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WHAT TYPE OF FDI IS ATTRACTED BY BILATERAL INVESTMENT TREATIES?

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Abstract

Developing countries have increasingly engaged in Bilateral Investment Treaties (BITs) to attract foreign investors. While it is found that BITs are successful in attracting FDI, we argue that the effectiveness of BITs depends on the type of FDI. We find the effect of BITs to differ importantly across sectors of investment. FDI characterized by higher sunk investment costs responds more strongly to the signing of BITs. Given that the development impact of FDI differs according to the sector of investment, our results raise concerns on the effectiveness of BITs in attracting FDI in those sectors where it is considered most beneficial.

Keywords

investment treaties; foreign direct investment; sunk costs; Central and Eastern Europe; development

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1 INTRODUCTION

After a period of reluctance towards foreign direct investment (FDI), since the 1980s developing countries have started opening up to international capital flows, animated by the widely accepted view that foreign investments foster development by creating employment, bringing technology and managerial know-how, and access to foreign markets. Countries started removing barriers to foreign entry in their markets, while implementing favorable policies and undertaking various investment promotion activities aimed at improving the attractiveness of their countries.

Foreign investors often face significant uncertainty regarding the stability of these favorable conditions over time and have to consider that -even though investor-friendly policies were put in place to attract foreign investments- governments may have incentives to reverse course, for example by increasing taxes or by expropriating once investments have occurred.

Bilateral Investment Treaties (BITs) represent one of the main policy tools that governments have used to decrease the (perception of) investment risk and attract foreign investment. By signing a BIT the host country commits itself to fair and equitable treatment of foreign investors. The BIT guarantees compensation in case of expropriation and, most importantly, the host country submits to a binding external dispute settlement mechanism in case of disputes between investors and the state (UNCTAD, 1998). In this way, a BIT removes much of the uncertainty regarding basic ownership rights and the broader regulatory framework that foreign investors would otherwise face.

Since the first BIT was signed between Germany and Pakistan in 1959, the number of such bilateral agreements has been rising very fast. Between 1990 and 2009, the number of BITs signed by developing countries increased from 200 to about 2000. Not surprisingly, this marked evolution attracted the interest of researchers. The empirical findings on the effectiveness of BITs in attracting FDI are highly ambiguous. The use of different host country samples, dyadic or non-dyadic FDI flows, and different methods to account for the potential endogeneity of BITs have led to different conclusions[1]. Hallward-Driemeier (2003) finds little support for the effectiveness of BITs using bilateral FDI flows for a small sample of host countries. Using FDI flows aggregated over source countries and using a larger sample of host countries, Neumayer and Spess (2005) find a positive effect, with a stronger effect of BITs for countries with a weaker institutional quality. Most recent empirical studies using bilateral FDI flows and implementing more convincing methodologies to address for the endogeneity of BITs generally find that BITs do stimulate foreign investments (e.g. Egger and Merlo, 2007; Busse et al., 2010; Berger et al., 2012). Using firm-level information for German investment abroad, also Egger and Merlo (2012) come to the conclusion that BITs generate and increase in FDI.

One of the shortcomings of existing studies is that they all look at the impact of BITs on the overall FDI flows, aggregated over the different types of FDI. However, we argue that the key mechanisms through which BITs are thought to affect FDI, suggest that their effectiveness depends on specific characteristics of the investment project. Foreign investment projects involving larger sunk investments stand to lose more in case of expropriation, and are less likely to be undertaken in an uncertain environment. Also investment projects that are considered politically sensitive are more susceptible to policy reversals and expropriations. The extra protection provided by a BIT is therefore likely to disproportionally benefit these types of

[1] For an overview of the literature, refer to Sauvant and Sachs (2009).

investments. With this chapter we aim to enrich the existing empirical literature by looking for the first time at the heterogeneous effects of BITs.

Understanding which type of FDI is attracted by BITs is especially important because the development implications of foreign investments differ considerably across different types of FDI. This is emphasized in the most recent World Investment Report (UNCTADa, 2012), which introduces a Contribution Index as a first attempt to measure the contribution of foreign affiliates to value added, employment and wage generation, tax revenues, export generations etc.

The expected impact of FDI on the host economy differs widely across sectors of FDI (Nunnenkamp, 2004). Foreign investments will contribute more to poverty alleviation when they are targeted at labor-intensive industries and when interactions with local firms can create spillovers of technology, managerial knowledge and trade networks, leading to higher productivity and, ultimately, to economic growth (OECD, 2002; Mayer-Foulkes and Nunnenkamp, 2009). Resource extraction activities generally tend to be capital intensive, consisting of continuous processes that are not divisible into discrete stages of production (UNCTAD, 2001). Foreign investment in resource extraction therefore tends to operate as "enclaves", with little linkages to the local economy and a low contribution to economic development (Asiedu, 2004; Nunnenkamp, 2004; UNCTAD, 2012a). Investments in the manufacturing sector are believed to be most relevant for the diffusion of advanced technology (Xu, 2000), but also within manufacturing there may be important differences, as the extent of backward linkages with domestic suppliers are found to differ considerably across manufacturing industries (Javorcik, 2004), and spillovers may be limited if the type of manufacturing goods and technologies used have little in common with those of local firms (Kokko, 1994). In the tertiary sector the scope for dividing production into stages and subcontracting parts of production to domestic firms is often limited. Still, in the retail and hotel sector there may be considerable potential for linkages with local input suppliers (UNCTAD, 2001). By studying how the effects of BITs differ across sectors, we will be able to better understand whether BITs successfully attract those foreign investments from which the largest contribution to the developing host countries can be expected.

In order to analyze the heterogeneous effects of BITs across sectors, we use data on FDI stocks for 13 countries in the Former Soviet Union and Central and Eastern Europe. While this relatively small dataset obviously imposes constraints on our empirical analysis as well as on the geographical representativeness of our results, it is the only available source of sectorally disaggregated FDI data that has been collected in a systematic way[2]. Moreover, the specific set of countries in our sample seems to be especially relevant for a study on BITs, both because these countries have increasingly engaged in signing investment treaties since the early 1990s, with 800 new BITs entering into force between 1990 and 2009, and because previous empirical studies have revealed that BITs may be particularly effective for transition economies. In a survey among managers by UNCTAD (2009), BITs were reported to be amongst the most important decision factors when undertaking FDI in transition countries, and more important than for developing countries. In the empirical studies by Busse et al. (2010) and Berger et al. (2012) the effect of BITs is found to be considerably smaller when excluding the transition

[2] The US Bureau of Economic Analysis (BEA) provides sectorally disaggregated information for US outward FDI, but – besides only being representative for US outgoing FDI – the data on FDI in mining and utilities contain a very large number of missing or non-disclosed observations while these are precisely two sectors of primary importance for testing our hypothesis.

countries from the sample, possibly because of the lack of credibility of unilateral measures immediately after the regime change. Moreover, by 2007, transition countries had been involved in 23% of all investor-state disputes, while they had received only 12% of the developing countries' FDI stock (UNCTAD, 2012b-c).

Our estimates for the overall effect of BITs are in line with the recent literature: their impact on the FDI stock is statistically significant and non-negligible, with one additional BIT increasing the stock of FDI by about 1 to 2 percent. But more importantly, our results show that there are large differences in the effectiveness of BITs across sectors: BITs appear particularly successful in attracting foreign investments in the utilities sector, real estate and mining, while no significant effect is found for investments in manufacturing and services. Given that the largest gains in terms of development for the host economies are expected from these latter sectors, our results cast some doubts on whether the success of the BITs signed so far have delivered the expected benefits to the host countries.

In the next section we develop a conceptual framework that explains why we expect the impact of BITs to differ across different sectors of FDI. The third section describes the data and section 4 discusses the empirical estimation strategy. Section 5 contains the results and section 6 concludes.

