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No. 1800 | October 2012

Web: www.ifw-kiel.de

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What Drives India's Outward FDI?

Peter Nunnenkamp, Maximiliano Sosa Andrés, Krishna Chaitanya Vadlamannati, Andreas Waldkirch

Abstract:
We empirically assess the determinants of India's FDI outflows across a large sample of host countries in the 1996-2009 period. Based on gravity model specifications, we employ Poisson pseudo maximum likelihood (PPML) estimators. Major findings include: India's outward FDI is hardly affected by motives to access raw materials or superior technologies. Market-related factors appear to have dominated the location choices of Indian direct investors. A larger Indian diaspora in the host countries attracts more FDI. Finally, it seems that Indian direct investors are relatively resilient to weak institutions and economic instability in the host countries. However, we do not find robust evidence that India provides an alternative source of FDI for countries that traditional investors tend to avoid.

Keywords: FDI outflows, gravity model, PPML, India.

JEL classification: F21

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1. Introduction

The boom of foreign direct investment (FDI) inflows to India since the liberalization of regulations in the early 1990s is well documented and its driving forces have been analyzed in several empirical studies (e.g., Balasubramanyam and Mahambare 2003; Kumar 2006; Mukim and Nunnenkamp 2012).[1] However, the opening up of the Indian economy had also the effect that "Indian firms have begun to go global" (UNCTAD 2006: 131). India's outward FDI stocks amounted to little more than ten percent of its inward FDI stocks in 2000 (US$1.7 billion compared to US$16.3 billion).[2] Ten years later, outward stocks were almost half the size of inward stocks (US$92.4 billion compared to US$197.9 billion). While India did not appear on earlier rankings of major sources of FDI outside the OECD area (UNCTAD 2006: 113), it belonged to the top 10 developing and transition economies in 2010.

In contrast to the driving forces of the boom of FDI in India, little is known about the determinants of location choices by Indian direct investors. Closing this gap is particularly relevant for other developing countries that are increasingly drawing on non-traditional sources of FDI. Various developing countries have been avoided by OECD-based multinationals, whereas their non-OECD peers appear to be better prepared to explore new territory. The share of developing host countries is typically higher for FDI from non-traditional sources.[3] However, empirical evidence on what precisely attracts FDI from these sources is still scarce.

Sosa Andrés et al. (2012) use UNCTAD data on bilateral FDI flows, finding *inter alia* that access to raw materials represents a minor determinant of FDI from some non-traditional sources. This is in contrast to widespread belief, but India and other important new sources such as China are not considered by Sosa Andrés et al. (2012) as comparable data were not

[1] However, Huang and Tang (2012: 104) argue that "India's FDI liberalization has lagged domestic liberalization."
[2] For details see UNCTAD (2011: Annex table I.2).
[3] According to Aykut and Ratha (2003), more than one third of FDI flows to developing countries originated from other developing countries in the 1990s already. Chakrabarti (2001) provides rigorous sensitivity analyses of the determinants of FDI from traditional sources.

available from UNCTAD.[4] Recent studies focusing on selected non-traditional sources also suffer from data constraints. This applies especially to China which publishes data on outward FDI in line with international standards only since 2003 (Cheung et al. 2011).[5] According to Mlachila and Takebe (2011: 4), there are "almost no readily available and relatively reliable data on FDI" from the remaining three so-called BRICs (Brazil, Russia, and India – besides China) in low-income host countries.

Yet Indian authorities have collected detailed information on outward FDI that has hardly been used in the previous literature to systematically assess the determinants of location choices. Most of the previous literature on Indian FDI is purely descriptive.[6] Pradhan (2011) provides a notable exception. This author employs annual data on FDI outflows for eight years from the Ministry of Finance to assess the determinants of location choices.[7] We extend the period of observation to 1996-2009.[8] We use gravity type models and employ the Poisson pseudo maximum likelihood (PPML) estimator with robust standard errors to achieve consistent estimates on the determinants of India's outward FDI. Furthermore, we interact FDI determinants with time dummies to assess changes over time in their relative importance.

The structure of the paper is as follows. We review the relevant literature in order to develop our hypotheses in Section 2. Section 3 discusses our methodology and sample selection. We present the empirical results in Section 4. We find that market-related factors, rather than motives to access raw materials or superior technologies, have dominated the location choices of Indian direct investors. India's outward FDI proves relatively resilient to

[4] Gao's (2005) sample of non-traditional sources suffers from similar limitations. Gao finds that FDI from five developing economies in East and Southeast Asia (Malaysia, Singapore, South Korea, Taiwan and Thailand) exhibits some distinctive features, compared to FDI from developed OECD countries.

[5] Buckley et al. (2007) use approved (instead of realized) Chinese FDI outflows, as we do in the following for India.

[6] Recent contributions offering detailed stylized facts include Nayyar (2008), Pradhan (2008), Milelli et al. (2010), and the collection of papers edited by Sauvant and Pradhan (2010). In addition, there is a much smaller literature focusing on the characteristics of Indian firms as push factors of outward FDI. Notable examples of this strand of the literature include Pradhan (2004), Kumar (2007), and Bhat and Narayanan (2011).

[7] Pradhan and Singh (2011) focus on the differences between Indian firms belonging to larger business groups and stand-alone firms when assessing the location of foreign acquisitions in 2000-2008.

[8] See: http://finmin.nic.in/the_ministry/dept_eco_affairs/icsection/icsec_index.asp (accessed: October 2012).

weak institutions and economic instability in host countries. Nevertheless, there is no robust evidence that India provides an alternative source of FDI for countries where traditional investors are missing. Section 5 summarizes and concludes.

2. Background and hypotheses

FDI from non-traditional sources has attracted a lot of interest recently, notably by investment promotion agencies in developing host countries which may benefit from more options to lure FDI (Sauvant 2008). In particular, it has been suspected that direct investors based outside the OECD core are transferring better adapted technologies to developing countries in closer proximity, even though these host countries may be characterized by relatively small markets and higher risk. This view goes back to the initial phase of outward FDI by some emerging economies in the 1970s and 1980s, as portrayed by Lall (1983) and Wells (1983). However, reliable empirical evidence on the determinants of FDI from non-traditional sources continues to be scarce.

The traditional view that direct investors based in non-traditional source countries are well prepared to operate in other developing countries invites some hypotheses that apply to essentially all types of FDI.[9] Ramamurti (2009: 409) argues that non-traditional investors enjoy an "adversity advantage" since experience with political and economic uncertainty at home enables them "to function effectively in the difficult conditions of emerging markets, where both the 'hard' and 'soft' infrastructures were missing." Likewise, UNCTAD (2006: 104) expects non-traditional investors to be better equipped "to handle risks associated with operating in States characterized by weak governance." Desbordes et al. (2011) present a theoretical model that allows for the possibility that non-traditional investors have a competitive advantage in South-South FDI, due to their experience with poor institutional quality. This leads to the first hypothesis:

[9] See below for major types of FDI and more specific hypotheses.

