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Economic Impact of Investment Agreements

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Abstract

Based on a thorough analysis of theoretical arguments, this meta-analysis does not find a genuine empirical effect of Bilateral Investment Treaties on Foreign Direct Investment after correcting for publication selection bias.

Keywords: bilateral investment treaty (BIT), foreign direct investment (FDI), policy evaluation

JEL: C83 (Survey Methods, Sampling Methods), K33 (International Law), F21 (International Investment, Long-term Capital Movements)

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1. Introduction

A notable feature of the on-going globalization process of production and services via Foreign Direct Investment (FDI) has been the proliferation of International Investment Agreements (IIAs) and Bilateral Investment Treaties (BITs) as well as Preferential Trade Agreements (PTAs) with investment provisions, in particular. The "purpose of investment treaties is closely tied … to the removal of obstacles that may stand in the way of allowing and channeling more foreign investment into the host states". (Dolzer and Schreuer 2012, p. 22)

The issue regarding whether the ratification of investment agreements actually leads to an increased FDI inflow from the partner economy / economies is the fundamental question for policy makers.

This study intends to answer this fundamental question by two routes in order to provide the ground for evidence-based policy:

First, we develop an investment literature overview by discussing the main theoretical arguments to justify policy intervention in the form of the conclusion of IIAs and as to the expected impact on FDI (Part 1: Theoretical Background).

Second, we identify the actual impact of investment agreements on FDI by an objective review (meta-analysis) of empirical results put forward to date (Part 2: Empirical Evidence).

2. Definition of FDI, IIAs and Economic Effects

2.1. Definition of FDI

In brief, FDI reflects the objective of establishing a lasting interest by a resident enterprise in one economy (direct investor) in an enterprise (direct investment enterprise) that is resident in an economy other than that of the direct investor. (OECD 2008, p. 48)

There are a number of data issues of FDI statistics, two of which are particularly relevant when assessing the impact of BITs on FDI:

The empirical literature is divided concerning the use of flow or stock values. Both measures have virtues and drawbacks. For example, Bellak and Cantwell (1998) discuss the valuation of FDI stocks. Studies on the effects of BITs on FDI have used both measures.

The majority of studies on the effects of BITs on FDI uses bilateral FDI flows as the dependent variable. The reported bilateral FDI flow may, however, be considered problematic, when FDI is conducted via a third country. (e.g., Hong Kong, China is the gateway for FDI into/from PRC). In short, this results in imprecise measurement, which has to be taken into account when interpreting empirical results. The estimated impact of investment agreements on FDI may thus be an artefact.

2.2. Definition of IIAs

Sornarajah (2007, pp. 87ff) identifies four types of sources for the international law on foreign investment: “treaties”, “custom”, “general principles of law” and “judicial decisions”. IIAs are international treaties, which include substantive and procedural clauses.

There are three types of IIAs: first, *investment protection treaty*; second, *investment liberalization plus protection treaty*. Those two are usually called investment treaties. The third type is *investment chapter* under EPA/FTA (Economic Partnership Agreement/Free Trade Agreement). The latter usually cover both liberalization and protection. These are termed *framework agreements on economic cooperation and investment chapters in economic partnership agreements* (UNCTAD, WIR 2013, p. 117, FN 12)[1].The term IIAs is used to refer to the two types of investment treaties as well as investment chapter under EPA/FTA. The bilateral investment treaty (BIT), which is the focus of this analysis is just one category of IIAs.

International agreements/treaties may also be classified in terms of the *number of contracting parties*: When the contracting parties are two, agreements/treaties are called “bilateral”. Bilateral agreements can be EPA/FTA and bilateral investment treaties (BITs). “BITs are agreements between two countries for the reciprocal encouragement, promotion and protection of investments in each other's territories by companies based in either country.” When the concerned parties are three or more, they are called “plurilateral”. Among the plurilateral agreements, regional agreements (e.g. NAFTA, ASEAN Treaty on the Protection and Promotion of Foreign Investment, Mercosur Agreement) and multilateral agreements are possible. With regard to investment agreements, no multilateral agreement has been achieved so far.

The distinction of the three types of IIAs bears consequences for the analysis of effects of investment treaties. Essentially, the effect of an investment treaty (liberalization and protection) is not different from the effect of an investment chapter under EPA/FTA. However, analytically, they are different, because it is not easy to assess the impact of investment chapter under EPA/FTA on investment. Even if EPA/FTA contribute to investment, this may not be because of its investment chapter; as there is a possibility that trade liberalization under FTA contributes to investment. The effects of IIAs on FDI are discussed in the next subsection. This report focuses on BITs and thus does not analyze the trade-investment interrelation.

[1] For example “ASEAN is also considering an ASEAN Comprehensive Agreement on Investment as a part of the process of moving toward an ASEAN Economic Community by 2015.” (Kawai and Wignaraja, 2011, p. 11) This is called the Regional Comprehensive Economic Partnership Agreement (RCEP). “The RCEP seeks to create a liberal, facilitative and competitive investment environment in the region. Negotiations on investment under the RCEP will cover the four pillars of promotion, protection, facilitation and liberalization, based on its Guiding Principles and Objectives for Negotiating the Regional Comprehensive Economic Partnership.” (UNCTAD WIR 2013, p. 103)

3. Theoretical Background

It will be argued that two types of market imperfections arise in investment decisions of foreign investors (section 3.1.), which are related to the fact that foreign investment is sunk and this may create a short-run incentive for governments to change their policies towards foreign investors (section 3.2.). Thus, a credibility problem may arise which ultimately leads to an inefficiently low level of foreign investments (section 3.3.). Are BITs (or investment agreements in general) a remedy to this problem? (section 3.4.)

3.1. Market imperfections

There are mainly two factors that lead to market imperfections in investment decisions: adverse selection and time inconsistency. Both types deal with the impact of the past on future investment decisions. Adverse selection arises on part of the investors and time inconsistency arises on part of (host country) governments.

Information asymmetry is based on a micro-economic perspective and refers to the fact that information about the true intentions of a government may be private, i.e. “when observers lack information about the beliefs and values that are motivating a government to pursue (…)” a certain policy (Tomz, 1997, p. 2; see also Kerner, 2009, p. 74). When observers are domestic investors, this asymmetry may have a serious impact on their domestic investment decisions. The information asymmetry will be larger, if the government in question is a foreign government where it is more costly for the foreign investor to obtain information, especially when dealing with countries that lack credible institutions, e.g. some developing countries. Due to the information asymmetry investor’s expectations will be based on their experience with past policies and this will inter alia determine their future investment decisions. This argument holds independently of the motivation of the policy change. For example, a host country government may have lowered its taxes in the past to attract FDI or in order to maximize the probability of re-election; or a host country government may have raised its taxes in the past due to external pressures for budget consolidation.

The time inconsistency argument has originally been developed with regard to macro-economic policies (e.g. Kydland and Prescott, 1977) but can be applied to micro-based policies as well In the context of foreign investment the time inconsistency problem is of relevance, if the short-term incentives for host country governments are more important than the long-term incentives and thus lead to changes in its behavior against the foreign investor. “In other words, time inconsistency is said to arise if, though nothing has changed (at least ostensibly), these choices are not equal (…)." (quoted from Sasse, 2010, p. 18)

Consequently, the existence of these two types of market failures may serve as an economic justification for government intervention in the area of foreign investment.

3.2. Incentives for governments to change investment policies

The market imperfections described in section 3.1. are not only important from an investor’s point of view, but they create a very serious problem for governments designing their investment policies, because FDI is sunk costs: “Once a firm

undertakes a foreign direct investment, some bargaining power shifts to the host country government, which has an incentive to change the terms of the investment to reap a greater share of the benefits." (Büthe and Milner, 2008, p. 743) This has been termed the "obsolescing bargain". While at first glance, strengthened bargaining power sounds positive from a host country government's view, it bears potentially unpleasant implications.

The importance of the incentive to change the investment policy is related to the two types of market failure described in section 3.1. First, it depends on the extent to which past information asymmetry on part of the actual investors (i.e. the experience of investors with past policies of the host country) impacts on current investment decisions. Countries with a younger history of FDI (some developing countries, transformation countries) will thus have more room to change investment policies than countries which have hosted FDI for a long time.

Second, it depends on the conduct of democratic governments who need to pass elections from time to time have a tendency to discount the long-term too much in favor of the short-term. This may be aggravated in developing countries, as Büthe and Milner (2009, p. 743) argue that „resource-strapped developing country governments may have an even greater incentive than governments in advanced industrialized countries to discount the long term." The aim of such policy changes is to shift the division of surplus from the foreign investment in favor of the government. There are many ways how the host country government may shift the distribution of surplus / profit from the investor to the host state: raising tax levels, raising tariff levels, changes in regulation, fees, selective law enforcement, imposing new labor requirements etc. The most extreme form is expropriation (Guzman 1998, p. 81).