2 THE HETEROGENEOUS EFFECTS OF BITS ON FDI: CONCEPTUAL FRAMEWORK

Scholars in the fields of law, politics and economics have described how BITs are hypothesized to impact foreign investors' decisions. In this section we analyze conceptually how the effect of BITs could depend on the type of FDI and we formulate hypotheses regarding the sectors for which the impact of BITs can be expected to be larger.

(a) Bilateral investment treaties and investor incentives

As mentioned in the introduction, BITs specify a number of guarantees to foreign investors, including the right to freely transfer funds and assets, minimum treatment standards and protection from expropriation. Expropriation does not only refer to the direct taking of physical private assets. Virtually all BITs also include protection against so-called ‘regulatory takings’, or ‘indirect expropriations’, referring to regulatory acts taken by the host country that deprive investors of the value of their investment, such as changes in the taxation, regulatory measures, or governmental nonfeasance (Reisman and Sloane, 2004). The most crucial component of these treaties is the fact that the signatory partners submit to an international dispute settlement mechanism to ensure this protection (Elkins et al., 2006; Büthe and Milner, 2008; Kerner, 2009).

The need for an external arbitration mechanism, which allows investors to bring claims of treaty violations to international arbitration tribunals (usually the International Centre for Settlement of Investment Disputes, ICSID)[3] is the result of a time inconsistency problem (Vernon, 1971; Simmons, 2000): in order to attract foreign investment, a government can assure investors that it will not expropriate the investments or raise taxes after the investment is made; yet, once the costs of investments are borne by the investors, a myopic host country government might find it optimal to breach its promises and extract rents or expropriate property or funds. Anticipating this behavior, investors will not trust the promises made by the government in the

[3] ICSID was established in 1966 as a member of the World Bank Group. The primary purpose of ICSID is to provide facilities for conciliation and arbitration of international investment disputes between governments and private foreign investors. Other international investment arbitration tribunals are UNCITRAL (United Nations Commission on International Trade Law) or SCC, which is part of the Stockholm Chamber of Commerce.

first place and will refrain from investing in the country. This hold-up problem will thus ultimately lead to underinvestment (Büthe and Millner, 2008; Neumayer and Spess, 2005). By providing a credible commitment device, bilateral investment treaties aim at overcoming this problem, thereby reducing the risk of investment and, ultimately, attracting more FDI (Vandevelde, 1998; Elkins et al., 2006).

The mechanism just described suggests that we should expect foreign investments that involve larger sunk costs and that are more susceptible to expropriation to react more strongly to the signature of a new BIT. A very simple example illustrates this. Suppose an entrepreneur considers a foreign investment project. Starting this project requires a capital investment of K in period 0. The project generates a net return $R_0 > 0$ in period 0, and $R_1 > 0$ in period 1. However, with a probability p –the determinants of which will be discussed in the next section- the host country will expropriate in period 1. In the case of expropriation, the investor will lose a share s of the invested capital K. We assume for now that p is known and only depends on host country characteristics, not on the type of the investment project. Thus, the parameter s expresses the "sunkness" or "irreversibility" of the investment in case of expropriation. Ignoring discount rates or depreciation, the investment will take place if the expected net present value (*NPV*) of the investment project at $t=0$ is positive, or $R_0 + R_1 - psK > 0$. It is clear that, *ceteris paribus*, investments in higher risk countries (high p) or in sectors requiring a higher initial capital investment (high K) and a higher share of sunk costs (high s) are less likely to take place.

In a context where investment can be postponed, the problem of underinvestment in the context of uncertainty becomes even larger, since even investments that are profitable in terms of net present value, may not be optimal to execute. As emphasized by Dixit and Pindyck (1994), all investment projects are at least to some extent characterized by irreversibility, but also by uncertainty and the possibility to choose the timing of investment to some degree. This uncertainty can be related to the company's market prospects, to uncertainty regarding the host country's future policies, or regarding the risk of expropriation. It might therefore be more convenient for an investor to postpone the investment decision and re-evaluate it in a later period, even if the expected present return on investment is positive. The prospective investor is very much like the owner of a call option on the stock of some firm, contemplating whether to keep the option, versus exercising his right to buy the stock in return for an uncertain future return. To illustrate this, consider the case where the entrepreneur in the above example has the possibility of investing in period 0, as before, but has now also the alternative to postpone the investment decision until period 1, when he will know whether or not the government will expropriate. For instance, knowing that elections will take place and a new government will be elected, it might be optimal for the investor to wait till the result of the election is known. The investor may decide to invest only if the new government is more favorable towards foreign investors and will not expropriate, otherwise the investor will not invest. Thus, by postponing the investment till period 1, the investor foregoes the initial return R_0, but also avoids the risk of expropriation. Investment in period 0 will then only take place if the payoff from investing in period 0 exceeds the payoff from waiting and investing in period 1 in case of no-expropriation, which happens with a probability $(1-p)$. Thus, the investor will now invest in period 1 only if $R_0 + R_1 - psK > (1-P) R_1$. A larger probability of expropriation p defers investment by affecting the expected return (*NPV*), as before, but now also by increasing the value of waiting. Therefore, the problem of underinvestment for projects with a high initial capital investment and a high degree of sunk costs will be even larger in a context of political uncertainty.

Signing a BIT reduces *s* to 0 by committing to full compensation in the case of expropriation and by submitting to international arbitration in the case of disputes, and simultaneously reduces the expropriation risk *p*, since expropriation becomes less profitable to the host country. As a result, a BIT directly increases the expected net present value of the investment and leads to more FDI. Moreover, by removing uncertainty regarding the future return on investment, BITs reduce the value of postponing the investment decision for foreign investors, leading to an additional increase in FDI. While this effect might be negligible in sectors with little sunk investment costs, it is likely to be important in sectors with high sunk costs and it seems reasonable to expect a heterogeneous impact of BITs across different sectors of the economy.

(b) Government incentives to expropriate

The capital requirement and the level of sunkness discussed above are not the only dimensions that vary between sectors. The risk of expropriation *p* itself may vary as well: the more valuable the investment is for the host country government, the more inclined the government will be to expropriate it.

Existing studies confirm that the risk of expropriation varies across sectors, with the most frequent targets being investments in natural resource extraction, utilities, mass communications, and (in the 1960s and 70s) banking (Truitt, 1970; Kobrin, 1980). Table 1, which is taken from Hajzler (2012), shows the share of each sector in the number of expropriation acts[4] by

[4] An expropriation act is defined as the involuntary disinvestment of assets of any number of direct investment firms, within a given industry and in a given year. This only concerns direct expropriations. Hence, 'indirect expropriations' or 'regulatory takings' are not considered here. Expropriation acts in the real estate sector are

developing countries between 1960 and 2006. Note that the sector of real estate was not considered in these studies. Moreover, these numbers refer only to direct expropriations, and do not include indirect expropriations. As a result these figures may underestimate the frequency of (direct and indirect) expropriation acts for sectors that are sensitive to adverse regulatory changes rather than to direct expropriations, such as the banking sector which is directly influenced by governments' monetary policy.

[Table 1 about here]

While most expropriation acts are concentrated in the 1960s and 1970s (which corresponds to the period of colonial independence), the number of expropriations has increased again since 1995, mostly in Latin America and Central and Eastern Europe. Expropriation is clearly most prevalent in the primary sector. Communication and utilities also account for a considerable share of the expropriation acts, especially relative to their share in total FDI stock in developing countries of less than 10% (UNCTAD, 2012b). Given that the manufacturing sector makes up more than half of the total stock of foreign investment in developing countries, the share of expropriations in the manufacturing sector appears to be very low.

What determines these differences in expropriation risk across sectors? Three main explanations have been put forward in the literature (Hajzler, 2012). The first one relates to the importance of sunk costs, which is especially clear in resource extracting industries and utilities provision. For example, mineral extraction requires large investments in exploration and

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not reported separately, and are included in 'Other services'. The number of expropriation acts was collected by Kobrin (1987), Minor (1994) and Hajzler (2012) from reports of expropriations published in a wide range of periodicals. For more details refer to the appendix of Hajzler (2012).

excavation infrastructure before revenues are realized. Once the profitability and the quality of mineral deposits is clear, expropriation becomes particularly profitable for the government, referred to as the 'obsolescing bargain' (Vernon, 1971). Similarly, the utilities sector is characterized by high fixed start up costs and relatively low variable costs. Thus, while an investor in these sectors takes a high risk by making a large sunk cost while the returns will only pay off later, as was illustrated above, it is this same feature that makes it interesting for a government to reap the returns once this sunk cost is made.