H1: FDI from non-traditional sources such as India is resilient to political uncertainty, weak institutions and economic instability in the host countries.

Available empirical evidence on *H1* is limited and inconclusive. Darby et al. (2009) find that the positive impact of good governance on the number of majority owned foreign affiliates in the host countries is weaker, or even absent, for investors with prior experience of weak institutions at home. By contrast, Sosa Andrés et al. (2012) find that non-traditional investors are as risk adverse as traditional investors. We consider several variables in order to test *H1* with respect to Indian FDI, notably the Heritage index of economic freedom. Alternative measures of governance and institutions enter in several robustness tests. We also take into account whether the host country and India have ratified a bilateral investment treaty or a double taxation treaty. Investment and tax treaties are typically meant to reduce risk and grant foreign investors protection against political discretion. However, bilateral treaties would be rather unlikely to induce more FDI from India if experience at home renders non-traditional investors less risk adverse. In a similar vein, higher inflation in the host countries might not affect Indian FDI if direct investors are used to economic instability at home.

At the same time, the argument that non-traditional investors offer technologies and products "especially well suited to the needs of other developing countries" (Wells 1983: 3) implies that FDI is more likely to locate in closer proximity. UNCTAD (2006: 104) considers most multinationals based in developing and transition economies to be "regional players." Dunning et al. (1998) offer a nuanced view along the so-called investment development path. Accordingly, the first wave of outward FDI focuses on neighboring countries; the second wave is still mainly regional, while FDI increasingly expands globally. Similarly, Rasiah et al. (2010: 338) argue that over time investors based in emerging Asia "have sought markets progressively further away from home." Apart from geographical distance, gravity-type models typically include common cultural traits – as reflected in a common language and the

size of the diaspora living in the host country. Our second hypothesis thus refers to (geographical and cultural) distance as an essential element of gravity-type models:

H2: The geographical distance between India and the host country should have a strongly negative effect on FDI, notably in the initial phases of outward FDI. Cultural and psychic dimensions of distance are likely to matter in addition to geography.

The familiarity with risk as well as the preference for neighboring locations may induce non-traditional FDI in host countries where OECD-based multinationals are less present. However, agglomeration forces can be expected to work in the opposite direction. The self-reinforcing effects of previous FDI on subsequent location choices have received particular attention at the regional level of specific host countries such as the United States and France (e.g., Bobonis and Shatz 2007; Crozet et al. 2004).[10] Agglomeration forces are also likely to affect location choices across host countries. FDI in countries with a long reputation of being attractive would be regarded as profitable by latecomers which are, therefore, likely to follow the location choices of their more experienced peers. We follow Sosa Andrés et al. (2012) and regard the already existing FDI stocks from all sources as a proxy of agglomeration in particular host countries:

H3: Non-traditional investors based in India tend to be attracted to host countries where previous FDI stocks are concentrated.

The subsequent hypotheses relate to specific types of FDI. The recent literature suggests that FDI flows from non-traditional sources are to be attributed to a broad set of motives. Yet it is widely believed that horizontal FDI, i.e., foreign firms using FDI as a means to penetrate host-country markets, dominates over other types. UNCTAD (2006: 158) concludes from surveys of multinational enterprises based in several emerging economies that "market-seeking FDI is by far the most common type of strategy for developing-country TNCs in their process of internationalization." Likewise, Rasiah et al. (2010) as well as

[10] Similarly, Mukim and Nunnenkamp (2012) find a strong tendency of foreign investors to engage in Indian districts where other foreign investors are already present.

Milelli et al. (2010) argue that access to foreign markets has been the dominant motive of outward FDI from emerging Asia, including from China and India.

The size and growth of host-country markets are widely used indicators to assess the importance of horizontal FDI. It cannot be ruled out, however, that the effects of host-country markets vary over time. This applies especially to FDI from non-traditional source countries where techniques are used which are efficient at relatively small scales, compared to the techniques used in the most advanced source countries (Lall 1983). Therefore, we expect:

H4: Access to foreign markets is likely to attract outward FDI from India, but the effect could be relatively weak as long as FDI is concentrated in relatively small and poor developing countries.

Vertical FDI – motivated by cost savings and often involving fragmented value chains – may figure less prominently than horizontal FDI from non-traditional source countries where wages are typically relatively low compared to more advanced source countries. Nevertheless, Wells (1983: 76) observed that export-oriented firms sought "lower wages than their home countries offered" already during the first wave of FDI from non-traditional sources. Aykut and Ratha (2003: 168) also suspect that some new multinational enterprises have undertaken vertical FDI "following an erosion in their export competitiveness." Taiwanese FDI in mainland China provides a case in point; cost-saving motives have played an important role since the second half of the 1980s because of the appreciation of the New Taiwan Dollar and rising labor costs in Taiwan (Liu and Nunnenkamp 2011).

Vertical FDI typically locates where wage costs are relatively low compared to the source country. However, reliable data on unit labor costs are not available for various host countries. The average per-capita income is often used as a proxy with almost universal coverage. Specifically, vertical FDI by more advanced source countries is assumed to be correlated negatively with per-capita income of host countries. In the case of non-traditional source countries, however, this correlation may be blurred by another type of FDI, asset-

seeking FDI. This type of FDI can be expected to flow in the opposite direction from relatively poor source countries to richer host countries.[11] It provides a means for the former to acquire superior technology available in the latter. UNCTAD (2006: 136) reports "a noticeable increase" in FDI from non-traditional sources in many developed countries. Dunning et al. (2008) attribute this development to a new wave of asset-seeking FDI from emerging markets. This appears to include asset-seeking FDI from India (Rasiah et al. 2010).[12] However, the parent companies in emerging markets need sufficient absorptive capacity to make use of superior technology for asset-seeking FDI to play a prominent role. Hence we hypothesize:

H5: Both vertical and asset-seeking FDI plays a minor role as long as costs of production are sufficiently low at home and domestic firms have insufficient capacity to absorb superior foreign technology.

Similarly, resource-seeking FDI may have gained importance more recently. Some years ago, UNCTAD (2006: 161) rated resource-seeking FDI to be of "moderate significance" in surveys of firms from non-traditional source countries. Sosa Andrés et al. (2012) come to a similar conclusion. Previous evidence is mixed even for China that is now widely perceived to use FDI as a means of accessing raw materials in typically poor host countries, notably in sub-Saharan Africa.[13] Rasiah et al. (2010) argue that India is increasingly competing with China to meet the stronger demand for steel and other raw materials. Moreover, these authors note that the Indian government announced plans in 2007 to approach oil-producing countries and request them to offer mining rights to India's state-owned oil and gas companies.

