so-called knowledge-capital model that combines horizontal (market seeking) and vertical (efficiency seeking) FDI in a single model. We divert from the model by Carr et al. in that we use additional control variables to account for the impact of BITs on FDI. Moreover, to include as many countries as possible, we sometimes refer to slightly different control variables for which we could obtain data for a large number of developing countries. We do not include the interaction terms used by them.

As concerns the dependent variable, our preferred measure is the share of FDI attracted by a specific host country in total FDI flows from the source country under consideration to all developing host countries included in our sample. This measure captures the attractiveness of a particular developing country relatively to other developing countries. Moreover, this FDI measure clearly relates to the theoretical model of Elkins et al. (2006), according to which host countries sign BITs in order to divert FDI away from competing host countries. As part of our extensive robustness tests in Section 6, we employ two additional specifications of the dependent variable: FDI inflows in US$ million and FDI as a share of GDP.

Since there is a large number of zero observations for FDI at a bilateral level, we consider two variants of our preferred FDI measure, with (*FDI1*) or without zero observations (*FDI2*). It is highly likely that the missing data in our dataset are in fact zeros, since we consider FDI at a bilateral level for a long period of time. Hence, *FDI1* includes missing values as zero observations even though there might be some unreported FDI figures due to confidentiality. We calculate three-year averages in order to smooth the considerable fluctuation of annual bilateral FDI flows. At the same time, this approach ensures that we have enough variation in the data. Negative FDI flows (for three-year averages) were set equal to zero to include as many observations as possible.[16]

We employ a fairly standard set of controls. To begin with, we include the lagged dependent variable in all specifications to avoid the problem of autocorrelation in the panel analysis.[17] Moreover, this approach is consistent with economic theory, as FDI in the past is a strong predictor for FDI at present (Gastanaga et al. 1998). As further control variables, we include total real host country GDP and real GDP growth for market seeking FDI (labeled *GDP* and *Growth*, respectively), host country inflation (*Inflation*), host country openness to trade (*Openness*), the difference in GDP per capita between the source and the host country for vertical FDI (*DiffGDPpc*), and a dummy for the existence of a bilateral or regional trading agreement, that is, a free trade agreement or customs union (*RTA*).[18] We expect a positive association of *GDP*, *Growth*, *DiffGDPpc,* and *RTA* with FDI; the opposite applies to *Inflation*, as this variable can be interpreted as a proxy for macroeconomic distortions.[19]

As for time invariant variables, we also closely follow the empirical literature on gravity models and incorporate dummies for a common border (*ComBorder*), common

[16] The results hardly change if we exclude negative values.
[17] Egger and Merlo (2007) stress the limitations of previous studies that omitted any dynamic effects on FDI.
[18] See Appendix A for exact definitions and data sources for all variables.
[19] Descriptive statistics can be found in Appendix B.

language (*ComLang*) and colonial ties (*ColonTies*), as well as the distance between the source and the host country (*Distance*). The first three control variables are expected to be positively associated with FDI flows, whereas the sign of *Distance* is unclear. On the one hand, management and transport costs are likely to increase if two countries are located far away from each other; on the other hand, remote markets might be better served through local production, that is, FDI in the host country. Hence, the net impact on FDI is uncertain.

To reduce the skewness in the data, we take the natural logarithm of *GDP*, *FDI1*, *FDI2*, *DiffGDPpc*, *Distance*, and *Inflation*. To avoid the loss of observations for which we have negative values or zeros, for example for *Inflation,* we use the following logarithmic transformation:

$$y = \ln\left(x + \sqrt{\left(x^2 + 1\right)}\right) \tag{2}$$

Whereas the sign of x is unchanged, the values of x pass from a linear scale at small absolute values to a logarithmic scale at large values by using this transformation.

Institutional development of host countries, proxied by political constraints on the executive branch (*PolCon*), is included as a control variable as poor institutions may discourage FDI by giving rise to uncertainty (e.g., with respect to the protection of property rights; Lee and Mansfield 1996; Henisz 2000) and additional costs (e.g., in the case of corruption; Wei 2000). We use the index for political constraints that has been developed by Henisz (2000). In contrast to alternative institutional indicators, this variable is available for a large number of countries and years. *PolCon* focuses on the political discretion of the executive branch. Less discretion is supposed to render credible commitments to (foreign) investors more likely. The indicator ranges from zero (total political discretion) to one (no political discretion). Thus, we expect a positive link between *PolCon* and FDI flows.

In contrast to earlier studies, we mitigate the omitted variable bias by controlling for unilateral regulatory changes that may have an impact on FDI flows. Note that unilateral regulatory changes typically apply to FDI from all sources in the same way. We use the Chinn-Ito index measuring a country's capital account openness (*CapOpen)*, expecting a positive link between *CapOpen* and FDI flows. The Chinn-Ito index is available for the period 1970-2004 and for more than 160 countries. Given its broad coverage over time and across countries, the Chinn-Ito index is clearly superior to other possible measures of FDI-

related local restrictions.[20] For example, UNCTAD's account of changes in national FDI regulations is not available for specific host countries. The World Economic Forum (2006) presents survey information on foreign ownership restrictions for 125 countries, but this information is not available over time. The time series data of Quinn and Toyoda (2006) on countries' policies towards the capital account come closest to the Chinn-Ito index.[21] However, country coverage (94) is far from that of the Chinn-Ito index. In particular, low-income countries are underrepresented in the Quinn-Toyoda dataset, giving rise to a sample selection bias.[22]

As concerns our variable of principal interest, *BIT* stands for a ratified bilateral investment treaty between the source and the host country. While we could have used the date of signing a BIT, we rather employ the date of ratification since only ratified BITs offer protection to (foreign) investors.[23] Accordingly, the BIT variable represents a dummy taking the value of 1 when FDI flows from a specific source country to a specific host country were governed by a (ratified) BIT in a particular year. Since we use three-year averages for all variables, *BIT* takes the value of either 0, 0.33, 0.66, or 1.

While we follow previous studies in employing a dummy variable for BITs, the resulting limitations should be kept in mind. Treating BITs as homogenous may be justified to the extent that most of them share important characteristics; but this "does not mean…that all agreements provide the same degree of investment protection" (UNCTAD 2007c: 155). In particular, some recent BITs have broadened the coverage of FDI-related issues and have become more binding. We tentatively address this issue in Section 6 by testing whether recent BITs have been more effective than older BITs in promoting FDI inflows. We also perform separate estimations for BITs concluded with the United States, which has been the frontrunner in pressing for stricter BITs and imposing more discipline on host countries

[20] See Quinn and Toyoda (2006) for a comparison of different measures on capital account openness.

[21] We would like to thank Dennis Quinn for providing access to these data, derived from the coding of *de jure* measures published in the IMF's Annual Report on Exchange Arrangements and Restrictions. The scoring takes into account the severity of restrictions in various categories of financial transactions.

[22] The sample of Quinn and Toyoda includes just 18 countries with a capita income of less than $ 875 (2005), compared to 47 low-income countries for which the Chinn-Ito index is available. Moreover, the Quinn-Toyoda dataset covers just four annual observations for the period under consideration here, with 1997 being the most recent observation for most of the country sample. Hence, it is also with respect to the time dimension that the Chinn-Ito is to be preferred for the present purpose.

[23] A few countries signed BITs but never ratified them; for example, Brazil was signatory of 14 non-ratified BITs as of June 2006. Any impact of the signed BITs is thus questionable.