The second explanation is linked to the firm-specificity of foreign owned knowledge and capacities. Governments can indeed only expropriate capital, but not more immaterial and firm-specific factors of production such as foreign managerial expertise, which may be especially important in many manufacturing and service industries (Eaton and Gersovitz, 1984; Raff, 1992). The returns from investments in sectors where firm-specific knowledge is important might therefore be considerably lower for the government than for the foreign company and, as a consequence, the government will have less incentives to expropriate. Kobrin (1980) provides empirical support for this hypothesis, finding a negative effect of firm-specific knowledge on the probability of expropriation.

Finally, foreign ownership might be politically sensitive in certain sectors and therefore more prone to expropriation. Extractive industries, utilities, railways, communications and national defense are often seen as important to political and economic independence and national security (Kobrin, 1980; Shafer, 2009). Utilities might be considered as basic provisions that should be in public ownership, while natural resources are considered to be owned by the host country and their exploitation by foreign nationals may easily encounter protests, especially when a period of overall poor economic performance in the host country coincides with a period of prosperity in industries that are dominated by foreign owned firms (Kobrin, 1984; Jodice, 1980). Moreover, a sudden increase in mineral prices may result in governments wanting to renegotiate contracts that are suddenly perceived as much more generous to the investor than expected (Duncan, 2006; Engel and Fischer, 2010). Investments in these sectors are therefore likely to face high risks of expropriations or policy reversals.

Overall, this analysis indicates that investments in sectors that require high sunk capital investments, have a low degree of firm-specific skills, and that are more politically sensitive face relatively higher expropriation risks, and are therefore expected to be disproportionally affected by BITs.

(c) Dispute settlement

A first indication that the relevance of BITs may indeed vary across sectors of the economy can be found in the records of investor-state dispute settlement cases at the international investment arbitration courts (mostly ICSID) between 1987 and 2010 (UNCTAD, 2012b). The increasing number of BITs signed resulted in an increased number of claims laid down at the international arbitration courts over that time period. Figure 1 illustrates the share of each sector in the total number of investor state disputes laid down since 1987 and compares it to the share of the sectors in the global FDI stock.

[Figure 1 about here]

Unsurprisingly, the pattern derived from the disputes is largely similar to the one observed based on the number of expropriation acts in Table 1. Given that acts of expropriation are more likely to occur in certain sectors than in others (as was illustrated in Table 1), it is not surprising that also investment disputes more often concern investments in these sectors.

The utilities sector accounts for 23.6% of total disputes, while accounting for only 1.4% of the stock of foreign investments in developing countries. Also the share in total investor-state disputes of mining, agriculture, and real estate (respectively 14.0, 9.6 and 7.0%) is high compared to their share in global FDI stock (respectively 7.7, 0.2 and 1.3%). The number of disputes concerning investments in the manufacturing sector is non-negligible (18.2% of disputes), but is very low when considering that manufacturing makes up 32% of the FDI stock. It is also important to note that within manufacturing, 35% of arbitration cases relate to investment in chemicals, oil refineries and steel production, which are the industries with the highest sunkness proxies within that sector (see Figures A2a and b). Also disputes regarding investments in private services or banking are less frequent (respectively 11.5 and 14% of disputes) relative to their share in FDI stock (30% and 26%). Note that while Table 1 only considered direct expropriations, disputes laid down at the international arbitration courts can also concern 'indirect expropriations'. This may explain why the share of the banking sector in these investment disputes is higher than its share in the records of direct expropriations described in Table 1.

Based on the arguments above on investor and government incentives, sectoral differences in sunk costs, knowledge specificity and political sensitivity, the actual figures on the frequency of expropriations, and number of arbitration cases on the sectoral level, we hypothesize that FDI in certain sectors may be more responsive to the signature or ratification of a BIT than in other sectors. A first goal of the empirical part of our paper will be to quantify these differences by estimating the effect of BITs on the sectoral level.

The irreversibility of the investment emerged as a key determinant both of investor's sensitivity to a given expropriation risk and of the government's incentives to expropriate.

Therefore, a second goal will be to develop proxies for investment irreversibility and investigate to what extent differences in these measures can explain the observed differences in the effect of BITs on investment.

Before showing the empirical strategy and results of this analysis, the next section describes the dataset, and the construction of proxies for investment irreversibility.

3 DATA DESCRIPTION

(a) Datasets

Our sample consists of FDI data for 7 different sectors in 13 countries in Central and Eastern Europe and the Former Soviet Union over the period 1994-2009. Table A1 gives an overview of the countries and years covered in the dataset. We use data on FDI stocks disaggregated by industry, collected by the Vienna Institute for International Economic Studies (WIIW, 2010). We have classified industries into seven economic sectors: agriculture and fisheries (further referred to as agriculture), mining, manufacturing, banking, real estate, utilities, and other private services. Table A2 shows which industries are considered in each of the sectors. Given that FDI data are missing for the agricultural sector in Slovenia and the Slovak Republic, this results in 88 country-sector cross-sectional units, with an average of 11 years of observations per cross-sectional unit[5]. Figure A1 illustrates the evolution of the FDI stock per sector over time for each country separately.

[5] See Table A1 for an overview of the countries and time periods considered in the analysis and Table A2 for the list of industries included in each of the seven sectors.

Table 2 indicates the mean, minimum and maximum volume of the FDI stock in each sector for the countries in our sample and shows the share of each sector in the total FDI stock. With on average 34.5 percent of the total FDI stock, manufacturing is the most important sector for foreign investments for the countries in our sample, followed by private services with 23.8 percent and banking with 18.1 percent. Note that the share of FDI in the agriculture, mining and utilities sector is low for all countries in our sample.

As a robustness test, in the second part of our analysis we make use of the industry disaggregation of FDI which is available for the manufacturing sector. We use FDI stocks for 12 different manufacturing industries in 12 countries (for Bulgaria industry-disaggregated data is missing). Since information on certain industries is missing for some countries, this results in 122 cross-sectional units and 9 time observations on average.

[Table 2 about here]

The dependent variable of our analysis will be the total stock of FDI in the host country in a certain sector, aggregated over the different home countries of investment. The literature has sometimes relied on dyadic FDI data (home-host country pairs) (e.g. Egger and Merlo, 2007; Busse et al., 2010), but the lack of FDI data that are disaggregated at the same time by home country and by sector does not allow us to do the same. However, there are valid arguments for not differentiating FDI by the countries of origin. By signing a BIT, a country commits to the protection and fair treatment of investors of the signatory partner only. Therefore one can argue that only investors from the country that is signing the treaty are expected to react to it. To properly measure this direct "commitment effect", dyadic FDI data are required. However, even though not protected by the BIT themselves, foreign investors may consider a BIT as an easily observable and credible signal that the host country is serious about attracting and protecting

FDI. The more BITs a country engages in, the stronger this signal is (Kerner, 2009). A BIT might thus not only encourage investment from the signatory partner, but there may also be a positive indirect effect on investments from other countries[6]. It can therefore be argued that a dyadic approach may underestimate the effect of BITs on FDI, because it ignores this indirect "signaling effect" (Neumayer and Spess, 2005; Tobin and Rose-Ackerman, 2011).

Information on the signing and ratification of BITs is taken from UNCTAD's IIA database (UNCTAD, 2012b). For each host country, we construct the total number of BITs that are ratified in a particular year as the explanatory variable of interest. We use the number of ratified BITs rather than the number of BITs that are signed, because between the moment of signature and ratification of the treaty several years may pass, and it is only upon ratification that the BITs enters into force and that actual commitments are made[7]. As a robustness check, we will replicate the regressions using the number of signed BITs and show that our main conclusions hold.