[11] As described in more detail below, we attempt to separate vertical from asset-seeking FDI by introducing the intensity of patenting in the host country as an additional variable to proxy for technological sophistication, assuming that asset-seeking FDI would be concentrated in host countries with a larger number of patents per 1,000 inhabitants.

[12] Pradhan and Singh (2009) analyze asset-seeking FDI by the Indian automobile industry. They find that outward FDI is associated with higher R&D activity by the Indian parent company.

[13] See, for instance, Buckley et al. (2007), Kaplinsky and Morris (2009), Mlachila and Takebe (2011), and Cheung et al. (2011). Pradhan (2011) finds that an abundant supply of raw materials attracts Chinese FDI, though not Indian FDI.

H6: While resource-seeking FDI is unlikely to figure prominently in India's FDI portfolio, the motive to access raw materials in this way may have become more important recently.

3. Methodology and sample selection

This section describes the data samples used in the estimation as well as the estimation procedure which is based on the specific characteristics of the data and model. As detailed in the previous section, the amount of Indian outward FDI in a country is hypothesized to be a function of a number of characteristics of the host country as well as the specific relationship between India and that host. Consistent with established literature, we use a gravity model specification with the dependent variable as well as most independent variables in log form.

We face a number of data issues when selecting our sample. For early years, we only have average FDI for a number of years. Annual data are available only starting in 2002. Thus, we use two samples. One is comprised of annual averages over three periods: 1996-2001, 2002-2005 and 2006-2009. The lack of time variation in this sample means results are largely identified from the cross-section. The advantage of using period averages is that it smoothes the volatility of the annual data. Exploiting the time variation of annual data for the years 2002-2009, we alternatively estimate a (country) fixed effects panel model. Here, identification can be both from the cross-section and the time series. We estimate variants of the following equation:

$$FDI_{it} = \alpha + \beta X_{it} + \gamma X_i + \delta_t + \theta_i + \varepsilon_{it}$$

where the vector X_{it} comprises variables that vary by host country and over time: GDP, GDP per capita, GDP growth, inflation, trade openness, the stock of current FDI-to-GDP, the Heritage index, the existence of a bilateral investment (or tax) treaty; and in some specifications the natural resource endowment and patents relative to the population. The vector X_i comprises time-invariant host country characteristics: distance, the size of the Indian

diaspora, and whether there is a common language. A set of year dummies, δ_t, is included in all specifiations; a set of host country dummies, θ_i, is included in the fixed effects models.

We employ the Poisson pseudo maximum likelihood (PPML) estimator with robust standard errors to estimate the determinants of India's outward FDI. Santos Silva and Tenreyro (2006) point out that ordinary least squares is inconsistent and have shown PPML to provide consistent elasticity estimates when the model is of the log gravity type. Robust standard errors fully account for heteroscedasticity. The errors are also clustered on countries in order to properly account for the within-country correlation of observations of variables that are time-invariant (see Moulton 1986). As a robustness check, we also employ the zero-inflated version of the model as suggested, e.g., by Burger et al. (2009) in the presence of a substantial number of zeros in the data to determine whether the number of zeros is affecting the results.

While PPML is appropriate for both of our samples, the volatility of annual FDI flows may make it difficult to detect significant determinants of FDI. Therefore, we also try a specification where the amount of FDI is replaced with a binary variable indicating whether there is any FDI in a country in a given year (value of 1) or not (value of zero). In this case of a binary dependent variable, the appropriate technique is a logit model.[14]

There are a number of countries in the sample that are known as tax havens through which FDI may be funnelled where the final destination is unknown. For these observations, traditional FDI determinants such as GDP or trade openness may not be relevant and their inclusion may thus contaminate the results. Therefore, we focus on results that delete these observations from the sample.

Appendix A provides the exact definition of the variables used along with their data sources. Table 1 provides sample statistics for both our cumulative and annual data samples.

[14] Using probit instead gives virtually identical results.

4. Results

We present our estimation results in several steps. In Sections 4.1 and 4.2, our dependent FDI variable represents annual averages of India's FDI outflows during three sub-periods – 1996-2001, 2002-2005, and 2006-2009. By considering averages and pooling the FDI data for the three sub-periods we smooth large fluctuations in annual FDI approvals. We account for the gradual liberalization of India's FDI outflows by including time fixed effects related to these sub-periods.[15] Section 4.1 reports the basic results, while Section 4.2 offers robustness checks as well as extended specifications with interaction terms. The interaction of the time dummies with our independent variables enables us to assess changes over time in the importance of the determinants of location choices of Indian direct investors. In the next step, our dependent FDI variable represents annual FDI outflows in the 2002-2009 period (Section 4.3). This complementary analysis allows us to account for host country fixed effects, in addition to time fixed effects, thus focusing on the within-country variation of independent variables.

4.1 Basic cross section results

Table 2 reports our baseline results of the PPML estimation introduced in Section 3 when pooling the FDI data for the sub-periods 1996-2001, 2002-2005, and 2006-2009. The results shown in columns I-III of Table 2 are based on all host countries of India's FDI with sufficient data on the independent variables. By contrast, the results shown in columns IV-VI exclude offshore financial centers from the list of host countries. Specifically, we exclude Mauritius plus all offshore financial centers listed in Eurostat's FDI statistics.[16] We expect the

[15] For details on the liberalization of India's outward FDI, see Nayyar (2008), Pradhan (2008) and several contributions in Sauvant and Pradhan (2010).

[16] For details, see http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-BK-08-001/EN/KS-BK-08-001-EN.PDF (accessed: October 2012). Mauritius is added to Eurostat's list of offshore financial centers as India's FDI is often channeled through Mauritius in order to take advantage of the double taxation agreement between Mauritius and India (Kumar 2006: 460). According to Milelli et al. (2010: 383), Mauritius is involved in so-called round-tripping, i.e., channeling back to India part of its FDI outflows as reported in the official statistics. See also Pradhan (2011: 127) and Nayyar (2008: 114) on the importance of offshore centers for India's FDI outflows.

impact of standard FDI determinants to be blurred as long as offshore financial centers are included which attract FDI mainly for reasons of tax evasion.