Against this view, one may hold that governments will have enough incentives not to exploit their increased bargaining power, once the investment is sunk. The argument usually put forward is that governments may resist the temptation to seize assets today in order to create or maintain a reputation that will attract future investment (Guzman 1998).

Yet, self-control of the government is unlikely to work in many cases and governments may adjust their investment policies frequently. Yet, investor memories and expectations place restrictions on such policy decisions.

3.3. The credibility problem

Viewed from the foreign investor's perspective, no conduct of the government can be credible, once the incentives described in section 3.2. exist. This is based on a more common reason for market failure, as Inman (1987) points out: Markets cannot enforce cooperative behavior of utility-maximizing or profit-maximizing agents. This leads to Prisoner's dilemma situations. Given the incentives for governments arising from the obsolescing bargain to re-optimize their investment policy, such policies may have a credibility problem. It is noteworthy, however, to emphasize that the existence of market failure is neither a necessary, nor a sufficient precondition for the credibility problem to arise, as there need not be an intent to deceive on the part of the host. It should also be noted, that the dynamic-inconsistency problem remains, even if the information asymmetry is completely avoided, i.e. all information is public.

(Tomz 1997) An investor will not undertake an investment or be able to enter into an efficient agreement with the host country.

As a consequence of the lack of credibility, an efficient investment, which would otherwise have taken place, may not be carried out at all or be carried out in a non-optimal way (too small or too large).

3.4. Policy intervention as remedy to the credibility problem?

Among the policy options to remedy the credibility problem in foreign investment policies, governments have chosen BITs in the overwhelming majority of cases and more recently regional agreements. BITs address the adverse selection problem via their signaling function and the time-inconsistency problem via their protection function.

How does a BIT remedy the credibility problem and generate a credible expectation? Kerner (2009) argues that there are two economic functions of BITs: First, BITs create ex-ante costs (signals) and second, BITs create ex-post costs (commitments). Tomz (1997, p. 5) emphasizes that the interplay between these two functions is important: "In a setting of imperfect information, all commitments are signals but not all signals are commitments."

The signaling function of BITs Signaling in the case of BITs and FDI may be defined as "sending a broadly received "signal" that a country is trustworthy". (Kerner, 2009, p. 74) In other words, doubts about the true intentions of the host country government – stemming from the information asymmetry -- can be reduced at the side of the investors, as they "update" their beliefs when the host country signs / ratifies a BIT. Signing / ratifying a BIT creates serious ex-ante costs on the side of the government as "the host state deliberately renounces an element of its sovereignty" (Dolzer and Schreuer, 2012).

As Kerner (2009, p. 79) points out, BITs can "present enough ex ante costs, or, … sunk costs, that ratifying a BIT credibly signals that a state is predisposed against expropriating from foreign investors. Any investor can observe the signal sent by a ratified BIT, regardless of whether they are protected. To the extent that ex ante costs effectively convey credibility, any investor should be more willing to invest in a state that signs and ratifies BITs."

The protection function of BITs BITs protect investors against some types of political risk through the inclusion of various substantive (e.g. expropriation, unfair treatment) and procedural standards (e.g. investor-state dispute settlement provisions). Thus, BITs "present significant ex-post costs to signatory states that violate the agreement." (Kerner, 2009, p. 74) In this view, a BIT is a commitment device[2], "which should make those commitments more costly to break." (Büthe and Milner, p. 744)

[2] How do commitments raise *ex-post* costs? According to Büthe and Milner (2009, p. 745) formal agreements, such as treaties, make them more visible. Yet, by far the most important reason, why BITs make commitments more credible is the investor-state dispute settlement mechanism included in the majority of BITs.

3.5. Conclusion of theory part

Conceptually, BITs may indeed remedy the credibility problem. Yet, two caveats need to be made as BITs may not be the optimal policy intervention:

First, it should be noted that BITs favor foreign over domestic investors (or more neutral: discriminate between domestic and foreign investors) by treating them differently. Rather, welfare maximizing investment policies should avoid an allocation bias between domestic and foreign investors. Measures referring to all investors alike are a preferable type of investment promotion policy with little side-effects on the allocation of resources (e.g. subsidies or tax breaks, provision of infrastructure).

Second, one needs to assess, whether the conceptual argument of investment promotion effect has any empirical support. It is this latter problem to which we turn now.

4. Empirical Part

4.1. Introduction

In general, empirical results suffer from the fact that the research process is prone to biases. (Stanley and Jarell, 1989) Therefore, particular emphasis will be put on correcting the results for publication bias. This is necessary, as publication selection leads to the main – if not the only – bias of empirical results and thus may seriously distort the evidence and following from it, would lead to misleading policy conclusions. In this endeavor, the technique of meta-analysis will be used to uncover the genuine economic effect of BITs on the basis of existing evidence.

In order to ensure that only the highest quality of empirical results enters into our meta-analysis, we use only results, where a semi-elasticity, as the best measure of the effect in question, can be derived. This derivation of a comparable measure of the effect size is necessary, because the coefficients presented in the underlying empirical studies are not comparable due to different specifications of the underlying empirical models. Rather, they have to be transformed.

There are several reasons, why it may not be possible to derive a semi-elasticity from coefficients: no standard errors or t-values published; necessary information for the derivation of the semi-elasticity, such as mean values of variables, normally included in descriptive tables, may be missing; unclear description of the specification of the empirical model; authors do not bother to reply to our request to provide certain kind of information etc.

One may argue that this does not constitute a problem insofar, as in the meta-analysis the estimation equation may be transformed and use the t-value as its dependent variable and thus the number of observations could be increased by using also t-values from coefficients, where no semi-elasticity can be derived. Yet, our view is that when authors have reasons not to share the necessary information or data or do not want us to use their study at all – even if available on the web for

years and quoted widely in other papers – this is a sign of low quality and these studies are therefore excluded.

4.2. Method

Heterogeneity in empirical results is common in economics and the study of BITs' effects on FDI is no exception. The main aim here is to correct for publication selection bias in the results put forward so far.

Many other biases exist, such as language bias, institution bias etc., but publication selection bias is considered the most serious one. Meta-analysis provides a method which uncovers the size of publication selection bias of results. (e.g. Hedges 1992)

The question here is therefore not only "What is the average result on the effect?", but rather "What is the bias corrected result?" Only the latter provides useful information for decision makers, because it may prevent them from spending too many resources on certain measures -- or commitments in the case of BITs.

Concerning the effect of BITs on FDI, the only plausible prior of the effect of publication bias is an exaggeration of the effect, i.e. more positive results are being published due to the reasons given above. As a starting point, publication selection implies that the reported effect (of BITs on FDI) is positively correlated with its standard error, ceteris paribus. (see Stanley and Doucouliagos, 2012, p. 60). Therefore, the first estimation equation is:

$$effect_i = \beta_0 + \beta_1 SE_i + \varepsilon_i \qquad \text{(equ. 1)}$$

with $effect_i$ is the reported effect of BITs on FDI in study i; SE_i its standard error; and ε_i the error term.

Three empirical models, using weighted least squares, will be used to examine publication bias: Funnel-asymmetry testing (FAT), precision-effect testing (PET) and the precision-effect estimate with standard error (PEESE).

FAT models the publication selection by $\beta_1 SE$ from equation 1 as a measure of asymmetry. β_0 in equation 1 serves as a correction for publication bias, as the expected value of $effect_i$ is β_0 as the standard error goes to zero. Dividing equation 1 by SE_i yields the following estimation equation:

$$t_i = \beta_1 + \beta_0 \, 1/SE_i + v_i \qquad \text{(equ. 2)}$$

Note, as v_i is ε_i / SE_i, its variance should be approximately constant, which avoids the heteroscedasticity problem of equation 1.

First, we test $H_0: \beta_1 = 0$ in order to reveal whether there is publication selection – FAT.