Figure A1 in appendix shows the number of BITs signed by each of the host countries in our sample over the period 1994-2009. By 2009, the countries in our sample had signed BITs

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[6] Using a dyadic dataset, Kerner (2009) estimates how bilateral FDI flows react to a BIT signed between the host and the investors' home country (commitment effect) and to BITs signed between the host country and another country (signaling effect). He finds evidence for both, the magnitude being considerably larger for the commitment effect, as expected.

[7] Moreover, states tend to publish the text of treaties and submit them to the United Nations only after ratification, making it difficult to obtain information on the specific provisions before ratification (Yackee, 2008).

with on average 48 countries. Each country engaged in BITs with at least 15 EU member states, and all except Hungary had ratified a BIT with the United States. With respectively 72 and 62 BITs, Romania and Czech Republic are the countries with the largest number of BITs in force by 2009, while Estonia and Macedonia engaged in only 23 and 28 BITs respectively.

We will include a number of control variables that can explain variation in FDI and that are collected from different sources (see the next section for details on their selection). Data on the monthly wage in manufacturing are taken from ILO (ILO, 2012). Political institutional quality is measured through the Political Constraint Index (Henisz, 2006), which is a composite index of variables measuring the political structures and their ability to support credible commitments. It ranges from 0 to 1, with a higher value indicating better institutions[8]. The inflation rate and the measure of trade openness (sum of exports and imports relative to GDP) are taken from the World Development Indicators (World Bank, 2012).

(a) Measuring sunkness across sectors

Sunk costs are difficult to measure precisely and therefore we will use two proxies that have been proposed in the literature. The first proxy is the average fixed capital stock per firm in the sector. The industrial organization literature describes the role of sunk costs as barriers to entry and their impact on firm size and industry structure (Tirole, 1989). High fixed capital

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[8] Since the Political Constraints Index is only available till the year 2007, we set the values for 2008 and 2009 equal to those in 2007. Alternative indicators of political institutional quality suggest that compared to the period before there were little changes in those two years. Our results are in any case robust to the use of alternative indicators such as the Freedom House Index (FHI) (Freedom House, 2012), or the Polity 2 variable (Polity IV, 2012), as well as to the joint inclusion of the three indicators.

requirements are more likely to lead to markets with relatively fewer and larger firms (Ghosal and Loungani, 2000). Following Lambson and Jensen (1998) and Gschwandtner and Lambson (2002), we therefore use the average capital stock per firm, calculated as total real fixed capital stock in the sector over a certain time period divided by the average number of firms in the sector.

The second proxy for sunk costs is the capital-labor ratio as proposed in Cabral (1995) and used for example in Pennings and Sleuwagen (2000) and Gschwandtner and Lambson (2002). Since sunk costs are probably higher in more capital-intensive industries than they are in labor-intensive industries, our second proxy is the capital-labor ratio for each sector, calculated as the average total real fixed capital stock in the sector over a certain time period, divided by the average number of workers in the sector over that time period.

These are certainly not perfect measures for irreversibility. Both proxies may overestimate sunk costs, since they ignore the depreciation and the scrap value of capital. On the other hand, some intangible and recurring sunk costs, such as market research, legal fees, advertising costs etc. are not included in our capital measure. Nevertheless, we believe that - in the absence of detailed firm-level data on sunk costs - these are good approximations and both proxies yield qualitatively very similar results.

Both proxies are constructed based on the micro-data and capital and labor accounts in the EUKLEMS (2011) database. Since complete data is only available for a limited number of countries and years, we constructed both proxies for Germany, which is the largest capital exporter to the countries considered in our analysis[9]. Based on the available data, the capital-labor ratio is averaged over the period 1997-2007 and the capital per firm-proxy is averaged over the period 1991-1997. Because data are missing on the number of firms active in the real estate sector in Germany, we replaced the value of the average capital per firm in the German real estate sector by its corresponding value in The Netherlands. Our results are robust to excluding the real estate sector entirely, or using the value in The Netherlands for all sectors.

The value of these proxies for each of the seven sectors that will be considered in our empirical analysis are presented in Figures 2a and 2b. Our proxies confirm the intuition that utilities and real estate, and to a lesser extent also mining and banking, have the highest degree of irreversibility. In light of our previous analysis, this would suggest that investors in these sectors are more susceptible to uncertain investment environments and would respond more strongly to a credible reduction of this uncertainty through a BIT. The services sector has the lowest value for both proxies and investment in this sector therefore is predicted to be less sensitive to the introduction of a BIT.

[Figure 2a and b about here]

[9] Note that this capital-labor ratio may be a slight overestimation of the true capital-labor ratio for the activities by foreign-owned firms in Central and Eastern Europe compared to domestic companies in Germany because of the relatively lower labor cost in these host countries. Therefore we tested the robustness of our results using the capital-labor ratio for Czech Republic, which in turn might be a slight underestimation, and found all our conclusions to remain valid.

4 EMPIRICAL SPECIFICATION

We will use fixed effects models to estimate the effect of BITs on FDI stocks, thereby effectively considering the impact of an extra BIT on the change in the FDI stock within a host country. Given that it takes some time for FDI to adjust, and in order to reduce simultaneity problems at least to some extent, the explanatory variables are lagged by one year[10]. We start off with the following static specification, reported in column (1) in the results tables:

$$FDI_{is(t+1)} = \beta_s{}'BIT_{it} + \gamma' x_{it} + \tau_t + \mu_{is} + \varepsilon_{ist}$$

$$\text{with } i = 1, \ldots, 13\,;\, s = 1, \ldots, 6;\; t = 1, \ldots, T-1.$$

Here, the subscript i indicates the host country, s indicates the sector and t indicates the year. The error term is composed of an idiosyncratic component ε_{ist} and a country-sector specific fixed effect μ_{is}. Year dummies τ_t are included to capture eventual common shocks in FDI across host countries[11]. The FDI variable (FDI_{ist}) is the logarithm of FDI stock in country i, sector s and year t. Then we introduce a lagged dependent variable as an explanatory variable to

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[10] Lagging all explanatory variables or only the BIT variable by two years instead of one in order to anticipate that FDI may react slowly, does not alter our main results.

[11] For example, 8 countries in our sample accessed the EU in 2005 and two countries followed later. Year dummies largely account for this. Our results are robust to including post-EU-agreement and post-EU-accession dummies. These variables are found not to contribute significantly to explaining foreign investment flows and are therefore not included in the final model.

account for the sluggish adjustment of FDI stocks. The resulting dynamic fixed effects model (column 2) takes the following form:

$$FDI_{is(t+1)} = \alpha FDI_{ist} + \beta_s' BIT_{it} + \gamma' x_{it} + \tau_t + \mu_{is} + \varepsilon_{ist}$$

$$\text{with } i = 1, \ldots, 13\,;\ s = 1, \ldots, 6;\ t = 1, \ldots, T-1.$$

This lagged value of FDI allows us to take into account the sluggish adjustment of FDI over time and its coefficient is expected to be positive and smaller than one.

The explanatory variable of interest is the total number of BITs (BIT_{it}) ratified by host country *i* in year *t*. In a first set of regressions, we analyze the effect of an additional BIT being ratified without allowing the effect to differ across sectors (hence $\beta_s = \beta$), which corresponds to the functional form that has been analyzed in earlier studies. Second, in order to determine whether BITs attract more FDI in certain sectors than in others, we estimate a BIT effect β_s for each sector separately. Finally, to capture what we think is the main explanation for the differential effect of BITs across sectors, we will interact the BIT variable with the de-meaned indicator of the irreversibility of investment for each sector, allowing the effect of a BIT to change linearly as a function of the relative sunkness in a sector using the average capital cost per firm as a proxy for the importance of sunk costs. We test the robustness of our results to using the capital-labor ratio as a proxy. While we use the number of BITs ratified in our basic specifications, we also test the robustness of our results to using the number of BITs signed, which we expect to have a smaller impact on FDI. In addition, we repeat the estimation using the number of BITs ratified with the top 15 capital exporters. We expect the effect of BITs to be larger when the signatory partner is a country with a large stock of outward FDI.