(Tobin and Rose-Ackerman 2006: 8). However, it is clearly beyond the scope of the present paper to classify the about 2,500 BITs according to the degree of protection offered.[24]

To check the robustness of our results, we use different estimation techniques: For a start, we ignore the potential endogeneity of *BIT*. First of all, we estimate a fixed-effects model, since a standard Hausman test indicated that this model is preferred in comparison to a random-effects model. We then estimate a Poisson Pseudo-Maximum-Likelihood (PPML) model to account for the fact that the sample includes a large number of zero observations (*FDI1*); the PPML estimator includes the above mentioned time-invariant variables.

In the next step, we account for possible endogeneity. While ratifying a BIT could increase FDI flows to a developing country, we cannot rule out reverse causality. Above all, investors might press their government to ratify BITs with host countries in which they are heavily engaged, though feeling insecure regarding, for example, expropriation or the repatriation of profits. Neumayer and Spess (2005) lag BITs by one period to mitigate potential reverse causality, but dismiss instrumental variable (IV) regressions for lack of appropriate instruments. One period lags can be problematic, especially when using annual data as in Neumayer and Spess (2005). Hallward-Driemeier (2003) applies the number of BITs a host country has concluded with third countries as an instrument for the BITs concluded between particular pairs. This instrumentation is awkward if Neumayer and Spess (2005) are right in that BITs concluded with a particular source country have signaling effects and may, thus, be correlated with FDI from other sources, too. Tobin and Rose-Ackerman (2005) use a time variable and the level of democracy in the host country as instruments. The reason given for this instrumentation is that, observing that more and more countries conclude BITs, a particular host country may feel the need to join this trend in order not to be left out. However, this argument rather suggests employing the number of BITs concluded by other host countries, and in particular by neighboring host countries, as an instrument for pairwise BITs concluded by the particular host country under consideration.

Against this backdrop, we use three instruments for *BIT*: (i) the number of BITs ratified by neighboring countries with the source country under consideration, divided by the number of neighbors (*BIT_Neighbors*); (ii) the difference between the average number of BITs ratified by all developing countries included in the sample (but excluding the host country under consideration) and the number of BITs ratified by the host country under consideration (*BIT_Competitors*); and (iii) the lagged level of the BIT variable (*BIT_lagged*).

[24] As argued by Neumayer (2007) with respect to DTTs, this would require an enormous effort; various provisions may be next to impossible to quantify.

As for the instrumentation technique, we use a Generalized Methods of Moments (GMM) estimator to account for heteroskedasticity.

Our analysis covers the period 1978-2004, that is, nine observations of three-year averages for all indicators. UNCTAD's Data Extract Service provides FDI data since 1970, but very few countries report FDI flows for the 1970s at a bilateral level. To avoid any biases arising from an extremely small sample of reporting countries, we start with 1978. We include the maximum number of source and host countries for which bilateral FDI flows are available, except financial offshore centers, such as Panama, The Bahamas, or the Cayman Islands.[25] However, as concerns the hosts of FDI, we follow most of the previous studies and consider developing countries only. It is mainly for them that BITs may compensate for less developed local institutions and can, thus, be expected to promote FDI inflows. At the same time, extending the sample to include a large number of poor developing host countries is crucial to avoid a sample selection bias and to assess the chances of these countries to become more attractive to FDI. Our sample consists of 83 developing host countries, which is almost three times as large as the sample used by Hallward-Driemeier (2003). By covering 28 source countries of FDI, including various non-OECD source countries, we at least partly capture the recent surge of FDI flows from developing countries to other developing countries.[26]

[25] The FDI data for financial offshore centers are highly likely to be biased. We exclude all countries that are on the list of offshore financial centers as reported by Eurostat (2005).
[26] See Appendix C and Appendix D for the source and host country sample.

5. Main Results

Following the model specification and the introduction of the variables, we now turn to the empirical results. We start with the fixed-effects technique and focus, for a start, on *FDI1* (columns 1 to 4 in Table 1). In Model I, we include all relevant control variables except *CapOpen.*[27] As expected, FDI in the previous period is a strong predictor for FDI in the current period. Likewise, FDI is clearly flowing to larger and growing markets (marking seeking, or horizontal FDI), as the coefficients for both the size and the growth of the host country market are positive and highly significant at the 1 per cent level. The same applies to the difference in GDP per capita between source and host countries (vertical FDI), though the significance level is lower in comparison to horizontal FDI. The estimated coefficients of *Inflation*, *RTA* and *PolCon* have the expected signs but fail to reach conventional significance levels. Likewise, openness to trade is not significantly associated with FDI inflows.

Finally, the *BIT* variable has a positive coefficient and is significant at the 5 per cent level, meaning that having a BIT ratified with the source country is associated with an increase in FDI flows to the host country. Concerning the economic impact, some peculiarities have to be taken into account. According to Kennedy (1981), the impact g^* of a dummy variable on a dependent variable that enters the empirical model as a logarithm would have to be approximated appropriately as follows:[28]

$$g^* = \exp\left[\hat{c} - \frac{1}{2}\hat{V}\left(\hat{c}\right)\right] - 1 \qquad (3)$$

with $\hat{c}$ the estimated coefficient for *BIT* in our case, and $\hat{V}$ the estimated variance of $\hat{c}$. This would imply a change of 7.8 per cent in the share of FDI from all source countries if host country *i* concluded BITs with all source countries.

However, a further complication results from the transformation of variables according to equation (2) above, which helped us keeping zero and negative observations. This transformation implies that the dependent FDI variable has a linear and a logarithmic part, with the former ranging up to one per cent in the case of *FDI1*. With the mean of about 0.3 for *FDI1* remaining considerably below this threshold, the coefficient for *BIT* in column (1) of Table 1 suggests that, at the mean, the conclusion of BITs with all source countries

[27] The sample declines by some 200 observations if *CapOpen* is included (Model II).
[28] This point is stressed by Egger and Merlo (2007) in the context of BITs and FDI.

would raise the host country's share in total FDI flows from all source countries by almost 25 per cent.

Finally, the inclusion of the lagged dependent variable allows us to calculate the long-term effect of concluding BITs, by dividing the coefficient of *BIT* by one minus the coefficient of the lagged dependent variable. At the mean, this results in a long-term effect of about 31 per cent.

The overall fit of the fixed-effects estimations regarding the within R^2 is relatively low. It should be noted that *FDI1* and *FDI2* stand for relative shares in FDI inflows into developing countries and that we cover a fairly diverse sample of 28 source and 83 developing (host) countries.[29] Hence, a much better fit was hardly to be expected. In fact, our model fit is quite similar to those obtained by Hallward-Driemeier (2003) and Neumayer and Spess (2005).

In Model II, reported in column 2, we add *CapOpen* to control for unilateral capital account liberalizations by host countries. The coefficient of *CapOpen* has the expected positive sign but does not reach the 10 per cent significance level.[30] While the BIT variable keeps the positive sign, the significance level drops somewhat and the size of the estimated coefficient is slightly lower. This is consistent with our expectation that the impact of BITs on FDI flows tends to be overestimated when ignoring unilateral measures of capital account liberalization.

