Hamburg Institute
of International
Economics

What Drives FDI from Non-traditional Sources? A Comparative Analysis of the Determinants of Bilateral FDI Flows

Maximiliano Sosa Andrés, Peter Nunnenkamp, Matthias Busse

HWWI Research
Paper 114

Hamburg Institute of International Economics (HWWI) | 2012
ISSN 1861-504X

Corresponding author:
Matthias Busse
Ruhr-University of Bochum | Faculty of Management and Economics
Universitätsstr. 150 | 44801 Bochum | Germany
Phone: +49-234-32-22902 | Fax: + 49-234-32-14520
matthias.busse@rub.de

HWWI Research Paper
Hamburg Institute of International Economics (HWWI)
Heimhuder Str. 71 | 20148 Hamburg | Germany
Phone: +49 (0)40 34 05 76 - 0 | Fax: +49 (0)40 34 05 76 - 776
info@hwwi.org | www.hwwi.org
ISSN 1861-504X

Editorial Board:
Thomas Straubhaar (Chair)
Michael Bräuninger
Silvia Stiller

© Hamburg Institute of International Economics (HWWI)
January 2012
All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means (electronic, mechanical, photocopying, recording or otherwise) without the prior written permission of the publisher.

What Drives FDI from Non-traditional Sources?
A Comparative Analysis of the Determinants of Bilateral FDI Flows

Maximiliano Sosa Andrés[a]
Peter Nunnenkamp[a]
Matthias Busse[b,c]

January 2012

Abstract: Non-traditional source countries of FDI play an increasingly important role, notably in developing host countries. This raises the question of whether the determinants of FDI differ systematically between traditional and non-traditional source countries. We perform Logit and Poisson Pseudo Maximum Likelihood estimations drawing on UNCTAD's database on bilateral FDI flows, including various emerging and developing countries as sources of FDI outflows. We find that economic geography variables are more relevant for FDI from non-traditional sources, while non-traditional investors appear to be as risk adverse as traditional investors. Access to raw materials represents a less important driving force of FDI from non-traditional sources. The differences are less pronounced for other types of FDI.

JEL code: F21
Keywords: FDI flows, types of FDI, source-host country pairs, location choices, gravity-type models

[a]Kiel Institute for the World Economy
[b]Ruhr-University Bochum
[c]Hamburg Institute of International Economics (HWWI)

Corresponding author: Matthias Busse, Ruhr-University of Bochum, Faculty of Management and Economics, Universitätsstr. 150, GC 3/145, 44801 Bochum, Germany; phone: +49-234-32-22902, fax: + 49-234-32-14520, e-mail: matthias.busse@rub.de.

1. Introduction

Multinational enterprises (MNEs) based outside the OECD have attracted a lot of interest recently. According to Santiso (2007), "the entire global corporate chessboard is changing rapidly" as new MNEs are emerging in various Asian and Latin American countries. *The Economist* (2008) reckons that "a new breed" of MNEs challenges the more traditional ones based in Europe, Japan and North America. A study by Boston Consulting Group (2006) outlines different strategies used by MNEs from emerging markets to expand sales and production internationally. The share of developing and transition economies in outward FDI stocks from all sources was about 17.5 percent in 2010 (UNCTAD 2011: annex table I.2). In most recent years (2009-2010), more than 28 percent of overall FDI outflows originated from developing and transition economies. This suggests that non-traditional sources become increasingly important, even though the most developed source countries may regain some ground after overcoming the financial crisis.

The rise of "new" foreign investors would not only involve competitive challenges for established MNEs based in the most advanced countries. At the same time, this development could be highly relevant for the host countries of FDI, by providing better chances to attract more FDI. Investment promotion agencies may have more options available to lure FDI from different sources (Sauvant 2008). Furthermore, FDI from emerging markets may be better adapted to local conditions in developing host countries. Hence, it could be especially those host countries that had been sidelined by direct investors from the most advanced countries which can now benefit from non-traditional FDI flows. Indeed, Aykut and Ratha (2003) find that more than one-third of FDI flows to developing economies originated from other developing economies in the 1990s already.

This leads to the question of whether foreign direct investors based in emerging markets and developing countries behave differently from traditional investors. Surprisingly, this question has received little attention in the previous empirical literature on the determinants of FDI. In particular, hardly any evidence exists on whether the location choices of foreign investors from non-traditional sources are affected by other pull factors than the location choices of traditional investors. In the following, we employ gravity-type models to address important dimensions of this question. In particular, we assess whether neighboring markets represent a more important pull factor of FDI from non-traditional sources; whether economic instability and political risk in the host countries hinder FDI from non-traditional sources less than FDI from traditional sources; whether cost motives and access to raw materials are driving FDI from both traditional and non-traditional sources; and whether

asset-seeking motives attract FDI from non-traditional sources to more advanced host countries.