The vector x_{it} consists of a standard set of explanatory variables of FDI. We include the logarithm of the real monthly wage, which can be interpreted as a proxy for labor cost - in which case the expected coefficient would be negative - but it can also be considered a measure for purchasing power or it might capture the productivity of the labor force - in which case we would expect a positive coefficient. Which of these effects is most important for FDI is an empirical question. The level of GDP per capita is omitted because of multicollinearity with the wage variable. An increase in the real wage over time can thus equally well be interpreted as an indicator of economic growth. Inflation is often used as an indicator of macroeconomic stability, and high inflation would be expected to reduce foreign investments. However, while high levels of inflation are found to be bad for growth, at low levels the effect on growth is often found to be positive (Fischer, 1993; Kahn and Senhadji, 2001). As a result, we have no strong hypothesis on the sign of the coefficient. To account for this non-linearity to some extent, we include the logarithmic transformation of the inflation variable. A higher degree of trade openness is expected to lead to an increase in FDI. Finally, a higher value of the Political Constraints Index corresponds to a higher quality of political institutions and a positive coefficient is expected.

While our dynamic fixed effects model takes into account the fact that FDI stocks adjust slowly, it brings along another problem. The inclusion of the lagged values of the dependent variable in a fixed effects estimation causes indeed the so-called ‘Nickell bias’ (Nickell, 1981). To address this problem we resort to the GMM (General Method of Moments) estimator (column 4 in the results tables) proposed by Arellano and Bond (1991)[12]. In particular, we use the forward

[12] Arellano and Bover (1995) and Blundell and Bond (1998) also proposed a system GMM approach in which in addition lagged first-differences are used as instruments for the levels. However, the last approach imposes the

orthogonal deviations transformation (Arellano and Bover, 1995) in which the transformed 'differences to the future mean' are instrumented with past levels of the dependent variable[13]. In our basic specification we will use lags 2 to 4 and in order to limit the number of instruments, we collapse the instrument matrix (Roodman, 2009a). We report the test statistic for the joint validity of instruments: the Sargan tests of over-identifying restrictions, which holds in most of our specifications[14]. We will also prove the robustness of our results to using different lag structures.

Finally, we attempt to address concerns about the potential endogeneity bias in the BIT coefficient. The direction of such bias is not a priori clear. The conclusion of BITs being signed may be (partially) determined by investors lobbying for protection of existing or planned investment projects. Such reverse causality would lead to an overestimation of the real effect. On the other hand, if BITs are more likely to arise in those host countries in which foreign investments flows in at a slower rate compared to other host countries, for instance because of a

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additional assumption of stationarity of the dependent variable (Roodman, 2009b), which is unlikely to hold for FDI stocks in a period of increasing FDI inflows.

[13] The orthogonal deviations transformation removes the fixed effects by subtracting from each observation in t=1,… T-1, the mean of all the remaining future transformations. This minimizes data loss compared to the more commonly used first difference transformation in which both Δy_t and Δy_{t+1} are missing for a missing value of y_t.

[14] The Sargan test is passed for all except one of our main specifications (see Table 5 (5)). For this one specification, an alternative lag structure does pass the Sargan test and provides very similar estimates (see Table A4 in Annex).

lack of credibility, poor infrastructure or poorly developed markets[15], and if this slower build-up of FDI is not fully captured by the control variables, we would underestimate the effect. Note that even if we would not succeed in entirely removing endogeneity and estimate the precise causal effect, this does not undermine our main argument. If investors in high sunk cost sectors are more likely to lobby, this would suggest that our estimated effect partly reflects the fact that a BIT is more likely to arise when high sunk investments are already planned anyway. Hence, even if our estimate reflects a correlation rather than causality, it remains the case that this correlation is found to be higher for sectors with a high degree of irreversibility than for other sectors, which is our main point.

Nevertheless we will make use of two different strategies to solve these potential endogeneity problems and obtain a precise estimate of the causal impact of BITs. First, we add a country-time trend to the dynamic fixed effects specification (column 3), in addition to the country-sector fixed effects, to control for potential different growth paths of FDI stocks across countries when estimating the effectiveness of BITs. Second, in addition to instrumenting the lagged dependent variable, we also instrument the BIT variable in the GMM estimation, using lags 2 to 4 (column 5).

To summarize, in order to properly take into account the evolution of FDI stocks over time and to tackle the different econometric issues, we will report results for five different econometric specifications, in which we progressively refine our estimation strategy: (1) static OLS fixed effects model, (2) dynamic OLS fixed effects model, (3) dynamic OLS fixed effects

[15] Neumayer (2006) finds that developed countries are more likely to sign a BIT with developing countries that are poorer and where investment protection is weak.

model including country-time trends, (4) GMM orthogonal transformation in which the lagged dependent variable is instrumented, (5) GMM orthogonal transformation in which the lagged dependent variable and the BIT variable are instrumented.

5 RESULTS

Table 3, 4 and 5 represent our main results. Table 3 shows the estimated effect of BITs on FDI stocks, without allowing the effect to differ across sectors. The results in Table 4 include a BIT effect for each sector separately. In Table 5, the BIT variable is interacted with the degree of sunkness of each sector.

Table 3 shows the results for specifications (1) to (5) with a common BIT effect across sectors. First of all, as expected, the dynamic models reveal the strong dependency in FDI stocks over time[16]. Bilateral investment treaties are found to have a significant positive impact on FDI stocks in specification (1) to (4). In specification (5) BITs are not found to significantly increase FDI, although p-values vary between 0.09 and 0.25 depending on the specification of lag structures. Based on specifications (3) and (5), which are thought to account best for endogeneity bias, we estimate that ratifying a new BIT increases FDI stocks by about 1 to 2 percent.

[Table 3 about here]

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[16] Note that a pooled dynamic OLS regression without fixed effects (not shown) generates a coefficient of 0.9. The GMM estimate lies in between the pooled OLS and the dynamic FE estimate, which is in line with the theoretical prediction that the pooled OLS estimate is upwards biased and the dynamic FE estimate downwards biased.

A higher monthly wage is associated with an increase in the stock of FDI, suggesting that an increase in purchasing power and labor productivity (and per capita growth in general), rather than low labor costs, explain the inflow of foreign investment. Probably the wage gap between investors' home countries and the host countries in our sample remained large, such that an increase in monthly wages in CEE and FSU did not negatively affect decisions to relocate production activities to these countries which were based on labor cost differentials. This is in line with Konings and Murphy (2006), who find no evidence that low labor costs are the drivers for multinational companies to relocate activities to Central and Eastern Europe. Political institutional quality is found to have a positive and significant effect on FDI in the static model, but once considering the dynamic nature of FDI stock, the significance disappears in most specifications. The effect of inflation is positive in the GMM regressions, but is not robust across specifications. For trade openness a positive and robustly significant coefficient is found.

While these results confirm that BITs succeed in attracting FDI, the actual purpose of this chapter is to analyze whether the effectiveness of BITs varies across sectors. Table 4 shows the estimated effect of BITs for each sector of investment separately. Consistently over all specifications, the estimated coefficients on the BIT variable are larger for FDI in utilities and real estate, banking, mining, and agriculture (ordered from the highest to the lowest estimate) than they are for manufacturing and services. The effect of BITs on FDI in real estate, utilities and banking is robustly significant over all empirical specifications[17]. For manufacturing and services the estimated coefficient is mostly not significantly different from zero. The estimates

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[17] For banking the last coefficient is not significantly different from zero at conventional significant levels, but has an associated p-value of 0.19.

for mining and agriculture are positive and larger in magnitude compared to manufacturing and services, but significance is less robust. Note that these last two sectors also have the smallest share in total FDI and not all countries are equally endowed with resources for agriculture or mining. It is obvious that improved investment protection can only lead to a substantial increase in FDI in mining, if there are considerable reserves of natural resources. If the impact of a BIT varies largely across countries because of different resource endowments, this may explain why the estimate is measured with more error. The estimates on the lagged dependent variable and the control variables are similar to those in Table 3.