Next we consider the possibility that the impact of BITs may depend on major characteristics of the host country by including interaction terms of institutional development (*PolCon*) and capital account openness (*CapOpen*) with the BIT variable (Models III and IV). This allows us to test whether BITs might act as a complement or substitute for unilateral improvements in institutions and the degree of capital account openness. In column 3, *PolCon* turns out to be significantly positive while the interaction term *PolCon*BIT* is negative (and highly significant at the 1 per cent level). This suggests that BITs may substitute for institutional quality in the host country. The evidence is considerably weaker for the second interaction term, *CapOpen*BIT;* the sign of the coefficient is also negative, but clearly fails to pass the conventional 10 per cent significance level. The *BIT* variable, on the other hand, is always positive and significant at the 10 per cent level or better.[31]

[29] Overall, our sample consists of 14,077 observations and 2,301 country pairs, that is, more than four times as many country pairs as used by Hallward-Driemeier (2003), who employed 537 pairs.
[30] As noted below, *CapOpen* is positive and highly significant if we use *FDI2* or other econometric methods.
[31] Note the increase in the size of the coefficient for *BIT* from Models I and II to Model III. This is mainly due to the fact that we add the interaction term. To get the net impact of a ratification of a BIT, we would have to take

In the remaining four columns of Table 1, we report the results for the same model specifications, except that we use *FDI2* as the dependent variable. Note the considerable decline in both the number of observations (by some 9,300) and the number of country pairs (from 2,301 to 743). The substantial drop in the sample affects the size and significance level of the coefficients for a number of control variables. Most notably, *DiffGDPpc* is no longer significant, *Openness* turns significantly negative (surprisingly suggesting that FDI and trade are substitutes), while *CapOpen* now is significantly positive as expected. Importantly, *BIT* always remains positive and significant at the 10 per cent level or better. Thus, even if we exclude the (large number of) zero observations for the dependent variable, the positive linkage between ratified BITs and FDI inflows still holds. Moreover, the size of the coefficients of *BIT* is considerably larger with *FDI2* as the dependent variable, compared to the estimations with *FDI1*. This suggests that BITs help less in countries that appear to be totally unattractive (and, thus, have zero FDI inflows).

Still, it can be argued that the inclusion of a large number of zeros in *FDI1* might bias the outcome, since ordinary least squares (OLS) might not be the appropriate estimation technique for this sample. To account for this fact, we employ the PPML estimator that has been suggested for gravity trade models by Silva and Tenreyro (2006). Unlike the OLS method, the PPML estimator is consistent even in the presence of heteroskedasticity and it will not ignore zero FDI flows.[32] By using this econometric method, we are also able to include various time-invariant indicators, which might be important for bilateral FDI, but have been captured by the country fixed effects in the previous model. We use the same four model specifications (Models I to IV) as before, but focus on *FDI1* only. As can be seen in Table 2, all previously used control variables have the expected sign, and are highly significant except for *Inflation* and *RTA*. Having better institutions and a liberalized capital account is now strongly associated with higher FDI inflows. There is also strong evidence with respect to the four additional control variables. Having a common border, speaking the same language, and having colonial ties are positively associated with FDI flows. For the distance between two countries, we get a negative coefficient. Accordingly, the increase in management and transport costs due to the distance between two countries is of higher importance than the

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the estimated coefficient for the interaction term into account too. The overall impact in this specification (and all other specifications in the following) is always positive and significant, which has been confirmed by an appropriate *F*-test.

[32] We also employed a Tobit model to examine the robustness of the results. Importantly, the BIT variable remains positive and highly significant.

attraction of investing in a remote country to serve that market through FDI and local production.

Importantly, independent of the model specification, *BIT* is always positive and significant at the 1 per cent level. Similar to the OLS fixed-effects estimation, the first interaction term maintains its negative coefficient and is highly significant, whereas the interaction term *CapOpen*BIT* is not significant. This provides further evidence that BITs might act as a substitute for institutional quality, but not necessarily for capital account liberalization. Concerning institutional quality, our finding corroborates the results reported by Neumayer and Spess (2005)[33], rather than the results obtained by Tobin and Rose-Ackerman (2005) and Hallward-Driemeier (2003) according to whom BITs are only effective in stimulating FDI in countries with an already stable political and business environment. Again, we think that the sample selection bias of most of the previous studies can explain these contrasting results.

So far, we have assumed that the BIT variable is exogenous. As noted before, however, FDI may affect the ratification of BITs if foreign companies press for some sort of protection of their capital invested abroad. This is why we proceed with an instrumental variable approach. We employ a standard GMM estimator to account for endogeneity of the BIT variable.[34] While we instrument *BIT* with three indicated variables (*BIT_lagged*, *BIT_Neighbors*, and *BIT_Competitors*), we also instrument both *PolCon*BIT* and *CapOpen*BIT* with interaction terms of the instruments for *BIT* and the indicators for political institutions and unilateral capital account liberalization.

Importantly, the instruments we use are both relevant and valid. We assess the relevance of instruments by the magnitude of the R^2 in the first stage for each endogenous variable (*BIT* and its interaction with *PolCon* and *CapOpen*). The Shea first stage R^2 shows that the partial R^2 for changes in *BIT* is between 12 and 38 per cent in the estimations reported in Table 3, which is reasonable. While the figures are relatively low for the first interaction term (*PolCon*BIT*), they are considerably better for the second interaction term

[33] Neumayer and Spess (2005) use several indicators for institutional quality and also find that the interaction terms are not always significant.

[34] Note that the dynamic GMM estimator suggested by Arellano and Bond (1991) is not suitable for our BIT variable since this estimator uses first differences. We only instrument *BIT* (and its interaction with *PolCon* and *CapOpen*) but not the control variables. This is not to ignore that some of the control variables may be endogenous, too. For instance, FDI may affect the overall trading volume if foreign companies import intermediate goods and export processed goods. However, using a large number of instrumented variables at the same time has its own problems and may lead to biased results. In addition, it is difficult to obtain appropriate instruments for variables like *Growth*, as the lagged variable did not work out due to substantial fluctuations from one (three-year) period to another.

(*CapOpen*BIT*) for which the Shea first stage R^2 is in the range of 0.54 to 0.62, indicating a reasonably good fit. Overall, this means that all instruments have sufficient relevance in Shea's sense. The validity of the instruments has been evaluated by using the Hansen *J*-test for overidentifying restrictions. Our IV regressions are based on the assumption that the instruments are uncorrelated with the error term in the FDI equation. The results for the *p*-value of the *J*-test for each IV specification show that we cannot reject the null hypothesis (instruments are uncorrelated with the error term) in all estimations. This result means that our instruments are affecting FDI but only through the BIT variable and, depending on the model specification, the interaction terms.

In all four models and for both FDI variables (*FDI1* and *FDI2*), we find that the coefficient of the BIT variable remains positive and significant, in most cases at the 5 or 1 per cent level. The GMM approach thus corroborates that ratifying a BIT with a source country leads to higher FDI inflows from that country.[35] The estimated coefficients of *BIT* are always larger in the instrumental regressions in comparison to the fixed-effects estimation. This outcome might be surprising, since the presumed reverse causality in the latter approach would mean that we should obtain lower estimates in the GMM regressions. The fixed-effects estimates are determined by the association between FDI and BITs, while the GMM estimates are determined by the partial association between FDI and the component of *BIT* correlated with the instruments. Therefore, technically speaking, the fact that the fixed-effects estimates are smaller means that the partial association of FDI with the instruments is weaker than its partial association with the component that is correlated.

Arguably, this outcome is because the fixed-effects estimates are biased downwards (rather than upwards). If there is a signaling effect of BITs beyond the signatory parties, as speculated by Neumayer and Spess (2005), the BIT variable may underestimate the impact on FDI. Consequently, the fixed-effects estimates would understate the impact of BITs on bilateral FDI inflows, whereas the GMM estimates do not suffer from this bias and are, thus, more reliable.