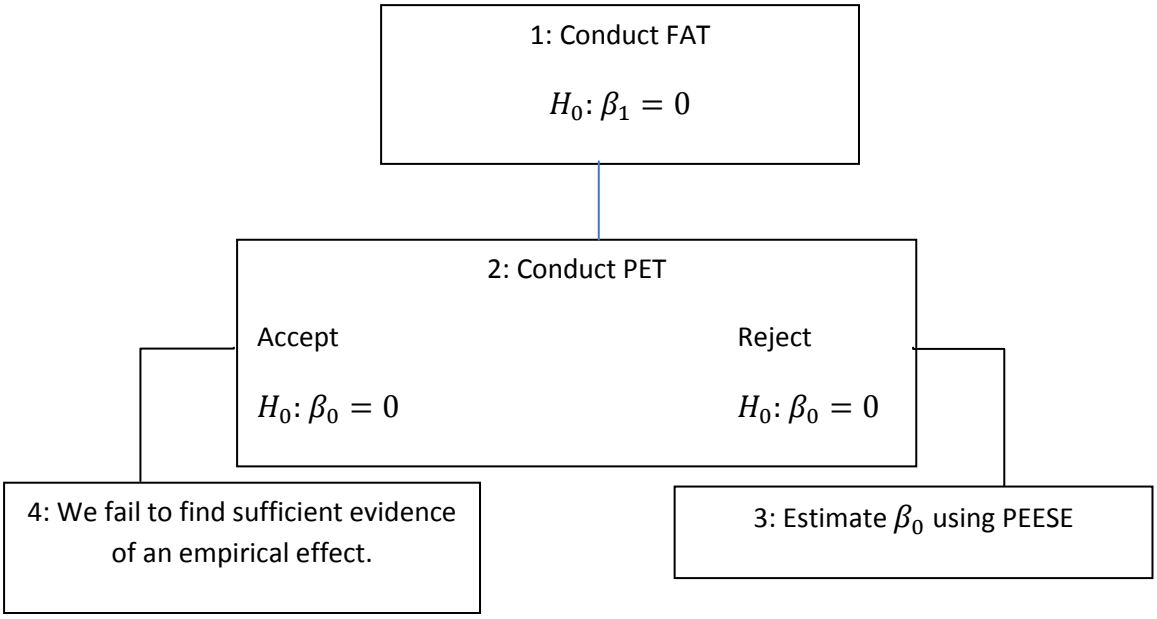
Second, we test $H_0: \beta_0 = 0$ – PET. Is there a genuine underlying empirical effect beyond the potential distortion due to publication selection?

$$t_i = \beta_1 + \beta_0 \, 1/SE_i + v_i \qquad \text{(equ. 3)}$$

Below, the graphical representations of FAT, i.e. the funnel plots will be shown as well. β_0 is the coefficient on precision, $1/SE_i$, which is measured on the y-achsis of the funnel plot.

Third, it has been frequently argued, that PEESE provides a better estimate of the underlying true effect, when there is an effect. Thus, it is recommended to use the PEESE corrected estimate of β_0 from equation 3, "if we have reason to believe that there is a non-zero effect (i.e. rejecting $H_0: \beta_0 = 0$ using equation 2).

These considerations are summarized in the following schema for investigating and correcting publication bias (based on: Stanley and Doucouliagos, 2012, p. 79, Figure 4.7.)



4.3. Dataset

A critical decision is which studies should be included. Our policy regarding the inclusion / exclusion of studies is the following:

Inclusion of *studies* by the following criteria:

- It is possible to derive a semi-elasticity from the coefficients.[3]
- The study is a quantitative study and available in electronic form – not necessarily freely.
- Studies have been published in English language.
- FDI must be the dependent variable in the empirical specification and BITs must appear on the RHS of the equation, yet not necessarily be the variable of main interest in an empirical study.

[3] For the justification see the remarks on the quality aspect of this criterion in the introduction to the empirical part above.

Exclusion of *studies* by the following criteria:
From the start, we have excluded two PhD theses (Tortian 2007, Siegmann 2008), as they contain a host of results and it is difficult to choose the appropriate results.

- In addition, the following studies have been dropped from the dataset, because authors did not want us to use their study, despite it is available on the internet (Jandhyala et al. 2010, because it is too preliminary; and Tobin and Rose-Ackerman 2005, without giving any reason why they did not want us to use their study).
- If an earlier version of a journal paper has been published in working paper / discussion paper form, and the journal paper and its earlier version are very similar, we drop the earlier version, assuming that the refereeing process has led to an improvement of the paper.

Exclusion / loss of *observations* by the following criteria:

- missing standard errors;
- missing mean values of variables, which does not allow to derive a semi-elasticity;
- due to the inclusion of interaction effects with the BIT variable, which makes the coefficient on the BIT variable meaningless, if the overall effect cannot be included;
- exclusion of outliers: semi-elasticities above 300 and below – 300 per cent
- exclusion of coefficients on aggregate BITs, if included besides a BIT dummy;
- exclusion of coefficients on effects in sub-periods;
- exclusion of studies using aggregate outward FDI but not inward FDI
- exclusion of coefficients on the BIT variable, if derived from models other than fixed effects models, where -- in addition to BIT coefficients -- interaction terms with BITs have been used frequently. In this case, the BIT coefficient cannot be interpreted in a meaningful way independently of the interaction effect.
- Exclusion of results on signed BITs: Only results on ratified BITs will be used, as only ratified BITs have legal effect. This does not exclude the possibility that signed BITs may have an impact, too.

The studies used are listed in Annex 1. The first empirical studies dealing with the effect of BITs on FDI date from 1998 and the most recent studies date from 2015 (Lejour and Salfi 2015; Urata 2015), which, however have not been included in the meta-analysis.The initial dataset has 1000 observations, but only subsamples of effect sizes have been used to create the tables below.

4.4. Description of variables

Dependent variable in the meta-analysis: semi-elasticities
Semi-elasticities are the most convenient measure of effect size, as they refer to the percentage increase in FDI due to a one unit change in BITs.

The general form of regression models used is represented by the following simplified equation (neglecting subscripts):

$$FDI = \alpha + \beta BIT + \delta X + \varepsilon,$$

where α is the intercept, BIT is the variable of interest with estimated coefficient β, X is a matrix of the other independent variables that expectedly have an influence on FDI, δ is a vector of coefficients that belong to the variables of matrix X, ε is the error term and FDI represents the dependent variable. In the reduced form of this regression model, other independent variables and the error term are disregarded here.

As the estimating equation in the underlying papers may be specified in level and log form, the coefficients published in various studies have been converted into semi-elasticities as described in Table 1.

As both variables of main interest, FDI and BITs, can be measured in various ways, we classify the elasticities by the following dimensions:

- Measurement of FDI: bilateral between countries versus aggregate for a single country; inward versus outward; stock versus flow.
- Measurement of BITs: in existence or not (dummy) versus cumulative number of BITs. (Sometimes both variables have been used at the same time in studies as explanatory variables.)

This leads to the following classification of semi-elasticities:

- Semi-elasticity 1: BIT as dummy, FDI dyadic, inward, flow
- Semi-elasticity 2: BIT as cumulative in level, FDI aggregate, inward, flow
- Semi-elasticity 3: BIT as dummy in level, FDI dyadic, outward, flow
- Semi-elasticity 4: BIT as cumulative in level, FDI aggregate, outward, flow
- Semi-elasticity 5: BIT as dummy in level, FDI dyadic, inward, stock
- Semi-elasticity 6: BIT as cumulative in level, FDI aggregate, inward, stock
- Semi-elasticity 7: BIT as dummy in level, FDI dyadic, outward, stock
- Semi-elasticity 8: BIT as cumulative in level, FDI aggregate, outward, stock
- Semi-elasticity 9: BIT as dummy, FDI aggregate[4]
- Semi-elasticity 10: BIT as cumulative, FDI dyadic[5]

Independent variables

a. Variables classifying the nominator and denominator of the semi-elasticity

in_out, = 1 if FDI is inward FDI with outward FDI as the base.

bit_dc, = 1 if BIT variable is measured as dummy variable with BIT variable measured as cumulative BITs as the base.

$dyagg$, = 1 if FDI is aggregate FDI with dyadic FDI as the base.

[4] Note: Even it may seem implausible at first sight, this combination is possible, if first only one home country, often the US, has been considered. This combination is therefore classified as bilateral FDI, not aggregate FDI. Second, if the BIT variable is split into BIT-US and BIT-other countries, while aggregate FDI is used as dependent variable. The latter combination has not been used in this report.

[5] Note: This combination is again possible, if cumulated BITs are used as an additional control besides dyadic FDI. The coefficients on these additional controls have not been used in this report.

fdi, = 1 if FDI variable is measured as flow variable with FDI measured as stocks as the base.

b. Variables accounting for publication selection (commonly called K-variables)

These variables describe factors that might affect the researcher's decision to report a given estimate:

SE, the standard error of the reported estimated coefficient.

$prcn$, the inverse of the standard error of the reported estimated coefficient.

nr_obs_years, the number of observation years (T). T affects the number of observations on which the published results rest.

nr_obs, = number of observations (N). N affects the number of observations on which the published results rest.

$study\_size$, = number of calculable semi-elasticities per study. A higher number reflects that an author(s) has / have also performed sensitivity analysis and a low number reflects careful analysis and possibly the presentation of only the preferred specifications etc.