[Table 4 about here]

As a next step in our analysis, we analyze whether the degree of irreversibility of investments in these economic sectors provide a plausible explanation for the differences in effectiveness of BITs across sectors, by interacting the BIT variable with a proxy for the importance of sunk costs in each sector (Table 5). In our basic specification we use the capital stock per firm as a proxy, while Table A3 in appendix the shows that results are robust to using the capital-labor ratio instead. In all specifications, sectors with a higher degree of sunk costs are found to be more responsive to a BIT. The coefficient on the BIT variable should be interpreted as the marginal effect of an additional BIT for a sector with the average level of fixed capital stock per firm. Based on specifications (3) and (5) this effect would correspond to an increase in FDI stock by about 2.3%. We calculate the effect of a BIT for a sector with a capital stock per firm at the lowest decile to be 1.1% (though not significantly different from zero), while for a sector with a capital stock per firm at the highest decile, an additional BIT is estimated to increase the FDI stock by 3.9%.

In addition to these basic results, which confirm our hypotheses, we perform a number of robustness tests to verify the sensitivity of our results to alternative specifications. Table 6 reports the results for specification (3) only, which corresponds to the dynamic fixed effects model including country-time trends, but our main conclusions remain valid over the other specifications as well. In the first two columns of Table 6, we report the results when using the date of signature rather than the date of ratification to construct the total number of BITs in each year. As expected, the estimates are lower when using the date of signature and the coefficients for the sector-specific BIT coefficients lose significance, although the variation in the magnitude of coefficients across sectors corresponds to the earlier results. We do find that the effect of signing an extra BIT increases significantly with the importance of sunk costs in the sector, but the coefficient on the interaction term is smaller than it was when using the number of BITs ratified.

When we use the number of BITs ratified with the top 15 capital exporters (columns 3 an 4 of Table 6), we find larger coefficients than in the basic specifications, as expected. BITs are found to be effective for investments in real estate, utilities, and banking. Again, a higher degree of sunk costs corresponds to a larger effect of an additional BIT, and this effect is larger when it concerns a BIT with a major capital exporter.

[Table 5 about here]

[Table 6 about here]

Given that the large sector of manufacturing is composed of industries with very different degrees of irreversible investments, we test whether these different levels of irreversibility affect the effectiveness of BITs also for manufacturing industries (Table 6, last column)[18]. In the same way as was done for sectors, we calculate the capital-labor ratio and the capital cost per firm for each industry and interact this with the BIT variable. The last column of Table 6 shows the results. While for the average level of sunkness, the effect of a BIT on investment in manufacturing for industries with an average fixed capital stock per firm is about zero (see also the result for manufacturing in Table 4), we find that for manufacturing industries with a high degree of sunk costs BITs do seem to matter, with a BIT effect of 1.5 percent for manufacturing industries operating at the 90th percentile of the average fixed capital stock per firm.

Finally, robustness of our basic results to alternative specifications of the GMM approach was tested. Table A4 in appendix reports the results using lags 2 to 3 and lags 2 to 6, with the BIT variable considered endogenous. Although it needs to be noted that not all these specifications pass the Sargan test, the estimated coefficients are similar and our main conclusions seem to be robust.

Overall, our results provide some evidence for BITs having a positive effect on FDI in general, which is in line with the most recent studies showing that BITs are effective, and especially so in transition countries (Busse et al., 2010; Berger et al., 2012). While a significant

[18] The limited size of our sample did not allow to estimate an industry-specific BIT effect, as we did for the sectors, therefore only the model with the BIT variable interacted with the degree of sunkness was estimated. Robustness of these industry-level results to using the GMM specifications could not be tested in a reliable way as the Sargan tests pointed to severe problems of instrument validity.

effect on FDI in general, however, is not robust to all specifications, an interesting pattern shows up when allowing the effectiveness of BITs to vary across the type of FDI.

Our results show that FDI in utilities, real estate and to a lesser extent in banking and mining reacts most strongly to a new BIT entering into force, while for manufacturing and services no significant effect was found. One additional BIT is estimated to increase the FDI stock in utilities by 2.5 to 4%, in real estate by 1 to 3.3% and in banking by about 0.8 to 2.3%. For mining the estimated effect of BITs is lower and less robust than we would have expected based on our conceptual arguments (about 0.6 to 1.7%). For agriculture, coefficients point to an effect of 0.5 to 1.6%, but are not always found to be significantly different from zero. For manufacturing and services no impact of BITs was found. Especially given the political sensitivity and the history of expropriations in this sector, one would expect the result to be more similar to that of the utilities sector. Note that this might be related to the nature of our sample, which does not include major mineral or oil exporting countries. Moreover, mining in Eastern Europe mainly consists of coal mines, concentrated in a few countries[19]. The different nature of mineral mining in certain resource-rich African countries may result in a different reaction to BITs. Hence, for a sample including a larger number of countries with considerable natural resource endowments and mining opportunities, a stronger impact of BITs on mining investments may potentially be found. In this regard, it is interesting to note that in a study on the effectiveness of BITs for 83 developing host countries, Busse et al. (2010) find that the size of the BITs coefficient is lower when excluding the resource-intensive host countries. While the

[19] Mining activities are mainly concentrated in Poland, Romania, Czech Republic and Ukraine and main resources extracted are mining of coal, oil, ore, manganese and gas.

authors of this study find this result surprising (they argue that the availability of natural resources should be such an important determinant of FDI that it would rule out the effect of a BIT), their finding actually supports our hypothesis that investments in the mining sector are particularly responsive to improved protection through BITs because of their high sensitivity to expropriation and policy reversals.

Interacting the BIT variable with a proxy for sunk costs in each sector suggests that higher capital requirements at least partially explain FDI being more responsive to the signing of a BIT in certain sectors than in others; supporting the hypothesis that investment projects with a large degree of irreversibility are more sensitive to risk and more attractive for expropriation by the government and, as a result, more responsive to the protection provided by BITs.

6 CONCLUSION

Developing and transition countries have increasingly engaged in the signing of bilateral investment treaties in order to attract FDI, based on the widely shared view that FDI can contribute significantly to economic development and poverty reduction. However, the degree to which foreign investments can be expected to generate employment, offer access to international technology and know-how and ultimately create growth, varies considerably depending on the type of investment. As phrased in the most recent World Investment Report: “Policymakers should be aware of the different types [of foreign investment], each with distinct development impacts” and “the potential contribution of foreign investment [...] should guide investment policy and targeting effects” (UNCTAD, 2012a, p. 112-113). We therefore believe that it is important to understand not only whether bilateral investment treaties effectively succeed in attracting foreign investments, but also which types of investments they are able to attract.

Recently several studies have addressed the more general question on the effectiveness of BITs, but no study has looked into the potential heterogeneous effects that these treaties might have on different types of FDI. In this chapter we try to answer this second question by distinguishing the effect of BITs on investments in different economic sectors. We argue that BITs can be expected to be most effective in those sectors with large sunk costs, relatively low levels of firm-specific know-how and sectors that are politically sensitive to foreign ownership. Our empirical results confirm that especially for investments in the sectors of utilities and real estate, and to a lesser extent for banking and mining, BITs have a robust and economically significant effect on FDI stocks. For foreign investments in manufacturing and services, BITs seem not to play a major role in investment decisions.

The small sample of countries in this study obviously limits the external validity of our findings. The impact of BITs on FDI in the mining sector may be very different in African countries with large amounts of FDI directed to the mining of high value minerals. Before extrapolating our results to other countries, a similar analysis on different and broader sets of countries would therefore be desirable. Nevertheless, we do think our results are important in that they are the first to point to a different impact of providing investment protection for different sectors of foreign investment. Given the considerable differences in the development impact to be expected from different types of FDI, our results question whether BITs are the most effective tool to attract those types of investments that are most beneficial for the development of the host economy. Finally, our results suggest that there is a strong need to better understand the heterogeneous effect of FDI across sectors on the host economy, and on the type of investments that are enhanced by policies aiming to attract foreign investments with the aim of stimulating economic development in developing countries.