6. Sensitivity Tests

We check the robustness of our main findings by using several additional model specifications. In view of space constraints, we focus on the GMM regressions and only

[35] For the interaction terms, we obtain the same outcome as in the fixed-effects estimation, that is, a negative coefficient for *PolCon*BIT* and *CapOpen*BIT*, though only the former is statistically significant. Note that *PolCon*BIT* falls slightly below the 10 per cent significance level if we exclude zero FDI observations (*FDI2*).

report the coefficients for the BIT variable with *FDI1* as the dependent variable.[36] First, we exclude *RTA*. Recall that we controlled for regional trade agreements since they increasingly include FDI-related prescriptions, thus reducing investor uncertainty. Hence, the isolated impact of BITs should be biased upwards if RTAs are ignored. This expectation turns out to be true, even though *RTA* always remained insignificant before. The coefficient of *BIT*, reported in Table 4, is slightly larger when replicating the estimations without *RTA*.[37]

Second, we exclude all transition countries. It can be argued that our results might be biased due to the inclusion of Eastern European and former Soviet Union countries since the countries have received much more FDI (or for the first time) after 1990 and, at the same time, have signed various BITs with developed countries. The exclusion of transition countries results in smaller coefficients of *BIT*. In other words, BITs tend to be more effective in transition countries. This may be partly because most transition countries belong to the group of middle-income host countries, for which BITs are more effective in promoting FDI (see below). In addition, the effects of BITs may be stronger in transition countries as many of them lacked any reputation concerning the credibility of unilateral measures immediately after the regime change. Still, for the remaining host countries in our sample, we obtain the same positive impact of BITs on FDI inflows, though the size and significance levels of the BIT coefficient are somewhat smaller.

Third, the size of the BIT coefficient also declines slightly when excluding resource-intensive host countries. This is surprising since the availability of natural resources in host countries could be expected to provide such a strong incentive to foreign companies that they care less about protection of resource-seeking FDI. While our results do not support this view, they are subject to some qualifications. The data situation is far from perfect. The World Bank criterion we use for classifying resource-intensive host countries[38] is not available for various countries of our sample. This may affect results especially because some countries in which FDI is fairly likely to be resource-seeking could not be classified (e.g., Azerbaijan, Equatorial Guinea, or Kazakhstan). Moreover, foreign companies are most likely to be rather lenient about protection in the case of oil. However, many oil-exporting countries are not included in

[36] All GMM robustness checks reported in this section have also been performed for the fixed-effects and PPML models as well as for *FDI2*. As the sign and significance levels of the coefficients are quite similar, we do not report them. Like all other non-reported results, they can be obtained from the first author upon request.

[37] For reference, we show previous GMM estimates for the full sample in the first row of Table 4.

[38] We classify a country as resource-intensive if its resource rents, that is, energy plus mineral depletion in per cent of GNI, are higher than 15 per cent in the first three-year period (1978-1980). See the notes below Table 4 for all resource-intensive countries that have been excluded in this set of regressions.

our sample of host countries, as the required data for the independent variables are not available.

Fourth, we run separate estimations for low and middle-income host countries. The BIT variable retains its positive impact for both sub-groups.[39] The effects turn out to be somewhat stronger for middle-income host countries. This appears to be reasonable as relatively advanced developing countries are better able to make use of FDI-specific assets, for example, by infringing on property rights. Hence, there is greater uncertainty for foreign companies in host countries with higher imitative capacity. The link between credible protection through BITs and FDI inflows is therefore likely to be stronger than in countries with less imitative capacity. Yet, the interaction term *PolCon*BIT* is negative and significant for both sub-groups (not reported), which suggests that the substitution effect holds for both low- and middle-income countries.

Fifth, the picture remains essentially the same when our estimations are based on a shorter period of observation (1990-2004, instead of 1978-2004). The size of coefficients is quite similar compared to the complete period, only in Model III do we obtain a lower coefficient for *BIT*. This outcome may come as a surprise, since one could have expected that more recent BITs were more effective in promoting FDI as the coverage of FDI-related issues became broader and more binding in the course of time. Interestingly, however, our results are similar to what Blonigen and Davies (2005) find with regard to bilateral *tax* treaties: While older tax treaties are positively associated with FDI, this does not apply to more recent tax treaties. There are several possible explanations why BITs have not become more effective over time. Increasingly binding BITs may essentially mean that it becomes easier for foreign companies to remit profits and repatriate capital, which *ceteris paribus* would reduce *net* FDI inflows.[40] Moreover, BITs may suffer from diminishing returns due to their proliferation (UNCTAD 1998; Nunnenkamp and Pant 2003; Tobin and Rose-Ackerman 2006). In contrast to earlier times, the conclusion of a BIT is no longer a distinctive factor signaling a particular host country's readiness to offer favorable FDI conditions. Rather, foreign companies may increasingly tend to regard BITs as a standard feature of the institutional framework governing FDI worldwide.

[39] By contrast, Neumayer (2007) finds that double taxation treaties were effective in increasing FDI flows only to middle-income host countries.

[40] In the context of tax treaties, Blonigen and Davies (2005) refer to concerns that such treaties arise due to lobbying efforts by profit-seeking investors. They conclude that treaties may then be geared towards maximizing investor profits rather than promoting FDI.

Sixth, we perform separate estimations for developed and developing source countries. It appears that BITs are effective only in stimulating FDI flows from developed source countries to developing countries. By contrast, BITs do not matter as a commitment device in developing countries' FDI relations with other developing countries. This finding justifies the assumption of Tobin and Rose-Ackerman (2006: 15), who consider only BITs concluded with high-income OECD partner countries "on the ground that they are the ones with the potential to have an impact on FDI flows." However, the underlying reasoning that developing countries are unlikely to undertake much FDI in other developing countries has become less compelling in the recent past, and BITs may play a more important role in future FDI relations among developing countries.

Finally, we run separate regressions for the United States as a source country to compare our results with those obtained by previous studies. Like Tobin and Rose-Ackerman (2005), we cannot establish any clear link between US BITs and US FDI to developing countries. We never obtain a statistically significant coefficient for *BIT*. This outcome can partly be explained by the fact that the United States has not concluded a large number of BITs. As of 1 June 2006, the US had ratified a total of 39 BITs (and 29 BITs with the 83 developing countries included in our sample), whereas Germany had concluded 114 (70) and the United Kingdom 91 (57) (UNCTAD 2007a). This is even though US multinationals accounted for 19.2 per cent of total outward FDI stocks in 2005, much more than the corresponding figures for German (9.1 per cent) and British (11.6 per cent) multinationals (UNCTAD 2007b). Moreover, the US concluded BITs with some countries mainly for political reasons. For instance, US commercial interest did not play a major role in Morocco and Jordan. The peculiar findings for the United States clearly reveal that it is important to include as many source countries as possible, as we do in this paper, to avoid any bias due to country-specific effects and to provide a comprehensive assessment of the impact of BITs on FDI.

In a final set of robustness checks, we use two alternative FDI measures, that is, bilateral FDI flows in million US$ (*FDI3*) and in per cent of the host country's GDP (*FDI4*).[41] As can be seen in Table 5, the BIT variable is always significant in all four model specifications and for all three econometric methods. The significance levels are somewhat lower if we use FDI flows as a share of the host country's GDP as the dependent variable.

[41] To save space, we continue to only report the results with zero observations for FDI flows included.