$cite$, number of citations of journal papers. This indicator measures the number of citations according to google scholar. A normalized variable has been used, which is $citenorm = cite/(2014 - publ\_year)$.

c. Variables accounting for heterogeneity (commonly called Z-variables)

Please note as this study does not intend to explain the heterogeneity of empirical effects, these factors, influencing the magnitudes of empirical effects, have only been used to classify the descriptive evidence on effect sizes. They include the following:

$trade\_agr$, = 1 if a model includes the existence of a trade agreement between signatories of BIT. Trade agreements may also stimulate FDI and therefore it is an important control variable besides BITs.

bit_dvng, = 1 if one of the signatories is a developing country, with both signatories are developing countries or both signatories are developed countries as the base). The traditional pattern of BITs was between developed and developing countries, yet recently, BITs have grown strongly also between developing countries. It is quite conceivable that the effects of BITs on FDI differ by the development-stage of countries included in a sample.

$panel$, = 1 if estimate relates to panel data with cross-section or time-series as base.

Table 1 Summary of the derivation of semi-elasticities from coefficients

Specification Dep — indep var	Calculation of semi-elasticity $\varepsilon(s)$	Notes
FDI as dependent variable		
level — level	$\varepsilon(s) = 100 * \hat{b}/\overline{FDI}$	
log — level	$\varepsilon(s) = 100 * \hat{b}$ $\varepsilon(s) = 100 * (e^{\hat{b}} - 1)$ $\varepsilon(s) = 100 * (e^{\hat{b} - 0.5 s^2(\hat{b})} - 1)$	Semi-elasticity: Adjustment necessary, as the independent variable is a dummy variable: • according to Wooldridge (2009) • according to Kennedy (1981) and vanGarderen and Shah (2002); $s^2(\hat{b})$ is the estimator of σ^2, variance.
level — log	$\varepsilon(s) = 100 * \hat{b}/(\overline{FDI} * \overline{BIT})$	
log — log	$\varepsilon(s) = 100 * \hat{b}/\overline{BIT}$	Elasticity $\hat{\varepsilon}$
FDI Ratio (share) as dependent variable; Examples: (FDI/GDP)-share or [FDI(of country i) / FDI(of all countries)]-ratio		
Ratio (share): level — level	$\varepsilon(s) = 100 * \hat{b} * \frac{\overline{GDP}}{\overline{FDI}}$	
Ratio (share): log — level	$\varepsilon(s) = 100 * \hat{b}$	and adjustment as above
Ratio (share): level — log	$\varepsilon(s) = \frac{100 * \hat{b} * \overline{GDP}}{\overline{BIT} * \overline{FDI}}$	
Ratio (share): log — log	$\varepsilon(s) = 100 * \hat{b}/\overline{BIT}$	

$publ\_type,$ = 1 if paper is published in a journal, with book chapter, working paper or discussion paper as the base. Publication selection will be present in all media, yet it is expected that the journal review process contribute in addition to the authors to publication selection.

$topjournal$, = 1 if "Top" according to the citation index in "web of knowledge" among the top 20 per cent in the respective field; with other publication type as the base. "Top" according to the citation index in "web of knowledge" among the top 20 per cent: This yielded the following results: Economics: World Development, law: Harvard International Law Journal, political science: American Journal of Political Science. This also shows how much this issue spans across the disciplines. In addition the Haftel (2010) paper, published in the Review of International Political Economy has been classified as a top journal. Yet, as the "web of knowledge" is no longer accessible, it is based on the ranking by Halkos and Tzeremes (2012).

$publ\_year$, the year of publication. It is assumed that semi-elasticities will decrease over time, as methodology of studies improves over time (e.g. not accounting for endogeneity may result in exaggerated effects); as journal will be less inclined to publish papers with implausibly large effects; yet, may increase over time, as BITs have become more "visible" to investors and thus may enter location decisions more often.

$bit\_us,$ = 1 if one of the signatory countries is US. The US uses a different model BIT than other countries, which may lead to different quantitative effects on FDI.

$int\_bit,$ = 1 if interaction effect with BIT variable is included. It would be of interest to include the total effect, i.e. BIT variable and BIT-interaction variable, yet this is not possible, as the significance of the total effect cannot be established. This variable is used in combination with the next one, fe, for excluding BIT variables, if interaction effects have been used.

$fe,$ = 1 if fixed effects are used with other methods as the base. Variable is used for excluding the semi-elasticity (see reasoning above).

$grav\_model,$ = 1 if the underlying theoretical model is the gravity model with all other models as the base

$other,$ = 1 if neither fe, re, pooled OLS or OLS estimation was used (e.g.time series); with other estimation methods as the base

$endog,$ = 1 if model includes control for endogeneity with no control for endogeneity as the base. 1. The effect of endogeneity is ambiguous: As host and home states stand to lose more the higher their bilateral FDI, failure to account for this endogenous relationship should lead to *over-reporting* of the effect of BITs on FDI and thus larger effect sizes. Yet, in the same vein as the above argument on groups of BITs, host states have the greatest incentives to pursue BITs when their expected gain in FDI is highest, i.e. when bilateral FDI is low. A failure to account for the endogenous relationship would lead to *under-reporting* of the effect of BITs on FDI and thus to smaller effect sizes.

nr_host, number of host countries included. This is an indication of the size and heterogeneity of the sample used in a particular study.

$only\_deving\_host$, = 1 if host countries are only developing countries with mixed (developed and developing) host countries as the base

$long$, = 1 if long-term effect with all other estimates as the base: Short-run vs. long-run effects have been distinguished only by three studies: 12, Egger_Merlo (2007); Peinhardt and Allee (2012) and Buethe and Milner (2014). The distinction of short- and long-run is of interest, as BITs create investor confidence and thus overcome the credibility problem described above only over the long run. Trust cannot be built overnight.

$dset$, 1 = OECD, 2 = UNCTAD, with other datasets as the base. As there are basically only two datasets available, any bias in the results would be of interest.

$prov$, 1 = study controls for investment provisions in regional trade agreements, with no control as the base. There are only three papers – Büthe and Milner (2014), Berger et al. (2013) and Lesher and Miroudot (2006), who examine the effects of investment provisions enshrined in regional trade agreements (usually termed "trade agreement + investment agreement") in addition to BITs, so the evidence is quite scarce.

Table 2 Overview on variables used in the analysis

Moderator variable	Definition
SE	Standard error of the reported estimated coefficient
$prcn$	1/standard error of the reported estimated coefficient
$publ\_type$	Publication type = 1 if paper is published in a Journal, = 0 if book chapter, Working Paper, Discussion paper etc.
$topjournal$	Topjournal = 1 if "Top" according to the citation index in "web of knowledge" among the top 20 per cent in the respective field; with other publication type as the base
nr_obs_years	Number of observation years
nr_obs	= Number of observations
$study\_size$	= Number of usable semi-elasticities per study
bit_us	= 1 if one of the signatory countries is US
int_bit	= 1 if interaction effect with BIT variable is included
$trade\_agr$	= 1 if a model includes trade agreement between signatories of BIT
bit_dvng	= 1 if one of the signatories is a developing country (= 0 if both signatories are developing countries or if both signatories are developed countries)
$panel$	= 1 if estimate relates to panel data with cross-section or time-series as base
$publ\_year$	Year of publication

$grav\_model$	= 1 if the underlying theoretical model is the gravity model with all other models as the base
$other$	= 1 if neither fe, re, pooled OLS or OLS estimation was used (e.g.time series); with other estimation methods as the base
$endog$	= 1 if model includes control for endogeneity with no control for endogeneity as the base
nr_host	Number of host countries included
fe	= 1 if fixed effects are used with other methods as the base
$only\_deving\_host$	= 1 if host countries are only developing countries with mixed (developed and developing) countries as the base
in_out	= 1 if FDI is outward FDI with inward FDI as the base
bit_dc	= 1 if BIT variable is measured as dummy variable with BIT variable measured as cumulative BITs as the base
$dyagg$	= 1 if FDI is aggregate FDI with dyadic FDI as the base
fdi	= 1 if FDI variable is measured as flow variable with FDI measured as stocks as the base
$long$	= 1 if long-term effect with all other estimates as the base
$cite$	Number of citations of journal papers: number of citations according to google scholar
$dset$	1 = OECD, 2 = UNCTAD, with other datasets as the base
$prov$	1 = study controls for investment provisions in regional trade agreements, with no control as the base

4.5. Descriptive Results

This subsection presents a brief overview on the semi-elasticities. The mean value of semi-elasticities ranges from 4 per cent to 13 per cent (see Table 3 and Table 4) and the median values range between 1.9 per cent and 19 per cent, which is a-priori not implausible from an economic point of view.