We estimate Logit and Poisson Pseudo Maximum Likelihood models, drawing on bilateral FDI flow data from UNCTAD's Data Extract Service. Importantly, the dataset covers various emerging and developing countries as sources of FDI outflows. This allows us to pay heed to Wells' (2009: 40) warning that "it remains important to go beyond country studies to look for general patterns." Before describing the dataset in more detail in Section 3, we summarize the analytical background of our empirical analysis and the relevant literature in Section 2. Section 4 presents the estimation results. We find that economic geography variables are more relevant for FDI from non-traditional sources, while non-traditional investors appear to be as risk adverse as traditional investors. Access to raw materials represents a less important driving force of FDI from non-traditional sources. The differences are less pronounced for other types of FDI. Section 5 concludes.

2. Previous literature and hypotheses

In the light of recent claims according to which new MNEs are reshaping the "entire global corporate chessboard" (Santiso 2007), it may be surprising that a first wave of new MNEs from non-traditional sources was spotted in the late 1970s and early 1980s already (e.g., Lall 1983; Wells 1983).[1] As a matter of fact, large parts of the recent literature have a similar focus as earlier contributions by concentrating on the push factors of FDI, i.e., the characteristics of the firms and those of the countries where the new MNEs are based. Dunning's eclectic theory of FDI (e.g., Dunning 2001) and the related concept of the investment development path (Dunning 1981) provide the most widely used analytical background.[2] This literature is also relevant in the present context of host-country pull factors of FDI. If only indirectly, the discussion of the so-called ownership (or: proprietary) advantages of MNEs allows for inferences with regard to their location choices, and how these choices may differ between traditional and non-traditional MNEs.

The heterogeneous firm model of Helpman et al. (2004) predicts that only the most productive firms engage in FDI to serve foreign markets. In other words, ownership advantages are required to overcome the "liability of foreignness," i.e., to compensate the disadvantage vis-à-vis local firms of conducting operations abroad (Hymer 1976). Moreover,

[1] See Hernández (2008) for an annotated bibliography on outward FDI from emerging markets.
[2] Ownership-specific characteristics represent the first building block of the so-called OLI framework (ownership, location, internalization).

in the context of FDI from new sources, specific ownership advantages are required to compete with MNEs based in economically more advanced source countries. The ownership advantages of the latter are commonly attributed to firm-specific "proprietary technology, powerful brands, marketing prowess, and other managerial capabilities" (Ramamurti 2009b: 405).

In the earlier literature, the ownership advantages of new MNEs were mainly derived from technological adaptation to the conditions typically prevailing in developing countries. For instance, Lall (1983: 6) argued that MNEs based in less developed countries have advantages vis-à-vis competitors from more advanced countries because of "the ability to function better in the environment of other LDCs (governmental, climatic, cultural)". Newcomers may compete successfully with traditional MNEs "not merely because their processes and products are better adapted to local factor prices, factor quality, and demand conditions, but also because the direction of their innovation can provide techniques which are efficient at smaller scales than currently used in developed countries." Likewise, Wells argued that the location choices of Third World MNEs followed almost immediately from their peculiar characteristics compared to more traditional MNEs. Technologies and products were "generated from the conditions of the home countries and thus might be especially well suited to the needs of other developing countries" (Wells 1983: 3), notably those in the closer neighborhood (see also Dunning et al. 1998; UNCTAD 2006: 104 and 117). Ramamurti (2009b: 409) argues that non-traditional MNEs enjoy an "adversity advantage" as they are able "to function effectively in the difficult conditions of emerging markets, where both the 'hard' and 'soft' infrastructures were missing."

This invites several hypotheses related to FDI determinants that are typically considered in gravity-type empirical models (see also Section 3 for details):

H1: The geographical distance between the source country and the host countries should discourage FDI from non-traditional sources more strongly than FDI from traditional sources if new MNEs have competitive advantages mainly in neighboring developing countries.

H2: The familiarity of new MNEs with political and economic conditions prevailing in many developing countries could render them less risk adverse so that their FDI is less discouraged by political uncertainty and economic instability that FDI from traditional sources.