Indeed, the impact of our independent variables on location choices proves to be weak for the overall sample of host countries, including offshore financial centers. Most strikingly, we do not find evidence for either horizontal or vertical FDI choices for the overall sample of host countries. Horizontal FDI should be reflected in significantly positive coefficients of the size and growth of host country markets (*gdp* and *gdp growth*), while vertical FDI should be reflected in significantly negative coefficients of the average per-capita income in the host countries (*gdp per capita*) and significantly positive coefficients of their openness to trade (*trade openness*). However, all coefficients on these variables shown in columns I-III of Table 2 prove to be statistically insignificant at conventional levels.[17] The same applies to *fdi stock/gdp* which is supposed to capture the tendency of non-traditional Indian investors to locate where previous FDI stocks from more experienced investors are concentrated (*H3*).

Findings are ambiguous with respect to hypothesis *H1* according to which India's outward FDI should be resilient to political uncertainty, weak institutions and economic instability in the host countries. On the one hand, the positive coefficient on *inflation*, suggesting that economically less stable host countries with higher rates of inflation receive more FDI from India, provides support to this hypothesis. Calculating the marginal effect *dy/dx* (based on the full specification in column III of Table 2), we obtain that a one percentage point increase in inflation increases FDI flows by 0.37 per cent. On the other hand, the positive coefficient on *heritage index* is in conflict with *H1*. Better governance and institutions as reflected in higher values of the Heritage index attract more FDI from India, at the five per cent level of significance or better. Since the index ranges from one to 100, a one

[17] Our proxy for resource-seeking FDI, *natural resources*, enters significant in columns II and III, but with an unexpected negative sign. As shown below, this variable loses its significance once offshore financial centers are excluded. In other words, the unexpected negative sign is mainly due to resource-poor financial centers attracting high FDI outflows from India.

point improvement in economic freedom would lead to an increase in FDI flows by 0.19 per cent.

The evidence for the full sample of host countries is largely in line with *H2*. According to column III, Indian FDI outflows tend to decline by about one per cent if the geographical distance to the host country increases by one per cent. The quantitative impact of distance is thus considerable. This may be exemplified by comparing the United Kingdom and the United States as two major hosts of Indian FDI: Both countries received similar amounts of FDI from India in the sub-period 2006-2009; if the UK were as far away from India as the US, FDI flows to the UK would have been just about half of those to the US. The dummy variable set equal to one for English speaking host countries, *commlang*, does not offer additional insights as it fails to pass conventional significance levels. However, the presence of an Indian diaspora in the host country enters significantly positive at the five per cent level or better. To demonstrate its quantitative impact, Canada could have raised FDI flows from India by US$45-60 million per annum (from US$150 million in 2006-2009) if it had an Indian diaspora as large as the US.

Hypothesis *H2* continues to be supported when excluding offshore financial centers from the sample of host countries. This is even though the significance and impact of the Indian diaspora, *diaspora*, weakens considerably in columns IV-VI of Table 2. On the other hand, the significance and impact of geographical distance proves to be stronger for the reduced sample. In addition, we now find empirical support for hypothesis *H3*: Indian FDI outflows increase by 1.3 – 1.5 per cent to where the ratio of previous FDI stocks over GDP is one percentage point higher.

Before turning to the variables supposed to drive specific types of FDI, it should be noted that the conclusion of bilateral investment treaties appears to be irrelevant as a driving force of India's outward FDI. This consistently holds for the reduced sample in columns IV-VI. Nevertheless, the evidence for this sample rejects hypothesis *H1* more clearly than the

evidence with offshore centers included. While the positive coefficient on *heritage index* carries over to the reduced sample (though losing its significance in column IV), higher inflation in the host countries is no longer associated with higher Indian FDI outflows.

Comparing columns I and IV of Table 2, the significant and positive coefficient on *gdp* indicates that larger host country markets attract higher Indian FDI once offshore centers are excluded. The impact of host country markets continues to be statistically significant and quantitatively relevant (with an elasticity of 0.62-0.72) when extending the specification in columns V and VI. Yet, horizontal FDI motives are not fully supported in the reduced sample either, considering that the growth of host country markets, *gdp growth*, proves to be significantly negative in the extended specifications.

In line with *H5*, the variables introduced to capture vertical and asset-seeking FDI suggest that both types of FDI played a minor role during the period under consideration. This is even though *gdp per capita* is significantly negative in columns V and VI. The quantitative impact of cost-saving motives appears to be rather small; calculating the marginal effect for column VI, we obtain that an increase in per-capita income by US$ 1000 in the host country would reduce Indian FDI flows by only 0.12 per cent. Moreover, the negative coefficient on *trade openness* is in some conflict with vertical FDI which requires low trade barriers between the Indian parent companies and foreign affiliates. It should also be noted that our proxy of asset-seeking motives, *patents/population*, fails to shape Indian FDI in a significant way. Likewise, the insignificant coefficients on *natural resources* tend to support *H6* in that resource-seeking FDI did not figure prominently in India's FDI portfolio in the past.

4.2 Robustness checks and interaction terms

The robustness checks as well as the regressions with interaction terms reported in the following are based on the reduced sample after excluding offshore financial centers. The robustness checks are shown in Table 3, where column 0 reproduces the full specification of

the PPML model from Table 2 for ease of comparison. In particular, we assess whether our basic results are sensitive to the choice between (i) major types of FDI-related contracts between the governments of India and the host country, and (ii) alternative measures of governance and institutional quality in the host country.

All robustness checks have in common that the findings for our standard variables are hardly affected, compared to the full specification of the PPML model without offshore centers. Specifically, Table 3 underscores the relevance of distance-related factors (*H2*), even though the size and significance of the coefficients on *distance* declines, notably in column IV. The effect of *diaspora* loses its significance once (column I), but becomes stronger in some other robustness checks. The evidence on *H3* is almost as before, with higher FDI stocks from all sources (*fdi stock/gdp*) attracting more FDI flows from India. The same applies to the driving forces of horizontal FDI, notably *gdp.*[18] It is only the evidence on the driving forces of vertical FDI that proves to be sensitive to the choice of indicators on governance and institutions; the coefficients on *gdp per capita* and *trade openness* are no longer significant when replacing the Heritage index by alternative indicators in columns II-IV of Table 3.

The first robustness check underscores the previous evidence against *H1* for the reduced sample. As before, the Heritage index enters significantly positive at the five per cent level, indicating that Indian direct investors prefer locations with greater economic freedom. Furthermore, replacing bilateral investment treaties (*invest treaty*) by double taxation treaties (*tax treaty*) in column I suggests that India's outward FDI reacts positively to binding contractual arrangements that constrain tax-related political discretion. The quantitative impact of the conclusion of double taxation treaties is considerable. Calculating the marginal effect (with all other variables kept at their mean), FDI flows should more than double after the ratification of a double taxation treaty. It should be noted that reverse causation cannot be

[18] It may be noted that the negative coefficient on *gdp growth* is no longer significant at conventional levels in some of our robustness checks.

ruled out as Indian investors may induce the government to conclude double taxation treaties mainly with host countries where Indian FDI figures prominently. However, this would still be in conflict with the view that Indian investors are indifferent to (tax-related) political discretion in the host countries.