This outcome might be due to the fact the GDP stands on both sides of the question, which could lead to less reliable estimates for the explanatory variables.

In summary, our robustness checks strongly support our basic message that BITs help attract FDI to developing host countries, even though the size and significance level of coefficients differ somewhat across different specifications.

7. Conclusions

Policymakers in almost all developing countries are engaged in fierce competition for FDI. However, it has remained disputed how effective the means are that national policymakers have at their disposal when attempting to attract FDI inflows. In this paper, we focus on the impact of BITs that have increasingly been concluded in order to reduce uncertainty of foreign investors in a credible way and, thus, to promote FDI flows to developing countries.

Few earlier studies have addressed the effectiveness of BITs, and the available empirical evidence is inconclusive. Depending on the particular study, we argue that previous evaluations of the effectiveness of BITs are distorted due to sample selection and omitted variable biases as well as the potential endogeneity of BITs in the regressions. We attempt to overcome these econometric concerns by covering a much larger sample of host and source countries, by accounting for unilateral FDI liberalization, and by including an appropriate instrumental variable approach.

Our main finding is that BITs do promote FDI flows to developing countries. This result is fairly robust across various models. Moreover, the significantly positive effect of BITs on bilateral FDI flows holds for FDI flows from developed source countries to various sub-samples of developing host countries. BITs may even substitute for weak local institutions, though not for unilateral FDI-related liberalization measures.

All this suggests that policymakers in developing countries have resorted to an effective means to promote FDI by concluding BITs. Nevertheless, our analysis leaves several questions for future research. It depends not only on the benefits in terms of higher FDI inflows but also on the costs involved whether ratifying still more BITs would be rational. Costs may arise by reducing the policy options host countries might want to consider in selecting FDI projects at the entry stage and in regulating approved FDI projects after entry. In particular, it remains open to debate whether host countries have reason to feel unduly constrained given that recent BITs have become more binding and broader in coverage. Concerns are that recent BITs have shifted the balance towards the interests of profit maximizing foreign investors and away from the developmental interests of host countries.

This calls for a detailed evaluation of the *contents* of BITs, rather than only focusing on the number of BITs.

Furthermore, the effectiveness of more BITs to come will be affected by several factors. On the one hand, as argued by Tobin and Rose-Ackerman (2006), the proliferation of BITs is likely to result in diminishing returns. With an ever increasing share of bilateral FDI covered by contractual arrangements, BITs would no longer be a distinctive factor signaling the host country's readiness to protect foreign investors. The future effectiveness of BITs may be eroded further if plurilateral and multilateral agreements increasingly include FDI-related prescriptions. At the same time, the binding character of BITs may become less relevant: If the trend of unilateral FDI liberalization continues and reversals are rare, more and more developing countries will improve their reputation of treating FDI favorably.

On the other hand, BITs going beyond the "traditional admission model" (UNCTAD 2007c: 155) may have a stronger impact on FDI. To capture this effect, future research should explore possibilities to relax the assumption of homogenous BITs. It would be an important step towards a more realistic treatment of BITs if, as suggested by UNCTAD, two main models could be distinguished, with the "new" model involving a higher degree of discipline than the traditional model. To arrive at a nuanced categorization, three aspects of heterogeneity seem to be of particular importance: (i) BITs with explicit provisions relating to the pre-establishment phase should be treated differently from those granting protection only after establishment; (ii) BITs with pervasive provisions related to performance requirements may be separated from those without such provisions; and (iii) BITs including investor-state arbitration should be distinguished from those being limited to state-to-state arbitration.

But it is not only with regard to BITs that heterogeneity should be taken into account. The same may be required with respect to the dependent FDI variable. For instance, Gallagher and Birch (2006) suspect that BITs have been a more effective means of FDI promotion in South America than in Mesoamerica because of the different types of FDI attracted by the two sub-regions. Arguably, the protection of FDI through BITs is more relevant for horizontal, market-seeking FDI which stands in direct competition with local companies than for vertical, efficiency-seeking FDI. Future research may also explore in more detail the links between sector-specific BIT provisions, e.g., with regard to services, and sector-specific FDI flows. Data constraints may render it impossible to address such questions in panel studies; but country-specific studies may offer detailed insights to this effect.

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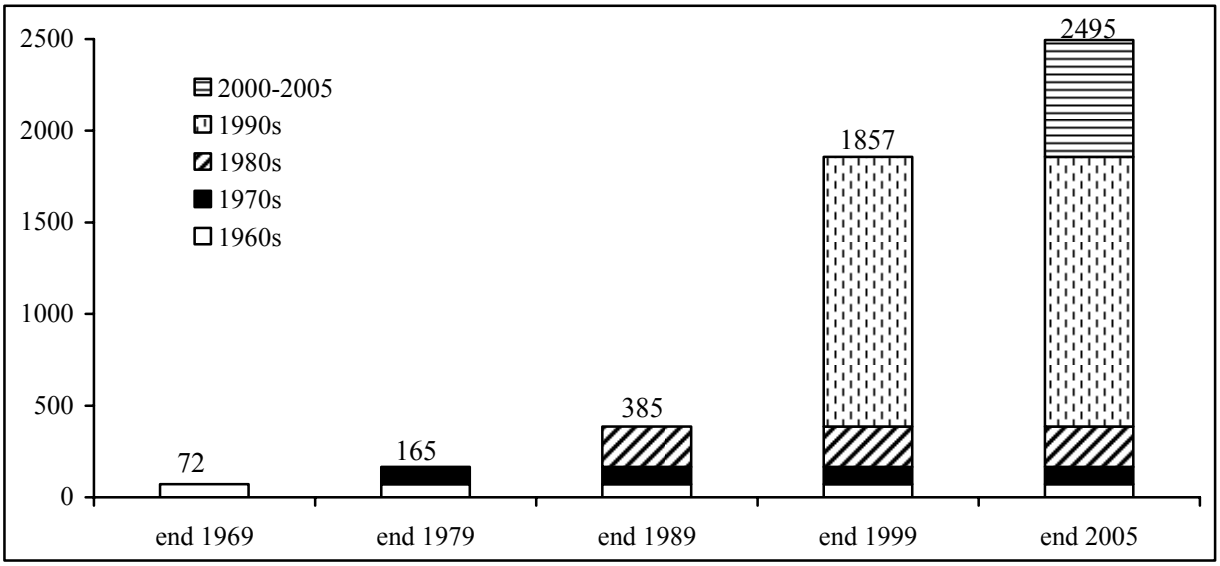
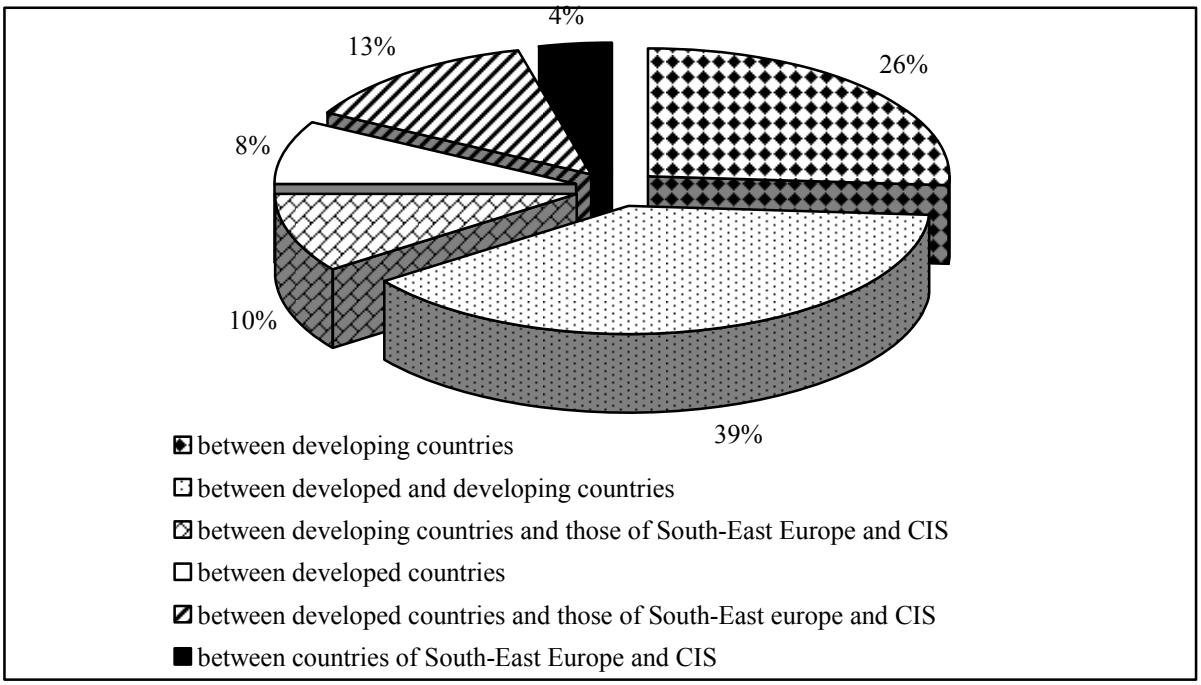
Figure 1: Number of BITs Concluded, 1969-2005