H3: The size of host-country markets could have a weaker impact on FDI from non-traditional sources if new MNEs were locating primarily where the local purchasing power is relatively small.

The more recent literature suggests that subsequent waves of FDI from non-traditional sources are to be attributed to a broader set of motives and more diverse competitive advantages. This could also imply that some pull factors are driving FDI from both traditional and non-traditional sources. Specifically, UNCTAD (2006: 158) concludes from surveys of MNEs based in several emerging markets that "market-seeking FDI is by far the most common type of strategy for developing-country TNCs in their process of internationalization." Chudnovsky and López (2000) find that the bulk of Latin American outward FDI aims at penetrating the markets in other Latin American countries. These findings qualify *H3* above, considering that market-seeking (or: horizontal) FDI typically turns out to be the most important motive in surveys of OECD-based MNEs, too. *H3* may hold as long as horizontal FDI from new sources is concentrated in smaller host economies with relatively low per-capita income. On the other hand, FDI from non-traditional sources may focus on host countries offering larger market potential and higher economic growth.

Similar ambiguity prevails with regard to cost motives as a driving force of vertical (or: efficiency-seeking) FDI as well as the motive to access raw materials in resource-rich countries by means of FDI. 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. Likewise, Aykut and Ratha (2003: 168) suspect that some new MNEs 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). However, survey results indicate that the prevalence of vertical FDI "varies considerably among developing-country TNCs, especially in terms of their country or region of origin and industry" (UNCTAD 2006: 158-9).

The same is probably true for resource-seeking FDI. While this type of FDI is widely discussed, notably with regard to Chinese FDI in Africa (e.g., Reisen and Rieländer 2011), its prominence appears to be limited to selected non-traditional source countries and the more recent past. According to UNCTAD (2006: 161), resource-seeking FDI is rated to be of "moderate significance" in surveys of MNEs from non-traditional source countries. Ambiguous findings are reported in recent country studies. The evidence is mixed even for Chinese FDI. Cheung et al. (2011) show that the endowment of host countries with natural resources is not significantly related with Chinese FDI in Africa. Buckley et al. (2007) come

to a similar conclusion, except for the more recent past. Pradhan (2011: 140) reports opposing results for Chinese and Indian FDI. This leads to the following hypotheses:

H4: Vertical FDI should figure more prominently for MNEs based in traditional source countries where wage costs tend to be higher, on average, than in less advanced source countries.

H5: Access to raw materials may induce FDI from both traditional and non-traditional sources. However, resource-seeking FDI is unlikely to constitute a particularly large share in the FDI portfolio of the latter.

As noted by Busse et al. (2010), the difference between the average per-capita income in the source country and that in the host country is typically used to capture the relevance of vertical FDI undertaken by relatively rich source countries in poorer host countries.[3] At the same time, another type of FDI may flow from relatively poor source countries to richer host countries, i.e., asset-seeking (or: asset-augmenting) FDI used as a means to acquire superior foreign technology.[4] UNCTAD (2006: 136) reports "a noticeable increase" in FDI from non-traditional sources in many developed countries.[5] While developed countries may be the most obvious target to acquire superior technology, this type of FDI appears to be in some conflict with the conventional view that foreign direct investors need to command over some form of ownership advantage. Moon and Roehl (2001: 197) introduce "the idea of imbalance, as opposed to advantage" as the theoretical basis of unconventional types of FDI, including asset-seeking FDI by emerging source countries.[6] Accordingly, firms invest abroad to redress an imbalance between advantages and disadvantages in their competitive position. In this context, Moon and Roehl (2001) argue that asset-augmenting FDI (seeking assets to support cheaper labor) is conceptually similar to vertical FDI (seeking cheaper labor to support proprietary assets), provided that new MNEs are capable of making efficient use of the acquired assets.

H6: While asset-seeking FDI is mainly undertaken by MNEs based in lower-income source countries, its quantitative importance is likely to be limited as long as many non-traditional source countries have insufficient capabilities to absorb superior technology.

---

[3] According to the knowledge-capital model of MNEs, skill differences between the labor force in the source and the host countries would be a preferred indicator (Carr et al. 2001). However, the relevant data are missing for many host countries.

[4] The difficulties of separating vertical from asset-augmenting FDI are discussed in more detail in Section 4 below.

[5] Dunning et al. (2008: 168) see signs of a new wave of asset-augmenting FDI from emerging markets in developed host countries.

[6] Similarly, Luo and Tung (2007) present an international "springboard perspective" according to which new MNEs undertake FDI to compensate for their competitive disadvantages and latecomer disadvantages.