The robustness checks shown in columns II-IV appear to be more in line with *H1*. We replace the broadly defined Heritage index by two more specific indicators on institutional conditions and governance in the host countries in columns II and III – control of corruption (*corruption*) taken from the World Governance Indicators or the index on the protection of intellectual property (*Ginarte Park*) constructed by Ginarte and Park. Higher values of these indicators reflect less FDI-related risk because of stronger institutions or better governance. In column IV we take the degree of political rights and civil liberties (*Freedom House*) from Freedom House; higher values of this index reflect less freedom. In contrast to the Heritage index above, all three alternative indicators prove to be insignificant at conventional levels. This suggests that Indian direct investors are indeed resilient to various aspects of FDI-related risk. All the same, the choice of alternative indicators on governance and institutions consistently rejects a stronger version of *H1* according to which the "adversity advantage" Ramamurti (2009: 409) of non-traditional investors could have led to a concentration of India's outward FDI in difficult environments, i.e., locations with weak institutions and bad governance.

In the next step, we interact the explanatory variables with the time dummies for the sub-periods 2002-2005 and, respectively, 2006-2009.[19] In this way, we assess whether the impact of explanatory variables has changed over time. However, estimating interaction terms in a non-linear model – such as the PPML estimation used here – is not straightforward. The coefficients do not correctly reflect the marginal effects (Ai and Norton 2003). Rather than showing the coefficients of the explanatory variables, Table 4 therefore shows the marginal

[19] The sub-period 1996-2001 represents the benchmark.

effects of each explanatory variable and the corresponding t-statistic evaluated at the mean of the explanatory variables.[20] Columns I and IV report the marginal effects for the benchmark, the 1996-2001 period (with and without *patents/population*), columns II and V those of the interaction with the dummy variable for the 2002-2005 period, and columns III and VI those of the interaction with the dummy variable for the 2006-2009 period. Note that the marginal effects of all interaction terms reveal an additional effect compared to the benchmark. In other words, insignificant results for an interaction term mean that the impact of the corresponding variable does not differ significantly between the benchmark period and the more recent period.

Table 4 points to several changes over time in the impact of explanatory variables on India's FDI outflows. First, agglomeration effects according to hypothesis *H3* have weakened, as shown by significantly negative marginal effects of the interacted variable *fdi stock/gdp*. This is plausible as Indian direct investors became more experienced over time and, thus, less inclined to follow the location choices of previous investors. Second, the positive impact of the Heritage index seems to be restricted to the more recent past, whereas the impact of double taxation treaties tends to be stronger during the earlier phase of India's FDI outflows.[21] It cannot be ruled out that the changes in the impact of *heritage index* and *tax treaty* are both related to the shift of India's outward FDI toward advanced host countries in the recent past. Economic freedom is typically better developed in these host countries, and tax treaties may matter less where the legal system limits political discretion.

Third, we find some evidence in line with *H2* that distance-related factors discouraged India's direct investors mainly in the initial phases of outward FDI. Several interaction terms suggest that the negative (positive) marginal effect of *distance* (*commlang*) weakened in recent sub-periods, though there is no clear linear trend.

[20] For the sake of brevity, we refrain from calculating the marginal effects over a larger range of variation of explanatory variables.
[21] However, just one of the negatively signed interactions with *tax treaty* proves to be significant (in column III).

Fourth, turning to the motives of specific types of FDI, the marginal effects of the interactions with *gdp* are in some conflict with *H4.* In particular, we find no evidence that the size of foreign markets attracted Indian FDI less strongly in the earlier phase. If at all, the impact of *gdp* weakened over time. Fifth, there is no compelling evidence that the motives of accessing natural resources in resource rich host countries or superior technology through asset-seeking FDI have increasingly shaped the location choices of Indian direct investors in the more recent past. The lack of support for *H6* may be attributed to the observation that India's resource-seeking FDI was dominated by a few very large projects (see, e.g., Satyanand and Raghavendran 2010), whose timing disrupts any smooth trend.

4.3 Panel estimations

All estimations reported so far are based on annual average FDI outflows in sub-periods 1996-2001, 2002-2005, and 2006-2009. While we prefer the previous approach of reducing the volatility of annual FDI outflows and covering a longer period, we performed complementary estimations with annual FDI outflows in 2002-2009 as the dependent variable. The list of explanatory variables is essentially as before.[22] However, we maintain two modifications made in the robustness checks shown in columns I and II of Table 3: (i) we include double taxation treaties in the panel estimations as *tax treaty* appears to have a stronger impact on India's FDI outflows than *invest treaty*; and (ii) we use *corruption*, instead of the Heritage index which was not available for the entire period.

The results for the PPML estimation with annual FDI observations in column I of Table 5 corroborate the previous findings on *tax treaty* as well as *corruption*. While the significantly positive impact of double taxation treaties carries over from column I of Table 3, *corruption* proves to be insignificant at conventional levels as in column II of Table 3.

[22] For the sake of brevity we report only the full specification with the patent variable included. We also estimated all models excluding *patents/population*. Our major results are hardly affected by this modification. Notable exceptions are that *inflation* enters significantly positive, and *natural resources* enters significantly negative in the PPML model when *patents/population* is excluded.

Furthermore, the PPML estimation with annual FDI observations underscores that India's direct investors prefer locations where the stock of FDI from all sources is relatively high and where the Indian diaspora is relatively large. Compared to Table 3, the results weaken in two major respects, however. Geographical distance, *distance*, loses its significance in column I of Table 5. The same applies to *gdp*, representing our major proxy of horizontal FDI motives. In contrast to the size of foreign markets, their growth (*gdp growth*) now enters significantly positive, though only at the ten per cent level.

In column II of Table 5, we show a logit estimation in which the dependent FDI variable takes the value of one in years with FDI flows from India to the particular host country and zero in years without such flows. Disregarding the annual amount of FDI in this way restores the significantly negative impact of geographical distance as well as the significantly positive impact of the size of foreign markets in line with hypotheses *H2* and *H4*. This suggests that it is mainly the volatility of FDI flows that erodes the significance of these two variables in the PPML estimation based on annual observations. On the other hand, the logit estimation indicates that the decision of Indian direct investors of whether or not to engage in a particular host country does not depend on FDI stocks from all sources or the size of the Indian diaspora.[23]

The evidence on the determinants of India's annual FDI outflows also proves to be weak when estimating the PPML model with fixed host country effects in column III of Table 5. This approach implies that the coefficients reflect only the within-country variation of our explanatory variables over time. We have to exclude *diaspora* from this estimation as we lack year-specific data on the size of the Indian diaspora. In addition, we have to redefine our measure of geographical distance as the previously used *distance* is time invariant. More precisely, we follow Warin et al. (2009) and construct *distance/population* by relating the time-invariant *distance* to the host countries' population.