Due to various factors described above, the results published in scientific journals may differ from those published in working papers, books etc. Our data reveal a substantially higher semi-elasticity for semi-elasticity 5 and a slightly higher one for semi-elasticity 2, while a lower one by the order of 1/3 for semi-elasticity 1, when published in a journal. Interestingly, if only the top journals are considered, for semi-elasticity 1 the picture changes only slightly, but for semi-elasticity 2 the semi-elasticity published in the top journal is 4 times those published in other media.

Over time, there is no convergence of semi-elasticities discernible, independently of their definition. (see Annex 3, Figure 1 and Figure 4).

Based on figures on citations (see variable cite above) we have constructed a ratio which shows the average annual citation of studies. The least number of quotations was 0.625, the largest number almost 40. This is strong evidence that among the 40 studies, very few have been very influential.

Dividing studies / estimates into those derived from models taking endogeneity between BITs and FDI into account, reveal a strong reduction, with the mean value

of semi-elasticity 1 dropping from 24 to 4 per cent and for semi-elasticity 5 from 35 to 6 per cent.

Since mainly two datasets have been used, one from OECD and the other one from UNCTAD, we were interested to see whether semi-elasticities show a bias, but the descriptive evidence across semi-elasticities is inconclusive. Likewise, the evidence about short- and long-run effects as well as between BITs and investment provisions included in trade-agreements does not show systematic differences.

Comparisons across groups of semi-elasticities are interesting, but do not reveal the extent of bias included in the results. The following section addresses this question.

4.6. Results on corrected effect size

Given the large number of different semi-elasticities listed in section 4.4., this suggests to provide a differentiated picture of the effects of BITs on FDI, rather than a catch-all number.[6]

First, *detailed* results on the effects of BITs on the corrected effect size of BITs on inward FDI are presented. (see 4.6.1.) Second, results on the corrected effect size of of BITs on all bilateral FDI, aggregating inward and outward FDI, are presented. (see 4.6.2.) Descriptive statistics underlying FAT, PET and PEESE are presented in Appendix 2, Tables 14-20.

4.6.1. *Detailed* results on the effects of BITs on inward FDI

When BITs are measured as a dummy variable, which is usually the case when bilateral FDI data are used, the effect size measures the marginal impact on FDI of a country-pair, which had no BIT, upon the conclusion of a BIT.

Annex 3, Figure 2 shows the size distributions of semi-elasticities, when BITs have been measured as dummy variable.

Turning to FDI flows first, Table 3 shows that the estimate accommodated for publication selection bias is in the order of 8.2% (standard deviation of 5.2; 11.1). Yet, this is likely to overstate the true effect and hence these effects need to be qualified: first, they do not pass the PET; second, the uncorrected mean of the 10 percent most precise estimates is only half (6.7 percent, see Table 13); and third, according to the funnel plot shown in Annex 3, Figure 3, the most precise estimates are close to zero. This kind of evidence clearly shows that using just single studies or relying on an average effect can be very misleading.

These characteristics also apply qualitatively to FDI stocks (see Annex 2, Table 2) and thus, we have to accept that the literature has failed to provide evidence with respect to an effect of BITs on bilateral inward FDI flows and stocks.

[6] Nevertheless, we have performed the FAT, PET and PEESE also on the overall effect (N=309), controlling in addition for inward FDI vs. outward FDI, bilateral FDI vs. aggregate FDI and BIT dummy vs. BIT cumulative. The results are: there is a genuine effect on FDI, as it passes the PET. However, PEESE reveals that the effect is 2 per cent and thus economically not significant. (see Annex 2, Table 4 andTable 10)

Table 3 Impact of BITs on FDI when BITs are measured as dummy

FDI	N	Unweighted average in %	… corrected for publica-tion bias +)	Size of publication bias in %	Pass the PET?	Economic signifi-cance
			Inward FDI			
Flow	79	13.8	8.2	41	No	Yes
Stock	11	8.7	3.2	63	No	No

***… 1%; **… 5%; *… 10% significance; +) Stanley and Doucouliagos (2012), p. 61, equ. (4.3.)

When BITs are measured in terms of the cumulative stock of BITs, which is usually the case when aggregate FDI country data are used, the effect size measures the marginal effect on FDI of an average country upon increasing its total stock of BITs by an additional BIT.

Annex 3, Figure 4 shows the distribution of the effects over time and Annex 3, Figure 5 the size distribution. Here, we describe results only on FDI flows in Table 4, as FDI stocks yielded too few observations. With a publication-bias corrected semi-elasticity of 2.3 percent, despite being statistically significant, the effect is negligible in economic terms, as FDI flows are highly volatile. In addition, according to the funnel plot (see Annex 3, Figure 6 and Annex 2, Table 13) the most precise estimates are, again, close to zero. The mean value of the 10 per cent most significant estimates is only 16 per cent of the unweighted mean (9.1% inTable 4).

Table 4 Impact of BITs on FDI when cumulative BITs are used

FDI	N	Unweighted average in %	… corrected for publica-tion bias	Size of publication bias in %	Pass the PET?	Economic signifi-cance
			Inward FDI			
Flow	111	9.1	2.3	75	Yes	no
Stock	4	4.0	n.a.	n.a.	n.a.	n.a.

***… 1%; **… 5%; *… 10% significance. n.a. … not applicable;
+) Stanley and Doucouliagos (2012), p. 61, equ. (4.3.)

From this analysis, we conclude that there might be a small effect of BITs on the attraction of FDI flows, yet this effect is due to the more imprecise coefficients and hence, this evidence is not very convincing either.

4.6.2. Effects of BITs on bilateral FDI, aggregating inward and outward FDI

Aggregation of inward and outward FDI is meaningful only on the *bilateral* level, as inward FDI flows or stocks between two countries should be mirrored by the outward FDI of the country-pair, and vice versa for outward FDI.[7] Aggregating bilateral inward and outward FDI leads to a substantial increase in the number of observations

[7] It is true that *in praxi,* inward and outward FDI hardly match *exactly* on the bilateral level. There are many reasons for it, yet the discrepancies are getting smaller over time, which is mainly due to the application of international reporting standards (OECD, UNCTAD).

(N=140). According to the PET in Annex 2, Table 5, there is again no genuine effect of BITs on FDI.

4.7. Summary of empirical part

Taken together, the empirical evidence on the basis of a meta-analysis suggests that the FDI promotion effect of BITs (measured in terms of a semi-elasticity) seems to be economically negligible. This section lists a few explanations for this findings.

A good deal of BITs has been concluded between countries where the danger of dynamic inconsistency of economic policy is low or has decreased over time. As these countries gained stability and growth, their policies vis-à-vis foreign investors have become more predictable, inter alia through supra-national or international commitments (e.g., transition economies joining the EU). In addition, several rights enshrined in BITs may be granted by other agreements as well (e.g. the four freedoms in the EU for new member states). As a consequence, FDI would have been undertaken even in the absence of a BIT.

The availability of substitutes for BITs (like private insurance for some types of political risk, e.g. expropriation; Bonnitcha and Aisbett, 2012) increases the likelihood of an investment abroad even in the absence of a BIT. Moreover, FDI data do not distinguish between FDI covered by BITs and those not covered.

A related issue is “treaty shopping”, which is a common practice of multinational firms: Studies using aggregate FDI data and aggregate number of BITs (see semi-elasticities 4r and 6r) face the problem that FDI data do not reveal, whether the actual FDI has been made from a different country than the country whose BIT is invoked in case of conflict, and hence the measured correlation may be spurious.

As many FDI were made before BITs were concluded between certain country pairs, an important causality issue is present and regression results, however small they are, may therefore overstate the actual effect.

A serious shortcoming of existing studies, namely the fact that most studies have used only the quantity of BITs, but not the quality of BITs, has to be mentioned in this context. Recently, a few studies have been published (Berger et al. 2013) which revealed to what extent treaty content matters. In particular, they have shown that the effect of BITs on FDI depends on whether a certain provision has been included into the treaty or not. Liberal admission rules generally promote FDI, but dispute settlement provisions play a minor role. (Berger et al., 2013, p. 268) This poor measurement of BITs in empirical studies is a strong determinant of their findings.

On the basis of applied methodologies, results of empirical studies must be interpreted mostly as short-run effects. Yet, trust is not built overnight but long-run effects are difficult to derive.

With regard to the FDI promotion effect of BITs, our reading of the results of empirical studies is that BITs do not function “stand-alone”. Rather, BITs indirectly exert an effect on FDI in the context of other determinants of FDI, institutional determinants in particular. (See Leibrecht and Bellak, 2015 for a discussion of BITs

as FDI incentives.) Thus, we do not share the view as expressed e.g. by Busse et al. (2010) who conclude that “BITs may even substitute for domestic institutions.”