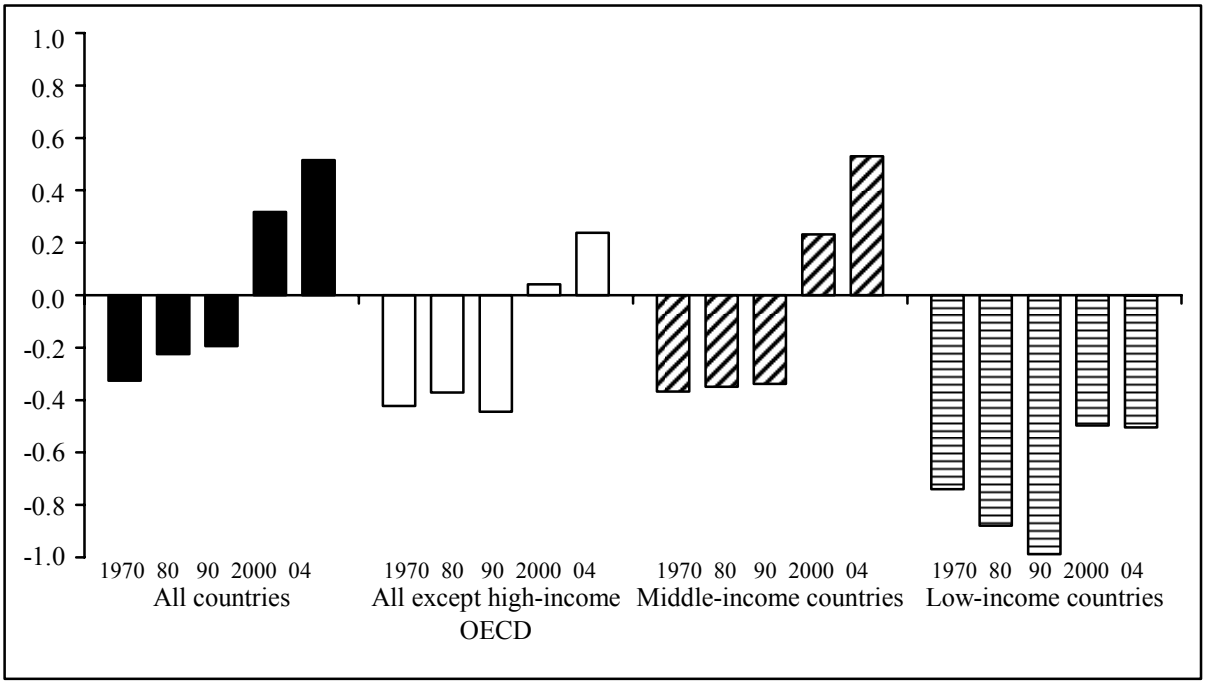
Source: UNCTAD (2007b).

Figure 2: Total BITs Concluded, by Country Group, as of End 2005



Source: UNCTAD (2007b).

Figure 3: Capital Account Liberalization, Average for Selected Country Groups 1970-2004



Note: Country classification according to World Bank (2006); see text for explanation of the Chinn-Ito index on financial openness.
Source: Chinn and Ito (2005).

Table 1: Fixed-Effects Estimation Results

Dependent Variable:	(1) ln (FDI1)	(2) ln (FDI1)	(3) ln (FDI1)	(4) ln (FDI1)	(5) ln (FDI2)	(6) ln (FDI2)	(7) ln (FDI2)	(8) ln (FDI2)
Model:	I	II	III	IV	I	II	III	IV
BIT	0.0756**	0.0552*	0.185***	0.057*	0.119*	0.115*	0.305***	0.120*
	(2.43)	(1.73)	(3.37)	(1.69)	(1.69)	(1.63)	(2.65)	(1.68)
ln (FDI_{t-1})	0.213***	0.200***	0.200***	0.200***	0.0558***	0.0544**	0.0549***	0.0542**
	(7.34)	(6.83)	(6.83)	(6.82)	(2.63)	(2.56)	(2.59)	(2.55)
ln (GDP)	0.107***	0.100**	0.0929**	0.100**	0.460***	0.493***	0.483***	0.496***
	(2.79)	(2.51)	(2.36)	(2.51)	(3.32)	(3.54)	(3.47)	(3.56)
ln (DiffGDPpc)	0.00316*	0.00355**	0.00339*	0.0036**	0.0308	0.0356	0.0341	0.0357
	(1.88)	(1.97)	(1.89)	(1.97)	(0.71)	(0.82)	(0.78)	(0.82)
Growth	0.0027***	0.0027**	0.0026**	0.0027**	0.0172***	0.0167***	0.0162***	0.0167***
	(2.64)	(2.51)	(2.41)	(2.52)	(3.26)	(3.16)	(3.05)	(3.15)
ln (Inflation)	-0.00543	-0.00653	-0.00755*	-0.0066	-0.0147	-0.00752	-0.0106	-0.00760
	(-1.36)	(-1.54)	(-1.78)	(-1.55)	(-0.99)	(-0.49)	(-0.69)	(-0.50)
Openness	-0.00050	-0.00039	-0.00038	-0.0004	-0.0053***	-0.0047***	-0.0045***	-0.0047***
	(-1.42)	(-1.07)	(-1.03)	(-1.08)	(-3.64)	(-3.14)	(-3.01)	(-3.16)
RTA	0.0666	0.0651	0.0740	0.0663	0.130	0.140	0.139	0.143
	(0.96)	(0.91)	(1.04)	(0.92)	(1.39)	(1.49)	(1.49)	(1.52)
PolCon	0.0406	0.0469	0.105***	0.0470	0.0953	0.126	0.291*	0.126
	(1.15)	(1.31)	(2.83)	(1.31)	(0.65)	(0.86)	(1.75)	(0.86)
CapOpen		0.00837	0.00867	0.0092		0.0472**	0.0471**	0.0544**
		(1.34)	(1.39)	(1.51)		(2.06)	(2.06)	(1.99)
PolCon * BIT			-0.376***				-0.535**	
			(-3.16)				(-2.09)	
CapOpen * BIT				-0.0044				-0.0177
				(-0.28)				(-0.48)
Observations	12,088	11,882	11,882	11,882	2,769	2,768	2,768	2,768
Country pairs	2,301	2,301	2,301	2,301	743	743	743	743
R^2 (within)	0.06	0.05	0.05	0.05	0.04	0.04	0.04	0.04
R^2 (between)	0.61	0.62	0.62	0.62	0.26	0.26	0.27	0.26

Notes: t-values, reported in parentheses, are corrected for heteroskedasticity; due to space constraints, the coefficients for the year dummies are not shown; *** significant at 1% level; ** significant at 5% level; * significant at 10% level.