[23] The effect of *tax treaty* also loses its significance in the logit estimation.

Larger values of the modified distance variable tend to discourage India's FDI outflows in line with *H2*. The coefficient of *distance/population* is only weakly significant, which is not surprising considering its limited variation over time. More strikingly, India's FDI outflows appear to be positively associated with increasing patent activity in host countries, providing some evidence in favor of asset-seeking FDI in recent years. However, all other explanatory variables fail to pass conventional significance levels in the estimation with fixed effects. Given the rather short period of observation underlying the estimations reported in Table 5 the inclusion of host country fixed effects tends to take away most of the variation in the variables of interest. The variation is mainly between rather than within countries, which is why we prefer the estimations without host country fixed effects.[24]

Hence, we return to the standard specification without host country fixed effects in the final column of Table 5. We estimate a zero-inflated Poisson model which accounts for possible distortions resulting from an excess of zero observations of annual FDI outflows. This does not appear to be a problem since the results are fairly similar when comparing columns IV and I. The most notable change is that the coefficient on *fdi stock/gdp* is no longer significant in the zero-inflated Poisson model.

5. Summary and conclusion

It is widely agreed that FDI could bring considerable benefits to host countries. However, various locations, notably poor and small countries with weak institutions, have traditionally been avoided by multinational enterprises based in advanced countries. The recent boom of outward FDI originating in emerging economies such as India could help close this gap and redress the heavily skewed distribution of worldwide FDI flows. Furthermore, FDI from

[24] Recent literature offers support for this view. According to Temple (1999: 132), "too often researchers use fixed effects approaches" to analyze the effects of variables that will affect outcomes only with a relatively long lag. Clemens et al. (2012) argue that hypothesis tests will then suffer from low power.

sources such as India is often perceived to be better adapted to local conditions in developing host countries.

Against this backdrop, it would be highly desirable for policymakers and investment promotion agencies to gain deeper insights on how to lure FDI from non-traditional sources. Our analysis of the driving forces of India's outward FDI in the 1996-2009 period contributes to the small empirical literature in this field. We use gravity model specifications and perform Poisson pseudo maximum likelihood (PPML) estimations with clustered robust standard errors to assess the determinants of India's outward FDI in a cross section as well as a panel context.

We find no evidence that India's FDI is motivated strongly by access to raw materials in resource-rich host countries or access to superior technology in advanced host countries. In other words, the lack of such resources and assets does not necessarily impair the chances to attract Indian FDI. At the same time, the evidence is similarly weak with respect to the chances of host countries with lower per-capita income to attract vertical FDI from India. Market-related factors appear to have dominated the location choices of Indian direct investors in the past, even though the results on the determinants of horizontal FDI prove to be sensitive to sample selection and model choice, too.

Similar to previous findings on the determinants of FDI from OECD sources, Indian FDI tends to concentrate in closer proximity. For host countries without a sizeable Indian diaspora it also appears to be difficult to lure more Indian FDI. Most interestingly, there is mixed evidence on whether India provides an alternative source of FDI for host countries lacking access to more traditional sources. On the one hand, the clustering of Indian FDI where previous FDI stocks from all sources are high points to similar location choices. On the other hand, it seems that Indian direct investors are relatively resilient to political uncertainty, weak institutions and economic instability in the host countries. This issue clearly deserves

more research, not least because our findings indicate that India’s outward FDI reacts differently to various aspects of uncertainty and instability.

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Table 1A – Summary statistics, cross section sample

Variable	Observations	Mean	Standard deviation	Minimum	Maximum
fdi	462	39.88	274.85	0.00	4,436.35
distance	462	8.78	0.58	7.04	9.74
commlang	462	0.28	0.45	0.00	1.00
diaspora	462	5.82	4.53	0.00	14.33
gdp	462	23.57	2.20	18.14	30.03
gdp growth	462	3.48	4.45	-19.65	34.68
inflation	462	63.10	367.19	-4.43	5,880.09
gdp per capita	462	6,708.97	9,838.83	90.54	54,009.30
trade openness	462	98.42	299.05	13.49	4,798.80
fdi stock/gdp	462	0.53	0.65	0.00	8.85
heritage index	462	59.27	10.94	15.60	89.68
invest treaty	462	0.22	0.40	0.00	1.00
natural resources	436	6.23	12.84	0.00	112.64
patents/population	381	213.38	516.39	0.00	3,435.08
tax treaty	381	0.40	0.48	0.00	1.00
corruption	385	0.08	1.04	-1.68	2.47
Ginarte Park	298	3.14	1.00	0.88	4.88
Freedom House	396	3.24	1.90	1.00	7.00

Table 1B – Summary statistics, 2002-2009 sample

Variable	Observations	Mean	Standard deviation	Minimum	Maximum
fdi	683	51.76	295.94	0.00	5,364.83
distance	683	8.73	0.57	7.04	9.74
commlang	683	0.19	0.39	0.00	1.00
diaspora	683	6.77	4.36	0.00	14.33
gdp	683	24.81	2.00	20.62	30.09
gdp growth	683	4.11	4.55	-18.01	34.50
inflation	683	6.95	7.97	-32.81	80.75
gdp per capita	683	9,548.45	12,138.30	124.13	56,624.73
trade openness	683	132.34	460.56	22.45	4,798.80
fdi stock/gdp	683	0.53	0.52	0.00	3.89
corruption	683	0.18	1.09	-2.02	2.47
tax treaty	683	0.54	0.50	0.00	1.00
natural resources	683	7.32	11.93	0.00	70.35
patents/population	683	355.93	754.89	0.01	4,144.42
distance/population	675	94.12	186.11	0.32	1,530.55

Table 2 – PPML estimation results, 1996-2009, three sub-periods, with and without offshore financial centers