From a conceptual point of view, BITs are part of a system of almost 3,000 agreements and in turn are part of a system of international investment law. Once a systemic view is taken (see Poulsen 2011, Poulsen et al. 2013), a lack of coherence in BIT standards as well as in the application of BITs (by arbitration tribunals) is revealed. For example, based on a large number of interviews, Poulsen (2011) reports a severe lack of knowledge on the side of host country authorities about the actual application of treaties. For instance, it is often uncertain and can require lengthy and costly litigation to determine, if a government’s decision to alter the tax policy or incentive regime actually does constitute a breach of the BIT. And different tribunals may come up with different answers based on the same set of facts. Such evidence shows clearly that BITs may not be able to automatically solve both types of market failures and exert a significant positive effect on FDI.

5. Summary

This study set out to discuss the fundamental question of whether IIAs increase Foreign Direct Investment (FDI) from a theoretical and empirical perspective. In the light of the very heterogeneous empirical evidence put forward so far, the innovation compared to earlier studies has been to employ a meta-analysis technique to address this question.

In a nutshell, the positive impact of BITs on FDI suggested by theoretical reasoning has not been confirmed empirically.

However, our results should not be read as implying that BITs are useless, as investor protection may enhance the effects of other types of investment policies and location factors, not least incentives, on FDI. Thus, the BITs’ promotion effect may work mainly indirectly, i.e. via other location determinants, which impact more strongly on FDI, in case a BIT is in place. In other words, BITs may be very helpful for the individual investor in case of problems which arise in the host country, yet BITs do not deliver as a policy to increase aggregate FDI directly. Thus, investor protection is a legitimate policy goal.

Besides, BITs may have a signaling effect, as described in the theoretical part.

While we have to conclude that BITs are not an important means to *attract* FDI through their FDI protection function, BITs may contribute substantially to the *sustainability* of FDI, as they allow taking legal action against the host country government in certain cases. This is not only possible during the existence of the BIT, but also after the BIT has expired (by termination, by elapse of time etc.) as the rights enshrined in BITs are usually guaranteed for a substantial period after expiration.

Apart from these economic considerations, political motives may be strong explanatory factors behind the dramatic growth of BITs. (see e.g., Jandhyala et al. 2011)

The relevant policy decision rests on the extent governments are prepared to tie their hands via IIAs. Commitments enshrined in BITs imply a reduced policy space in other policy areas. This may lead to inefficient policy conduct in other areas, e.g. domestic regulation, and may take the form of "regulatory chill", i.e. that otherwise welfare enhancing policies are not introduced at all or the need to pay compensation (on the basis of an IIA) for the introduction of regulations in the common interest. Therefore, the key decision parameter in signing new IIAs should be the net welfare effect between welfare gains from FDI (which are by no means automatic) and welfare losses from the limitation of the de facto right to regulate in other areas. This study suggests that policy makers should be very cautious in signing IIAs.

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7. Annexes

Annex 1: Empirical literature used in the meta-analysis

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Annex 2: Detailed regression results

1. FAT - PET

Note: all estimation results shown here were derived using STATA reg procedure, weighted least squares, and option cluster; cluster = study; standard errors are heteroscedastic-robust; meta-regression model 4.2. in Stanley and Doucouliagos, p. 61 has been used.

FAT – PET: BIT dummy – inward FDI

Table 1 BIT dummy: FAT-PET on FDI flows (N=79)

Dep var:	*Coefficient*		*Std.Err.*	*t-value*
tstat				
prcn	.0189325		.0191736	0.99
constant	1.767955	**	.5296169	3.34

Note: ***… significant on 1 percent level; **… significant on 5 percent level; *… significant on 10 percent level;
See also descriptive statistics below

Table 2 BIT dummy: FAT-PET on FDI stocks (N=11)

Dep var:	*Coefficient*		*Std.Err.*	*t-value*
tstat				
prcn	.0132413		.0143665	0.92
constant	1.290235		1.020864	1.26

Note: ***… significant on 1 percent level; **… significant on 5 percent level; *… significant on 10 percent level;
See also descriptive statistics below

FAT – PET: BIT cumulative – inward FDI

Table 3 BIT cumulative: FAT-PET on FDI flows (N=111)

Dep var:	*Coefficient*		*Std.Err.*	*t-value*
tstat				
prcn	.0201563	***	.0031216	6.46
constant	.4166666		.261213	1.60

Note: ***… significant on 1 percent level; **… significant on 5 percent level; *… significant on 10 percent level;
See also descriptive statistics below

FAT – PET not applicable for FDI stocks

FAT – PET: Overall effect

Table 4 FAT-PET for all observations in the sample (N=309)

Dep var:	*Coefficient*		*Std.Err.*	*t-value*
tstat				
prcn	.0200201	***	.0031939	6.27
inout	.2381918		.404485	0.59
fdi	-.257537		.4387118	-0.59
dyagg	-.0278076		.2429131	-0.11
bit_dc	1.069095	*	.3638939	2.94
constant	.772421		.643186	1.20

Note: ***… significant on 1 percent level; **… significant on 5 percent level; *… significant on 10 percent level;
See also descriptive statistics below

FAT – PET: all bilateral FDI used (inward and outward)

Table 5 BIT dummy: FAT-PET on inward and outward bilateral FDI flows (N=140)

Dep var:	*Coefficient*		*Std.Err.*	*t-value*
tstat				
prcn	.0300834		.0242978	1.24
constant	1.604068	**	.5217404	3.07

Note: ***… significant on 1 percent level; **… significant on 5 percent level; *… significant on 10 percent level;
See also descriptive statistics below

Table 6 BIT dummy: FAT-PET on inward and outward bilateral FDI stocks (N=48)

Dep var:	*Coefficient*		*Std.Err.*	*t-value*
tstat				
prcn	.0070313		.0109525	0.64
constant	2.090673	***	.4180808	5.00

Note: ***… significant on 1 percent level; **… significant on 5 percent level; *… significant on 10 percent level;
See also descriptive statistics below

2. PEESE

Note: all estimation results shown here were derived using STATA reg procedure, weighted least squares, and options noconst and cluster; cluster = study; meta-regression model 4.3. in Stanley and Doucouliagos, p. 61 has been used

PEESE: BIT dummy – inward FDI

Table 7 BIT dummy: PEESE on FDI flows (N=79)

Dep var:	*Coefficient*		*Std.Err.*	*t-value*
tstat				
SE	-.0102144	**	.0031182	-3.28
prcn	.0818565	***	.0106334	7.70

Note: ***… significant on 1 percent level; **… significant on 5 percent level; *… significant on 10 percent level;

Table 8 BIT dummy: PEESE on FDI stocks (N=11)

Dep var:	*Coefficient*		*Std.Err.*	*t-value*
tstat				
SE	-.1604094		1.018052	-0.16
prcn	.0320008	*	.0093836	0.076

Note: ***… significant on 1 percent level; **… significant on 5 percent level; *… significant on 10 percent level;
See also descriptive statistics below

PEESE: BIT cumulative – inward FDI

Table 9 BIT cumulative: PEESE on FDI flows (N=111)

Dep var:	*Coefficient*		*Std.Err.*	*t-value*
tstat				
SE	.2495046		.3006219	0.83
prcn	.023074	***	.0027066	8.52

Note: ***… significant on 1 percent level; **… significant on 5 percent level; *… significant on 10 percent level;
See also descriptive statistics below
For FDI stocks: not applicable

PEESE: Overall effect

Table 10 PEESE for all observations in the sample (N=309)

Dep var:	*Coefficient*		*Std.Err.*	*t-value*
tstat				
SE	-.0713615	***	.0199674	-3.57
prcn	.0202172	***	.0029331	6.89
inout	.2717		.3657526	0.74
fdi	-.1394313		.3986547	-0.35
dyagg	.5960846		.5494158	1.08
bit_dc	1.748901	***	.3657244	4.78

Note: ***… significant on 1 percent level; **… significant on 5 percent level; *… significant on 10 percent level;

PEESE: All inward and outward bilateral effect

Table 11 BIT dummy: PEESE on inward and outward bilateral FDI flows (N=140)

Dep var:	*Coefficient*		*Std.Err.*	*t-value*
tstat				
SE	-.0104804	*	.005738	-1.83
prcn	.0967268	***	.0208959	4.63

Note: ***… significant on 1 percent level; **… significant on 5 percent level; *… significant on 10 percent level;
See also descriptive statistics below

Table 12 BIT dummy: PEESE on inward and outward bilateral FDI stocks (N=48)

Dep var:	*Coefficient*		*Std.Err.*	*t-value*
tstat				
SE	1.576933		2.873734	0.55
prcn	.0602938	**	.0228511	2.64

Note: ***… significant on 1 percent level; **… significant on 5 percent level; *… significant on 10 percent level;
See also descriptive statistics below