Table 2: PPML Estimation Results

Dependent Variable:	(1) ln (FDI1)	(2) ln (FDI1)	(3) ln (FDI1)	(4) ln (FDI1)
Model:	I	II	III	IV
BIT	0.317***	0.284***	0.631***	0.289***
	(4.85)	(4.33)	(5.42)	(4.39)
ln (FDI_{t-1})	0.239***	0.235***	0.233***	0.234***
	(13.3)	(13.0)	(12.9)	(13.0)
ln (GDP)	0.718***	0.728***	0.723***	0.729***
	(25.3)	(25.4)	(25.1)	(25.4)
ln (DiffGDPpc)	0.0520***	0.0540***	0.0546***	0.0543***
	(5.56)	(5.79)	(5.86)	(5.82)
Growth	0.0221***	0.0217***	0.0209***	0.0217***
	(4.35)	(4.27)	(4.11)	(4.27)
ln (Inflation)	-0.0202	-0.00907	-0.0123	-0.00932
	(-1.28)	(-0.55)	(-0.75)	(-0.57)
Openness	0.00278***	0.00322***	0.00353***	0.00321***
	(2.97)	(3.39)	(3.70)	(3.38)
RTA	0.0729	0.0693	0.0880	0.0749
	(0.90)	(0.86)	(1.09)	(0.92)
ComBorder	0.526**	0.455*	0.429*	0.446*
	(2.17)	(1.88)	(1.78)	(1.84)
ComLang	1.114***	1.112***	1.111***	1.113***
	(8.92)	(8.88)	(8.88)	(8.89)
ln (Distance)	-0.706***	-0.713***	-0.708***	-0.711***
	(-13.6)	(-13.7)	(-13.6)	(-13.6)
ColonTies	0.489**	0.521**	0.531**	0.522**
	(2.35)	(2.50)	(2.55)	(2.50)
PolCon	0.801***	0.764***	1.098***	0.774***
	(5.54)	(5.27)	(6.35)	(5.32)
CapOpen		0.0793***	0.0820***	0.0914***
		(3.72)	(3.84)	(3.52)
PolCon * BIT			-0.976***	
			(-3.60)	
CapOpen * BIT				-0.0308
				(-0.81)
Observations	12,088	11,882	11,882	11,882
Country pairs	2,301	2,301	2,301	2,301

Notes: z-values are reported in parentheses; constant term not shown; *** significant at 1% level; ** significant at 5% level; * significant at 10% level.

Table 3: GMM Estimation Results

Dependent Variable:	(1) ln (FDI1)	(2) ln (FDI1)	(3) ln (FDI1)	(4) ln (FDI1)	(5) ln (FDI2)	(6) ln (FDI2)	(7) ln (FDI2)	(8) ln (FDI2)
Model:	I	II	III	IV	I	II	III	IV
BIT	0.144***	0.123**	0.511***	0.125**	0.276*	0.287*	0.891**	0.305**
	(2.64)	(2.16)	(3.88)	(2.08)	(1.79)	(1.87)	(2.13)	(1.93)
ln (FDI_{t-1})	0.216***	0.203***	0.190***	0.203***	0.0530	0.0520	0.0464	0.0528
	(7.52)	(7.02)	(6.54)	(7.00)	(1.64)	(1.61)	(1.42)	(1.62)
ln (GDP)	0.113***	0.105***	0.114***	0.103***	0.469***	0.503***	0.455***	0.502***
	(2.98)	(2.67)	(2.98)	(2.62)	(3.12)	(3.33)	(3.02)	(3.35)
ln (DiffGDPpc)	0.00331*	0.00361**	0.00342*	0.00361**	0.0287	0.0324	0.0269	0.0301
	(1.94)	(1.97)	(1.82)	(1.97)	(0.74)	(0.82)	(0.69)	(0.76)
Growth	0.0029***	0.0028***	0.0016	0.0028***	0.0174***	0.0171***	0.0154***	0.0168***
	(2.80)	(2.66)	(1.51)	(2.67)	(3.23)	(3.16)	(2.82)	(3.09)
ln (Inflation)	-0.00369	-0.00471	-0.00598	-0.00469	-0.0101	-0.00329	-0.0116	-0.00382
	(-0.91)	(-1.09)	(-1.35)	(-1.09)	(-0.61)	(-0.20)	(-0.66)	(-0.23)
Openness	-0.00058	-0.00046	-0.00029	-0.00047	-0.0053***	-0.0048***	-0.0041***	-0.0047***
	(-1.62)	(-1.25)	(-0.77)	(-1.27)	(-3.62)	(-3.19)	(-2.61)	(-3.17)
RTA	0.0487	0.0466	0.0436	0.0470	0.127	0.135	0.128	0.136
	(0.69)	(0.64)	(0.57)	(0.64)	(1.09)	(1.15)	(1.10)	(1.16)
PolCon	0.0413	0.0478	0.217***	0.0499	0.113	0.139	0.614*	0.149
	(1.17)	(1.33)	(3.48)	(1.39)	(0.83)	(1.04)	(1.81)	(1.11)
CapOpen		0.00788	0.0112*	0.00715		0.0430*	0.0404*	0.0442
		(1.26)	(1.79)	(1.10)		(1.82)	(1.69)	(1.47)
PolCon * BIT			-1.125***				-1.530*	
			(-3.55)				(-1.64)	
CapOpen * BIT				0.00231				-0.00799
				(0.12)				(-0.16)
Shea partial R^2 (first-stage)								
BIT	0.38	0.36	0.20	0.37	0.27	0.27	0.12	0.26
PolCon * BIT			0.16				0.10	
CapOpen * BIT				0.62				0.54
Hansen J statistic (χ^2 p-value)	0.98	0.83	0.36	0.65	0.63	0.70	0.46	0.55
Observations	11,887	11,683	11,683	11,683	2,629	2,628	2,628	2,628
Country pairs	2,206	2,206	2,206	2,206	623	623	622	623

Notes: z-values are reported in parentheses; *** significant at 1% level; ** significant at 5% level; * significant at 10% level. Instrumented variables: *BIT* and interaction terms; instruments: see text.