VARIABLES	I	II	III	IV	V	VI
	offshore centers included			offshore centers excluded		
distance	-0.616	-0.873*	-1.035**	-1.744***	-1.407***	-1.456***
	(0.565)	(0.478)	(0.451)	(0.428)	(0.542)	(0.539)
commlang	0.0190	-0.491	-0.490	0.104	0.185	0.169
	(0.783)	(0.753)	(0.735)	(0.445)	(0.550)	(0.538)
diaspora	0.300**	0.395***	0.401***	0.208**	0.149*	0.136*
	(0.130)	(0.151)	(0.149)	(0.0899)	(0.0874)	(0.0785)
gdp	0.0379	-0.0175	0.000116	0.621***	0.700**	0.722**
	(0.197)	(0.172)	(0.162)	(0.216)	(0.297)	(0.322)
gdp growth	-0.0360	0.0211	0.0471	-0.129	-0.205**	-0.216***
	(0.0861)	(0.112)	(0.121)	(0.0806)	(0.0804)	(0.0831)
inflation	0.00115***	0.00142***	0.00203**	0.000710	0.000249	0.000200
	(0.000419)	(0.000455)	(0.000948)	(0.000524)	(0.000579)	(0.000629)
gdp per capita	1.63e-06	-3.17e-07	3.87e-06	-2.86e-05	-5.92e-05**	-5.47e-05**
	(2.38e-05)	(3.33e-05)	(3.39e-05)	(2.54e-05)	(2.53e-05)	(2.55e-05)
trade openness	8.43e-05	-0.000119	-0.000186	-0.000461**	-0.000407	-0.000443*
	(0.000207)	(0.000152)	(0.000150)	(0.000186)	(0.000272)	(0.000268)
fdi stock/gdp	0.128	0.0223	-0.0101	1.524***	1.474***	1.292**
	(0.338)	(0.310)	(0.317)	(0.477)	(0.513)	(0.533)
heritage index	0.100***	0.0990***	0.104**	0.0752	0.0992**	0.111**
	(0.0385)	(0.0381)	(0.0426)	(0.0476)	(0.0449)	(0.0472)
invest treaty	0.725	0.755*	0.561	-0.00683	0.263	0.110
	(0.462)	(0.431)	(0.469)	(0.397)	(0.479)	(0.573)
natural resources		-0.0873**	-0.0977*		-0.00264	0.00270
		(0.0379)	(0.0513)		(0.0317)	(0.0312)
patents/population			-0.000243			-0.000417
			(0.000277)			(0.000338)
year 2002	0.197	0.316	0.421	0.200	0.253	0.341
	(0.265)	(0.364)	(0.384)	(0.211)	(0.254)	(0.256)
year 2006	2.296***	2.505***	2.646***	1.631***	1.608***	1.751***
	(0.518)	(0.587)	(0.615)	(0.339)	(0.371)	(0.388)
Observations	462	436	381	421	399	346
Country FE	NO	NO	NO	NO	NO	NO
Time FE	YES	YES	YES	YES	YES	YES

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table 3 – PPML estimation results, 1996-2009, three sub-periods, without offshore financial centers, robustness checks

VARIABLES	0	I	II	III	IV
distance	-1.456***	-1.421**	-1.022**	-1.196**	-0.589
	(0.539)	(0.609)	(0.479)	(0.492)	(0.697)
commlang	0.169	0.177	0.535	0.603	0.510
	(0.538)	(0.560)	(0.483)	(0.495)	(0.528)
diaspora	0.136*	0.104	0.209**	0.216*	0.218*
	(0.0785)	(0.0742)	(0.0990)	(0.113)	(0.117)
gdp	0.722**	0.705**	0.592**	0.555*	0.573***
	(0.322)	(0.325)	(0.242)	(0.312)	(0.221)
gdp growth	-0.216***	-0.253***	-0.123	-0.121	-0.123*
	(0.0831)	(0.0833)	(0.0790)	(0.0749)	(0.0746)
inflation	0.000200	0.000154	0.000603	0.00165*	0.000617
	(0.000629)	(0.000641)	(0.000485)	(0.000848)	(0.000474)
gdp per capita	-5.47e-05**	-6.26e-05**	-3.31e-07	5.42e-06	1.58e-05
	(2.55e-05)	(2.86e-05)	(3.08e-05)	(2.26e-05)	(2.37e-05)
trade openness	-0.000443*	-0.000514*	-0.000297	-0.000350	-0.000290
	(0.000268)	(0.000288)	(0.000240)	(0.000254)	(0.000250)
fdi stock/gdp	1.292**	1.129**	1.449***	1.487***	1.483***
	(0.533)	(0.538)	(0.535)	(0.549)	(0.533)
heritage index	0.111**	0.117**			
	(0.0472)	(0.0483)			
invest treaty	0.110		0.308	0.331	0.618*
	(0.573)		(0.538)	(0.555)	(0.369)
natural resources	0.00270	0.00863	-0.0126	-0.0109	-0.0413
	(0.0312)	(0.0303)	(0.0239)	(0.0259)	(0.0262)
patents/population	-0.000417	-0.000479*	-0.000319	-0.000265	-0.000272
	(0.000338)	(0.000290)	(0.000353)	(0.000355)	(0.000317)
tax treaty		1.507***			
		(0.494)			
corruption			0.0225		
			(0.422)		
Ginarte Park				-0.0680	
				(0.210)	
Freedom House					0.314
					(0.292)
year2002	0.341	0.434	0.412	0.488*	0.378
	(0.256)	(0.341)	(0.310)	(0.290)	(0.287)
year2006	1.751***	1.827***	1.735***	1.793***	1.714***
	(0.388)	(0.379)	(0.461)	(0.312)	(0.379)
Observations	346	346	349	278	358
Country FE	NO	NO	NO	NO	NO
Time FE	YES	YES	YES	YES	YES

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table 4 – PPML estimation results, 1996-2009, interactions with time dummies, marginal effects