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FIGURES

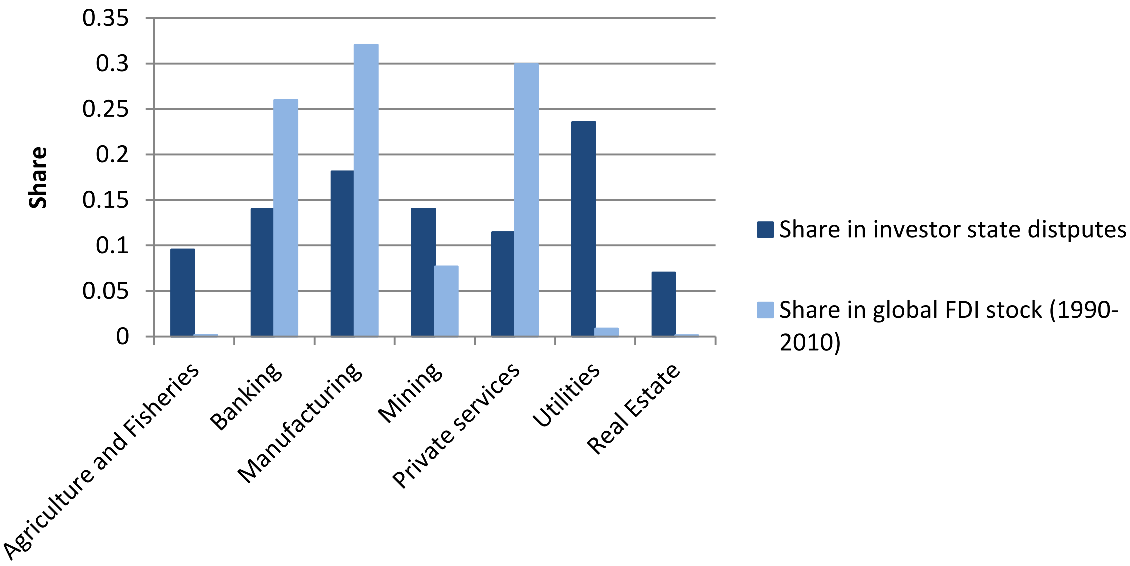

Figure 1. Sector shares in total FDI stock (1990 and 2010) and investor state disputes per sector (1987 – 2010)

Source: Authors' calculations based on UNCTAD (2012b), IIA database for investor state disputes and UNCTAD's WIR (2010) for data on sector shares in global FDI stock in 1990 and 2010.

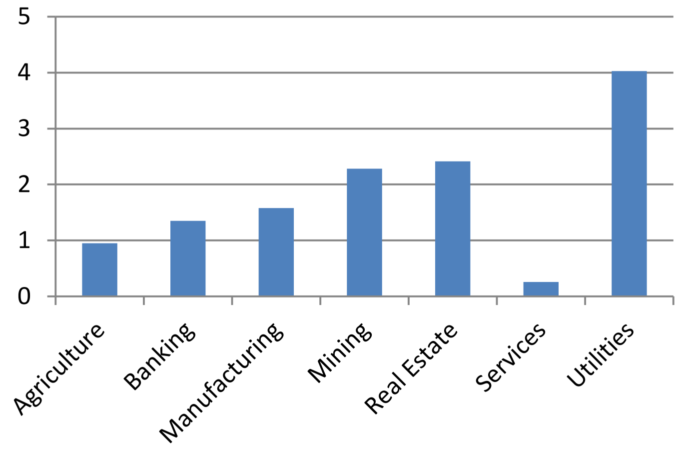

Figure 2a. Fixed capital stock per firm (in logarithm) by sector (Germany, 1991-1997)

The fixed capital stock per firm is calculated as the ratio of the real fixed capital stock (in million EUR) to the number of firms in each sector.
Source: EU KLEMS (2011)

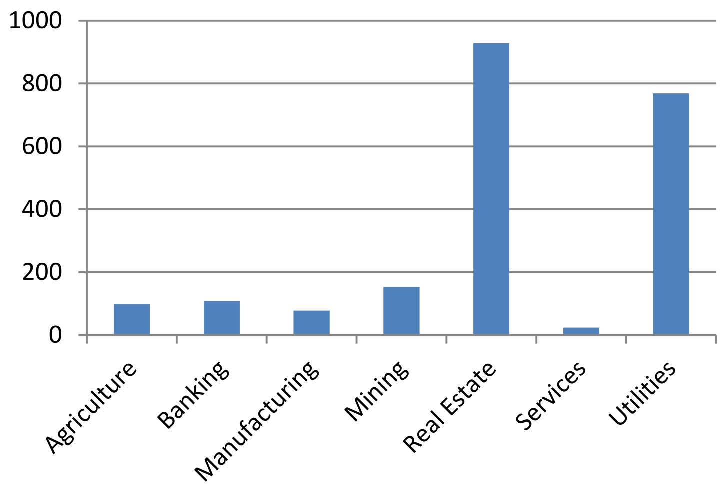

Figure 2b. Capital-labor ratio, by sector (Germany, 1997-2007).

The capital-labor ratio of each sector is calculated as the ratio of the real fixed capital stock (in million EUR) to the number of engaged persons (in thousands).
Source: EU KLEMS (2011).

TABLES

Table 1. Sector and Time Patterns of Expropriation Acts in Developing Countries: 1960-2006

	1960-69	1970-79	1980-89	1990-99	2000-06
Share in total expropriation acts (%)					
Primaries	**36.8**	**40.4**	**52.9**	**31.8**	**48.1**
Agriculture	8.8	8.7	36.3	0.0	11.1
Mining	11.8	12.3	0.0	22.7	18.5
Petroleum	16.2	19.4	17.6	9.1	18.5
Manufacturing	**25.7**	**27.4**	**23.5**	**13.6**	**14.8**
Services	**37.5**	**31.4**	**23.5**	**54.5**	**37.0**
Banking	12.5	11.6	0.0	0.0	0.0
Communication	1.5	2.4	0.0	0.0	7.4
Trade	7.4	4.0	5.9	4.5	3.7
Transportation	5.9	3.3	5.9	4.5	3.7
Utilities	10.3	4.5	0.0	18.2	11.1
Other services	0.0	3.8	11.8	18.2	11.1
Total number of expropriation acts					
	136	423	17	22	27

Taken from Hajzler (2012). Sources: Kobrin (1984), Minor (1994) and Hajzler (2012).

Table 2. Sector shares in total FDI stock for the countries in our sample (average over 1994-2009)

Sector	Total inward FDI stock (million euros)	Share in total FDI stock (%)		
	Mean	Mean	Minimum	Maximum
Agriculture and Fisheries	115	0.8	0.1	2.2
Banking	3,308	18.1	10.6	33.5
Manufacturing	6,085	34.5	14.9	44.8
Mining	271	1.3	0.1	5.1
Private Services	4,181	26.8	5.4	18.8
Real Estate	2,181	9.6	1.7	17.7
Utilities	764	3.6	0.8	6.7

Source: Author's calculations based on WIIW (2010)