Table 4: Robustness Checks and Extensions, GMM Estimation

Dependent Variable:	(1) ln (FDI1)	(2) ln (FDI1)	(3) ln (FDI1)	(4) ln (FDI1)
Model:	I	II	III	IV
Full Sample (as reported in Table 3)	0.144***	0.123**	0.511***	0.125**
	(2.64)	(2.16)	(3.88)	(2.08)
Excl. RTA	0.154***	0.133**	0.511***	0.133**
	(2.96)	(2.44)	(3.89)	(2.31)
Excl. Transition Countries	0.0860*	0.089**	0.436***	0.108*
	(1.61)	(2.04)	(3.88)	(1.62)
Excl. Resource-intensive Countries[1]	0.118**	0.113**	0.487***	0.111*
	(2.13)	(1.92)	(4.13)	(1.85)
Low-income Countries	0.139**	0.116**	0.358***	0.113**
	(2.35)	(2.18)	(3.07)	(2.31)
Middle-income Countries	0.151**	0.142*	0.702***	0.144*
	(2.20)	(1.73)	(3.32)	(1.75)
Period 1990-2004	0.141**	0.121**	0.392**	0.120*
	(2.23)	(2.12)	(2.31)	(1.85)
Developed Source Countries	0.134***	0.117**	0.442***	0.110*
	(2.64)	(2.24)	(3.58)	(1.72)
Developing Source Countries	0.187	0.129	1.403	0.222
	(1.37)	(0.87)	(1.36)	(1.33)
USA as Source Country	0.133	0.151	0.359	0.149
	(1.23)	(1.31)	(1.26)	(1.29)

Notes: To save space, we only report the results for the BIT variable with FDI1 as the dependent variable; z-values are reported in parentheses; *** significant at 1% level; ** significant at 5% level; * significant at 10% level. See Table 3 for further notes. [1]Algeria, Bolivia, China, Rep. of Congo, Ecuador, Egypt, Guyana, Indonesia, Nigeria, Oman, Papua New Guinea, Syrian Arab Republic, Trinidad and Tobago, Venezuela, Zambia.

Table 5: Robustness Checks and Extensions, Alternative FDI Measures

Model:	(1) I	(2) II	(3) III	(4) IV
Dependent variable and estimation technique				
FDI3, fixed effects	0.317***	0.248***	0.277**	0.242***
	(4.59)	(3.49)	(2.42)	(3.35)
FDI3, PPML	0.337***	0.271***	0.474***	0.277***
	(6.74)	(5.36)	(5.45)	(5.46)
FDI3, GMM	0.443***	0.337**	0.806**	0.339**
	(2.86)	(2.04)	(2.15)	(2.01)
FDI4, fixed effects	0.477***	0.400***	0.411*	0.413***
	(3.45)	(2.81)	(1.79)	(2.86)
FDI4, PPML	0.488**	0.462*	0.766**	0.361*
	(1.97)	(1.79)	(2.17)	(1.77)
FDI4, GMM	0.530**	0.417*	1.06*	0.46**
	(1.95)	(1.69)	(1.61)	(2.57)

Notes: To save space, we only report the results for the BIT variable; z-values are reported in parentheses; *** significant at 1% level; ** significant at 5% level; * significant at 10% level. See Table 3 for further notes.

Appendix A: Definition of Variables and Data Sources

Variable	Definition	Source
FDI1	Bilateral FDI flows from source to host country in % of total FDI to all developing countries included in our sample, including zeros	UNCTAD (2007a)
FDI2	Bilateral FDI flows from source to host country in % of total FDI to all developing countries included in our sample, excluding zeros	UNCTAD (2007a)
FDI3	Bilateral FDI flows from source to host country in Mio. US$, including zeros	UNCTAD (2007a)
FDI4	Bilateral FDI flows from source to host country in % of GDP of host country, including zeros	UNCTAD (2007a)
GDP	Real GDP, constant 2000 US$	World Bank (2006)
DiffGDPpc	Difference between source and host countries' GDP per capita, constant 2000 US$	World Bank (2006)
Growth	Real GDP growth rate of host country in %	World Bank (2006)
Inflation	Inflation rate of host country in % (GDP deflator)	World Bank (2006)
Openness	Sum of imports and exports in % of GDP (host country)	World Bank (2006)
BIT	Bilateral investment treaty, ratified between source and host country	UNCTAD (2007b)
BIT_Neighbors	Number of BITs ratified by all neighboring countries, divided by number of neighboring countries	UNCTAD (2007b)
BIT_Competitors	Difference between average number of BITs ratified by all other (82) developing countries and number of BITs ratified by particular developing country	UNCTAD (2007b)
RTA	Dummy regional trade agreement	WTO (2007)
PolCon	Political constraints III, Henisz database, range from 0 to 1	Downloaded from Henisz's homepage
CapOpen	Indicator for capital account openness; Chinn-Ito index on financial openness	Chinn and Ito (2005); data kindly provided by Hiro Ito
ComBorder	Common border between source and host country	Dollar & Kraay dataset
ComLang	Common language between source and host country	Dollar & Kraay dataset
Distance	Distance in km between source and host country	Dollar & Kraay dataset
ColonTies	Colonial ties between source and host country	Dollar & Kraay dataset

Appendix B: Descriptive Statistics for the Main Variables

Variable	Observations	Mean	Std. Dev.	Minimum	Maximum
ln (FDI1)	14,077	0.30	0.83	0	5.30
ln (FDI2)	3,726	1.13	1.28	0	5.30
GDP	14,077	23.26	1.70	19.14	28.07
ln (DiffGDPpc)	14,077	8.76	4.54	-10.15	11.21
Growth	14,077	3.46	5.58	-18.20	77.70
ln (Inflation)	14,077	3.02	1.66	-3.25	9.43
Openness	14,077	73.10	39.86	9.31	245.80
BIT	14,077	0.18	0.37	0	1
RTA	14,077	0.05	0.21	0	1
PolCon	14,077	0.25	0.20	0	0.68
CapOpen	13,747	-0.22	1.33	-1.75	2.62
ComBorder	14,077	0.01	0.12	0	1
ComLang	14,077	0.11	0.31	0	1
ln (Distance)	14,077	8.87	0.71	4.31	9.89
ColonTies	14,077	0.03	0.16	0	1

Appendix C: Source Country Sample

Argentina, Australia, Austria, Belgium-Luxembourg, *Brazil*, *Chile*, *Colombia*, Denmark, Finland, France, Germany, Iceland, Japan, Republic of Korea, *Malaysia*, *Mexico*, Netherlands, New Zealand, Portugal, Spain, Sweden, Switzerland, Taiwan, *Thailand*, *Turkey*, United Kingdom, United States, *Venezuela*

Note: Developing source countries in italics.

Appendix D: Host Country Sample

Albania, Algeria, Angola, Argentina, Azerbaijan, Bangladesh, Bolivia, Botswana, Brazil, Bulgaria, Burkina Faso, Cameroon, Chile, China, Colombia, Republic of Congo, Costa Rica, Côte d'Ivoire, Croatia, Czech Republic, Dominican Republic, Ecuador, Egypt, El Salvador, Equatorial Guinea, Estonia, Ethiopia, Gambia, Ghana, Guatemala, Guinea, Guyana, Haiti, Honduras, Hungary, India, Indonesia, Jordan, Kazakhstan, Kenya, Latvia, Lithuania, Madagascar, Malaysia, Mali, Mauritius, Mexico, Mongolia, Morocco, Mozambique, Namibia, Nicaragua, Niger, Nigeria, Oman, Pakistan, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Romania, Russian Federation, Senegal, Seychelles, Slovakia, Sri Lanka, Sudan, Swaziland, Syrian Arab Republic, Tanzania, Thailand, Togo, Trinidad and Tobago, Tunisia, Turkey, Uganda, Ukraine, Uruguay, Venezuela, Vietnam, Zambia, Zimbabwe