3. Most significant semi-elasticities

Table 13 The ten percent most significant semi-elasticities

Semi-elasticity number	Mean of 10 percent most significant elasticities	Standard deviation	Comparison item: Mean across all observations
1	6.67	4.305522	13.76
5	4.64	3.846631	8.66
2	1.45	1.247492	9.11
6	n.a.	n.a.	4.00

n.a. … not applicable, due to low number of observations

4. Descriptives

Table 14 Semi-elasticities on inward FDI

Variable	Obs	Mean	Std. Dev.	Min	Max
Semi-elasticity 1	79	13.76301	19.14516	-99.98456	53.08345
Semi-elasticity 5	11	8.664829	31.30487	-77.52351	35.39145
Semi-elasticity 2	111	9.111212	30.91182	-26.87501	207.7477
Semi-elasticity 6	4	4.000956	2.129736	.8133263	5.184693

Table 15 Semi-elasticity 1: Variables used in FAT, PET and PEESE

Variable	Obs	Mean	Std. Dev.	Min	Max
tstat	79	2.147805	1.373088	-1.6	6.317356
prcn	79	20.06343	12.78298	.023766	54.49102
SE	79	.9596599	5.578871	.0183516	42.077

Note: tstat … t value; prcn … 1 / standard error; SE … standard error

Table 16 Semi-elasticity 5: Variables used in FAT, PET and PEESE

Variable	Obs	Mean	Std. Dev.	Min	Max
tstat	11	1.542174	1.470094	-1.360532	4.05
prcn	11	19.02673	32.41394	.9114574	113.1579
SE	11	.2653462	.3437095	.0088372	1.097144

Table 17 Semi-elasticity 2: Variables used in FAT, PET and PEESE

Variable	Obs	Mean	Std. Dev.	Min	Max
tstat	111	1.671237	1.997104	-1.277799	8.674418
prcn	111	62.2421	70.5258	.6296297	266.9231
SE	111	.2387375	.3565229	.0037464	1.588235

Table 18 Overall effect

Variable	Obs	Mean	Std. Dev.	Min	Max
tstat	309	1.966337	1.652407	-1.6	8.674418
prcn	309	33.17483	49.17535	.023766	266.9231
SE	309	.434422	2.84974	.0037464	42.077

Table 19 All inward and outward bilateral: FDI flows

Variable	Obs	Mean	Std. Dev.	Min	Max
tstat	140	2.047098	1.497828	-1.6	6.518182
prcn	140	14.72674	11.77861	.023766	54.49102
SE	140	.6953949	4.209456	.0183516	42.077

Table 20 All inward and outward bilateral: FDI stocks

Variable	Obs	Mean	Std. Dev.	Min	Max
tstat	48	2.228006	1.061107	-1.360532	4.52
prcn	48	19.53159	19.05611	.9114574	113.1579
SE	48	.1158152	.1811036	.0088372	1.097144

Annex 3: Figures

Figure 1 BIT dummy: Semi-elasticities over time (blue: inward flow; red: inward stock)

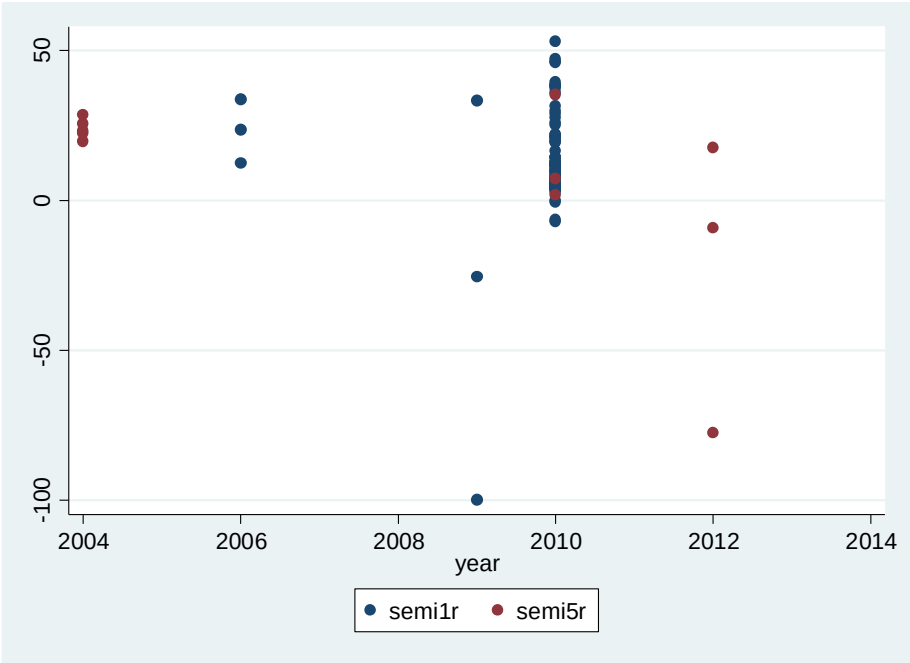


Figure 2 BIT dummy: Histograms for semi-elasticities

inward FDI flows (left) and inward FDI stocks (right)

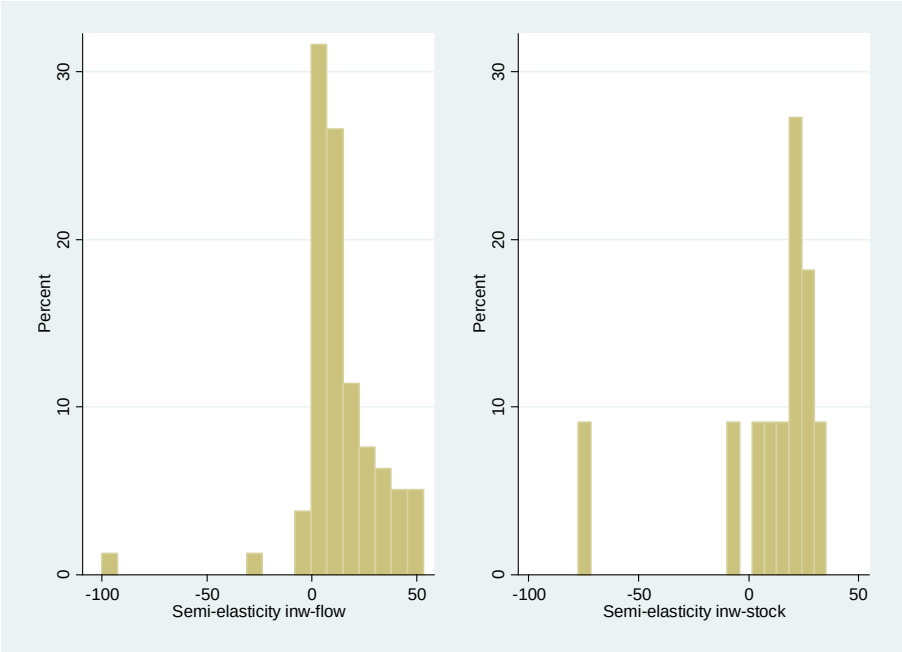


Figure 3 BIT dummy: Funnel plots

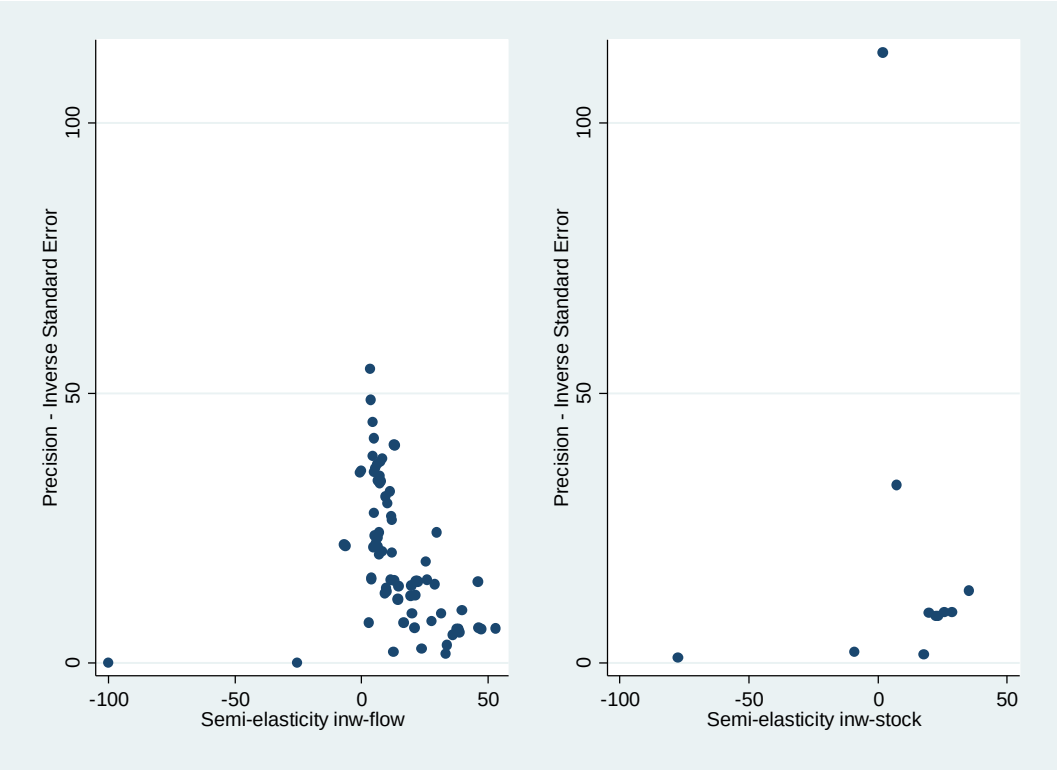


Figure 4 BIT cumulative: Semi-elasticities over time (blue: inward flow; red: inward stock)