Table 3. Regression results: common BIT coefficient

	(1) Static FE	(2) Dynamic FE	(3) Dynamic FE, country trends	(4) GMM	(5) GMM, BIT endogenous
L.FDI stock, Ln		0.672***	0.623***	0.861***	0.813***
		(0.0227)	(0.0246)	(0.101)	(0.0763)
BITs in force	0.0136***	0.00931***	0.0207***	0.0109***	0.0179
	(0.00615)	(0.00417)	(0.00876)	(0.00444)	(0.0163)
Monthly wage, Ln	0.560***	0.433***	0.221	0.392***	0.456***
	(0.192)	(0.148)	(0.212)	(0.159)	(0.191)
Inflation (%), Ln	-0.00813	0.0277	-0.0104	0.0526***	0.0484**
	(0.0328)	(0.0219)	(0.0254)	(0.0261)	(0.0258)
Political Constraints	0.636***	0.207	0.0573	0.119	0.186
	(0.258)	(0.174)	(0.193)	(0.191)	(0.202)
Trade (%GDP), Ln	0.613***	0.417***	0.447**	0.394***	0.436***
	(0.251)	(0.172)	(0.242)	(0.185)	(0.188)
Observations	933	853	853	745	745
Country-sector fixed effects	Y	Y	Y	Y	Y
Time dummies	Y	Y	Y	Y	Y
Country-time trends	N	N	Y	N	N
GMM lag structure				lags (2-4)	lags (2-4)
Number of instruments				22	24
AR(2)				0.68	0.60
(p-value)				(0.528)	(0.552)
Sargan test				0.16	6.33
(p-value)				(0.925)	(0.176)

Standard errors in parentheses. * $p < 0.15$, ** $p < 0.10$, *** $p < 0.05$

Table 4. Regression results: separate BIT effect for each sector

	(1) Static FE	(2) Dynamic FE	(3) Dynamic FE, country trends	(4) GMM	(5) GMM, BIT endogenous
L.FDI stock, Ln		0.654***	0.590***	0.839***	0.780***
		(0.0232)	(0.0254)	(0.0965)	(0.0676)
BITs* Agriculture	0.00155	0.00460	0.0163*	0.00739	0.0169
	(0.0101)	(0.00778)	(0.0110)	(0.00876)	(0.0159)
BITs* Banking	0.0201***	0.00857*	0.0231***	0.00914*	0.0179
	(0.00796)	(0.00567)	(0.00933)	(0.00608)	(0.0139)
BITs* Manufacturing	-0.0127*	-0.000130	0.0123	0.00521	0.00805
	(0.00795)	(0.00569)	(0.00931)	(0.00644)	(0.0144)
BITs* Mining	0.00511	0.00612	0.0174*	0.0110	0.0137
	(0.00946)	(0.00724)	(0.0106)	(0.00793)	(0.0149)
BITs* Real Estate	0.0479***	0.0160***	0.0335***	0.0104*	0.0235**
	(0.00810)	(0.00589)	(0.00973)	(0.00712)	(0.0143)
BITs* Services	-0.00507	0.000807	0.0137*	0.00532	0.00765
	(0.00796)	(0.00568)	(0.00930)	(0.00617)	(0.0142)
BITs* Utilities	0.0309***	0.0253***	0.0412***	0.0262***	0.0312***
	(0.00861)	(0.00613)	(0.00987)	(0.00649)	(0.0144)
Monthly wage, Ln	0.538***	0.401***	0.224	0.371***	0.429***
	(0.185)	(0.147)	(0.209)	(0.156)	(0.174)
Inflation (%), Ln	-0.0100	0.0269	-0.0179	0.0509***	0.0474**
	(0.0316)	(0.0217)	(0.0250)	(0.0256)	(0.0252)
Political Constraints	0.643***	0.209	0.0716	0.125	0.192
	(0.249)	(0.173)	(0.190)	(0.187)	(0.190)
Trade (%GDP), Ln	0.624***	0.394***	0.463**	0.371***	0.421***
	(0.242)	(0.171)	(0.238)	(0.182)	(0.181)
Observations	933	853	853	745	745
Country-sector fixed effects	Y	Y	Y	Y	Y
Time dummies	Y	Y	Y	Y	Y
Country-time trends	N	N	Y	N	N
GMM lag structure				lags (2-4)	lags (2-4)
Number of instruments				28	42
AR(2)				0.49	0.45
(p-value)				(0.521)	(0.650)
Sargan test				0.36	14.44
(p-value)				(0.834)	(0.566)

Standard errors in parentheses. * $p < 0.15$, ** $p < 0.10$, *** $p < 0.05$

Table 5. Regression results: BIT variable interacted with sunkness using capital-per-firm proxy.

	(1) Static FE	(2) Dynamic FE	(3) Dynamic FE, country trends	(4) GMM	(5) GMM, BIT endogenous
FDI stock, Ln		0.662*** (0.0226)	0.607*** (0.0245)	0.841*** (0.102)	0.807*** (0.0782)
BITs in force	0.0139*** (0.00606)	0.00930*** (0.00413)	0.0229*** (0.00866)	0.0109*** (0.00438)	0.0223 (0.0160)
BIT*Sunkness	1.163*** (0.227)	0.648*** (0.164)	0.733*** (0.162)	0.518*** (0.189)	0.710*** (0.324)
Monthly wage, Ln	0.534*** (0.189)	0.406*** (0.147)	0.202 (0.209)	0.377*** (0.156)	0.461*** (0.189)
Inflation (%), Ln	-0.0103 (0.0323)	0.0272 (0.0217)	-0.0160 (0.0251)	0.0516*** (0.0257)	0.0468** (0.0257)
Political Constraints	0.642*** (0.255)	0.208 (0.173)	0.0710 (0.190)	0.128 (0.189)	0.210 (0.202)
Trade (% GDP), Ln	0.585*** (0.248)	0.389*** (0.170)	0.453** (0.239)	0.376*** (0.182)	0.419*** (0.187)
Observations	933	853	853	745	745
Country-sector fixed effects	Y	Y	Y	Y	Y
Time dummies	Y	Y	Y	Y	Y
Country-time trends	N	N	Y	N	N
GMM lag structure				lags (2-4)	lags (2-4)
Number of instruments				23	27
AR(2) *(p-value)*				0.52 (0.603)	0.44 (0.657)
Sargan test *(p-value)*				0.32 (0.854)	11.50 (0.074)

Standard errors in parentheses. * $p < 0.15$, ** $p < 0.10$, *** $p < 0.05$.

Table 6. Regression results: Robustness tests with alternative BIT variables (1-4) and manufacturing industries (5)

	Dynamic FE, country trends (BITs signed)		Dynamic FE, country trends (BITs with top 15 capital exporters)		Dynamic FE, country trends (Manufacturing industries)
L.FDI stock, Ln	0.610***	0.624***	0.611***	0.622***	0.590***
	(0.0256)	(0.0247)	(0.0252)	(0.0245)	(0.0227)
BIT* Agriculture	-0.000339		0.0147		
	(0.0131)		(0.0299)		
BIT* Banking	0.00463		0.0301*		
	(0.0108)		(0.0206)		
BIT* Manufacturing	-0.00707		0.00475		
	(0.0108)		(0.0205)		
BIT* Mining	-0.000538		0.0380		
	(0.0125)		(0.0303)		
BIT* Real Estate	0.0137		0.0478***		
	(0.0110)		(0.0217)		
BIT* Services	-0.00568		0.00695		
	(0.0108)		(0.0205)		
BIT* Utilities	0.0131		0.0842***		
	(0.0113)		(0.0235)		
BITs		0.00320		0.0309	0.00639
		(0.00984)		(0.0261)	(0.00621)
BITs*Sunkness		0.533***		2.615***	0.250***
		(0.193)		(0.746)	(0.122)
Monthly wage, Ln	0.328*	0.312*	0.365**	0.354**	0.273*
	(0.208)	(0.207)	(0.209)	(0.211)	(0.174)
Inflation (%), Ln	0.00141	0.00242	-0.00172	0.00190	0.00607
	(0.0247)	(0.0247)	(0.0244)	(0.0244)	(0.0183)
Political Constraints	-0.00789	-0.00946	0.00988	-0.0170	0.123
	(0.191)	(0.191)	(0.189)	(0.189)	(0.149)
Trade (% GDP), Ln	0.478***	0.468**	0.473***	0.440**	0.206
	(0.242)	(0.242)	(0.240)	(0.242)	(0.216)
Observations	853	853	853	853	1156

All specifications include country-sector fixed effects, time dummies and country-time trends. Standard errors in parentheses. * $p < 0.15$, ** $p < 0.10$, *** $p < 0.05$.