	I	II	III	IV	V	VI
	Benchmark	Interaction with:		Benchmark	Interaction with:	
VARIABLES	1996-2001	year 2002	year 2006	1996-2001	year 2002	year 2006
distance	-0.769**	0.637**	0.169	-1.215***	1.121***	0.334
	(0.321)	(0.268)	(0.285)	(0.452)	(0.431)	(0.457)
commlang	0.517	-0.139	-0.260**	1.111	-0.377**	-0.435**
	(0.433)	(0.126)	(0.131)	(0.774)	(0.171)	(0.187)
diaspora	0.0636	-0.0594	0.000178	0.0757	-0.0754	0.00827
	(0.0412)	(0.0420)	(0.0532)	(0.0696)	(0.0692)	(0.0915)
gdp	0.394**	0.0401	-0.252	0.662**	-0.0761	-0.446*
	(0.172)	(0.0817)	(0.158)	(0.271)	(0.133)	(0.265)
gdp growth	-0.0348	-0.0272	-0.0294	-0.0671	0.0103	-0.0364
	(0.0247)	(0.0194)	(0.0612)	(0.0419)	(0.0444)	(0.115)
inflation	0.000216	0.00415	0.0297	0.000358	0.00830	0.0400
	(0.000165)	(0.00409)	(0.0209)	(0.000257)	(0.00632)	(0.0320)
gdp per capita	-2.00e-05	-2.05e-05*	4.12e-06	-2.39e-05	-2.84e-05	1.77e-07
	(1.39e-05)	(1.16e-05)	(1.18e-05)	(1.97e-05)	(2.35e-05)	(2.24e-05)
trade openness	-0.00132	0.00116	0.00120	-0.000976	0.000769	0.000799
	(0.00277)	(0.00278)	(0.00277)	(0.00429)	(0.00427)	(0.00427)
fdi stock/gdp	1.129***	-0.354	-0.805**	1.830***	-1.076*	-1.432***
	(0.401)	(0.338)	(0.339)	(0.613)	(0.557)	(0.526)
heritage index	-0.00613	0.0313	0.0520*	-0.0196	0.0739*	0.0925**
	(0.0165)	(0.0199)	(0.0280)	(0.0318)	(0.0382)	(0.0447)
tax treaty	0.868**	-0.374	-0.598**	1.198*	-0.0975	-0.736
	(0.404)	(0.272)	(0.303)	(0.625)	(0.405)	(0.504)
natural resources	0.0282*	0.0104	-0.0458*	0.0288	0.0397*	-0.0468
	(0.0168)	(0.0122)	(0.0273)	(0.0272)	(0.0240)	(0.0366)
patents/population				-0.000200	1.95e-05	5.96e-05
				(0.000288)	(0.000237)	(0.000274)
year2002	-854.5			-1,463		
	(2,422)			(4,149)		
year2006	392.2			869.3		
	(3,343)			(8,903)		
Observations	399			346		

Notes: three sub-periods, excluding offshore financial centers; marginal effects at the mean of the other variables. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table 5 – Panel estimation results, 2002-2009, excluding offshore financial centers

VARIABLES	I PPML	II Logit	III Poisson FE	IV ZIP
distance	-0.664	-1.439***		-0.536
	(0.636)	(0.361)		(0.625)
distance/population			-0.0301*	
			(0.0168)	
commlang	-0.136	1.546***		-0.222
	(0.585)	(0.539)		(0.597)
diaspora	0.276**	-0.0501		0.282***
	(0.114)	(0.0509)		(0.109)
gdp	0.331	0.658***	-0.994	0.195
	(0.354)	(0.132)	(1.204)	(0.374)
gdp growth	0.139*	-0.00640	-0.0440	0.141*
	(0.0824)	(0.0322)	(0.0602)	(0.0848)
inflation	0.0542	0.00979	0.0318	0.0505
	(0.0334)	(0.0154)	(0.0476)	(0.0317)
gdp per capita	2.10e-06	-4.30e-05	0.000263	1.92e-05
	(5.55e-05)	(3.39e-05)	(0.000277)	(5.46e-05)
trade openness	-0.000251	0.00379	0.00148	-0.000291
	(0.000200)	(0.00490)	(0.00161)	(0.000210)
fdi stock/gdp	0.781*	0.287	0.400	0.648
	(0.428)	(0.366)	(1.005)	(0.454)
corruption	0.529	0.332	0.617	0.369
	(0.426)	(0.288)	(0.929)	(0.454)
tax treaty	1.140**	0.0831	-0.0948	1.169*
	(0.511)	(0.363)	(0.827)	(0.636)
natural resources	-0.0653	-0.00200	0.00509	-0.0713*
	(0.0412)	(0.0116)	(0.0482)	(0.0427)
patents/population	-4.10e-06	-0.000109	0.00166**	-5.18e-05
	(0.000416)	(0.000371)	(0.000761)	(0.000402)
Observations	683	683	675	683
Country FE	NO	NO	YES	NO
Time FE	YES	YES	YES	YES
Pseudo R-squared		0.234		

Robust standard errors in parentheses;*** p<0.01, ** p<0.05, * p<0.1

Appendix A: Definition of variables and data sources

Variable	Definition	Source
fdi	Foreign direct investment flows from India to host country in USD millions, including zeros	Ministry of Finance of India; http://finmin.nic.in/the_ministry/dept_eco_affairs/icsection/icsec_index.asp
distance	Log of distance between India and the host country; based on bilateral distances between the largest cities of those two countries; weighted by the share of the city in the overall country's population	CEPII Gravity Dataset; http://www.cepii.fr/anglaisgraph/bdd/distances.htm
commlang	Dummy variable, set equal to one in the case of host and source countries sharing a common language	CEPII Gravity Dataset; http://www.cepii.fr/anglaisgraph/bdd/distances.htm
diaspora	Estimated size of Indian community in host country as of 2001, in persons	Non Resident Indians & Persons of Indian Origin Division - Ministry of External Affairs of India; http://www.indiandiaspora.nic.in/contents.htm
gdp	Log of GDP of the host country, in US dollars	World Bank, World Development Indicators
gdp growth	Real GDP growth rate of host country in per cent	World Bank, World Development Indicators
inflation	Inflation rate of the host country in per cent	World Bank, World Development Indicators
gdp per capita	GDP of the host country over total population, in US dollars	World Bank, World Development Indicators
trade openness	Sum of imports and exports of the host country in per cent of GDP	UNCTAD
fdi stock/gdp	Stock of foreign direct investment in the host country in US dollars over GDP	UNCTAD; http://unctadstat.unctad.org/ReportFolders/reportFolders.aspx
heritage index	Heritage foundation score of economic freedom; varying from 1 or complete control to 100 or total freedom	Heritage Foundation; http://www.heritage.org/index/explore
invest treaty	Dummy variable, set equal to one in the case of a bilateral investment treaty ratified between source and host country	UNCTAD, http://www.unctadxi.org/templates/DocSearch___779.aspx
natural resources	Natural resources depletion in per cent of gross national income; sum of net forest depletion, energy depletion, and mineral depletion	World Bank, World Development Indicators
patents/population	Patent applications by residents and nonresidents, divided by total population in thousands	World Intellectual Property Organization; http://www.wipo.int/ipstats/en/statistics/patents
tax treaty	Dummy variable, set equal to one in the case of a double taxation treaty ratified between source and host country	IBFD, Tax Treaty Database;http://www.ibfd.org
corruption	Score of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption; varying from approximately -2.5 to 2.5, with higher values corresponding to better governance	World Bank Worldwide Governance Indicators; http://info.worldbank.org/governance/wgi/index.asp
Ginarte Park	Index of the quality of patents regulation in the host country; ranging from 0 to 5 with the highest value implying better enforcement	Data kindly provided by Walter Park
Freedom House	Freedom House's average score of civil and political liberties; ranging from 1 to 7 with higher values denoting less freedom	Freedom House; http://www.freedomhouse.org/
distance/population	Distance between India and the host country over total population	World Bank World Development Indicators and CEPII Gravity Dataset