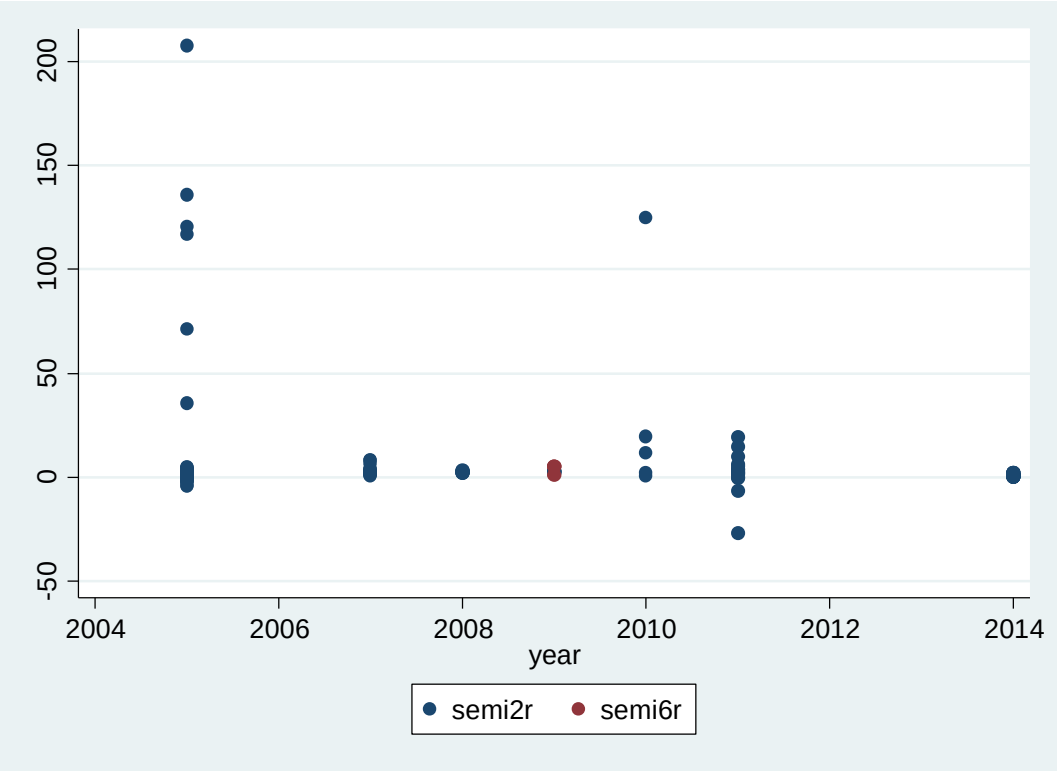


Figure 5 BIT cumulative: Histogram of semi-elasticities inward FDI flows

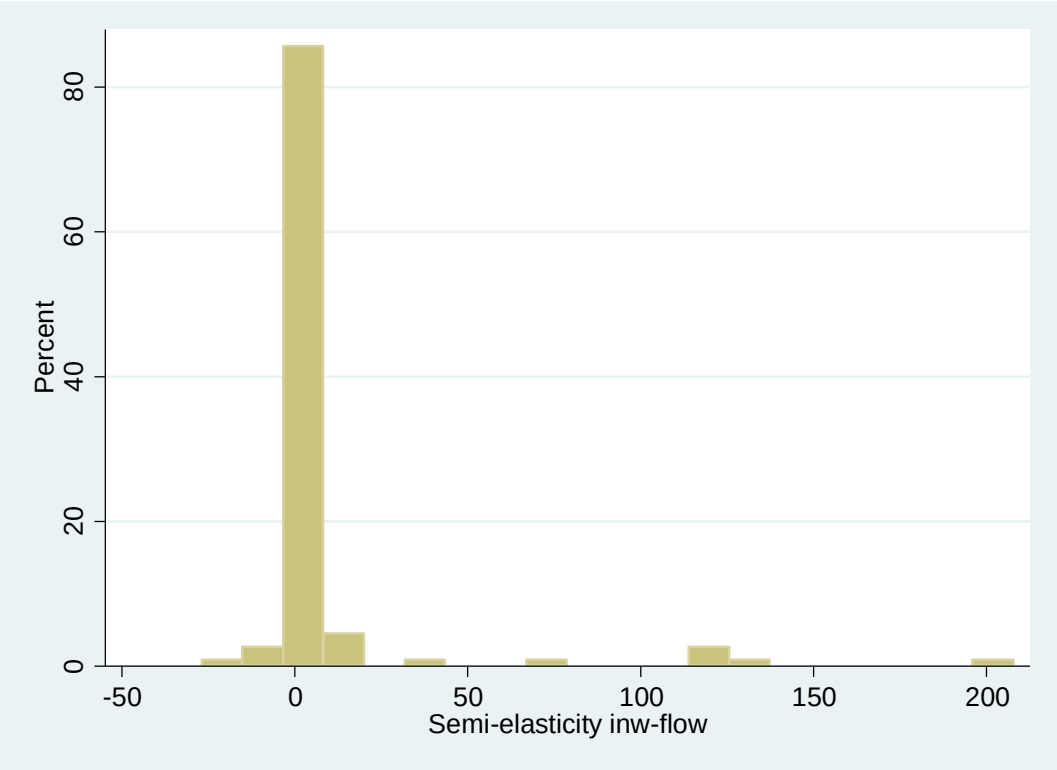
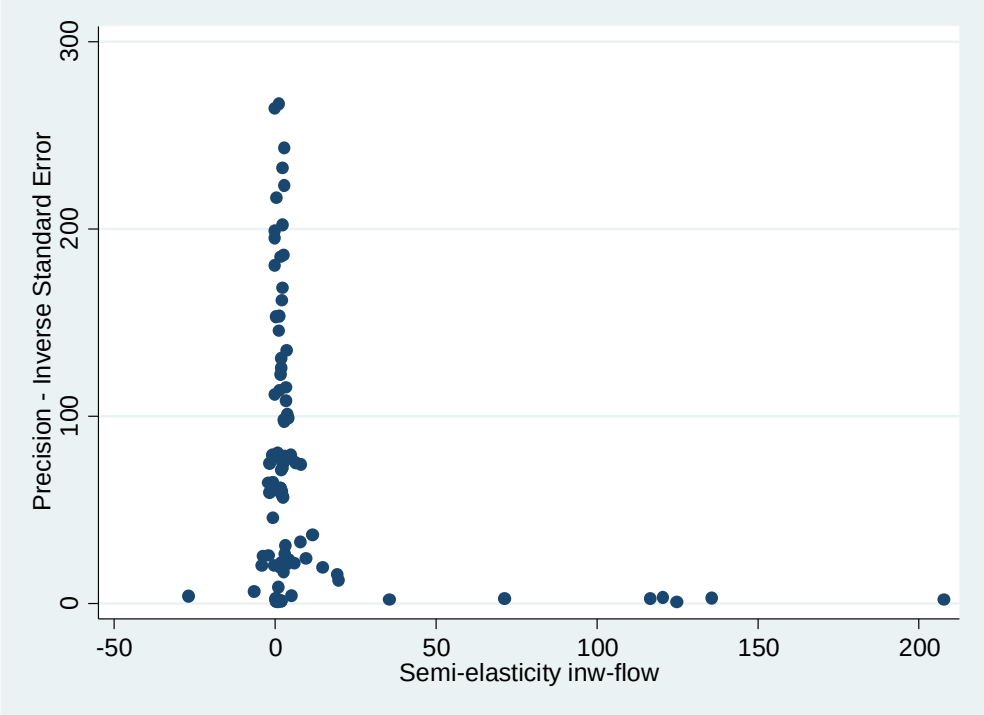


Figure 6 BIT cumulative: Funnel plot



Note: graph for FDI stocks not shown here due to too few obs