Generally speaking, no consensus has emerged from the previous literature on whether and how relatively new MNEs based in emerging markets differ from more traditional MNEs (Ramamurti 2009a). Some authors, including Aykut and Ratha (2003: 172), claim that the rise in South-South FDI flows is due to similar factors as the surge in North-South FDI flows. However, the factors considered are often broadly defined (e.g., the search of MNEs for higher risk-adjusted returns through diversification), and the relative importance of different factors is left open to debate (see also UNCTAD 2006). Dunning et al. (1998; 2008) posit that new MNEs from at least some emerging source countries such as Korea and Taiwan are becoming increasingly similar to traditional MNEs from the most advanced source countries. By contrast, Rugman (2009: 53) doubts that many MNEs from emerging economies are "truly internationalized" and sees "few signs of developing any proprietary FSAs [firm-specific advantages]." These contrasting views are typically based on descriptive information for a limited and unrepresentative set of MNEs.

Few econometric investigations exist on the determinants of FDI from non-traditional sources. This is in striking contrast to the large literature on FDI from traditional sources.[7] Recent empirical investigations of Chinese FDI provide notable exceptions (Buckley et al. 2007; Cheung et al. 2011). However, FDI from this source is peculiar in various respects, e.g., because of the prominence of state-owned enterprises as foreign direct investors. Moreover, it is only since 2003 that China has published data on outward FDI in line with international (IMF/OECD) standards (Cheung et al. 2011).[8] We are aware of just two comparative studies on FDI from non-traditional sources. Pradhan (2011) compares Chinese and Indian outward FDI. In contrast, our focus is on comparing non-traditional sources of FDI with traditional sources. Gao (2005) is closer to our approach, finding that FDI from five developing economies in East and Southeast Asia exhibits some distinctive features, compared to FDI from developed OECD countries. FDI from developing Asia is less encouraged by higher per-capita GDP of host countries, but more discouraged by larger distance to the host country. However, Gao's (2005) analysis is restricted to cross-sectional OLS and Tobit estimations with the sum of FDI flows over four years, 1994-1997, as the dependent variable.

3. Gravity approach and data

We estimate gravity-type models on the determinants of FDI. Initially applied in the empirical literature on bilateral trade flows, the gravity approach naturally built up into FDI analysis so

[7] For recent overviews, see Chakrabarti (2001) and Blonigen (2005).
[8] Buckley et al. (2007) use approvals rather than realized FDI outflows.

as to become "the most widely used empirical application of FDI" (Blonigen et al. 2007: 1309). According to Mátyás (1997), a correct specification of a gravity model includes time fixed effects (to account for the effects of business cycles or globalization processes on the analyzed variables over the sample) as well as time-invariant source and host country effects. Egger (2000) demonstrates that such specification allows unraveling time-specific and country-specific effects, which are motivated by geographical, historical and political contexts, and outperforms the random effects specification. Anderson and van Wincoop (2003) incorporate the concept of "multilateral resistance", meaning that trade between any two countries depends not only on their bilateral barriers but also on the average barriers of the two countries to all other trading partners. Anderson and van Wincoop (2003) as well as Feenstra (2004) suggest that country-specific fixed effects offer a computationally simple method to account for multilateral resistance terms and give consistent estimates in cross-section gravity models. For panel data specifications and turning specifically to FDI, Bergstrand and Egger (2007) argue on similar lines but include bilateral pair fixed effects so as to control for unobserved time-invariant pair-specific heterogeneity.[9]

Against this backdrop, we employ two different specifications regarding fixed effects. In our first model we include country and time fixed effects so as to allow for time-invariant bilateral variables, such as distance and cultural ties, to enter our model. This specification assumes that there is no time-invariant pair-specific heterogeneity. Our second specification follows Bergstrand and Egger (2007) and includes time and pair fixed effects. This second model will require some modifications in the gravity equation so as to account for time-variant bilateral variables only.

The basic specification of our gravity model is as follows:

$$\log fdi_{ijt} = \alpha + \gamma_0 X_{jt} + \gamma_1 Emerging_i X_{jt} + \phi_0 Y_{ijt} + \phi_1 Emerging_i Y_{ijt} + \lambda_t + \mu_i + \varphi_j + \varepsilon_{ijt} \qquad (1)$$

logfdi_{ijt} represents the natural logarithm of bilateral FDI flows from country *i* to country *j* at period *t*. X_{jt} are a set of control variables for the host country. Y_{ijt} are pair-specific characteristics. *Emerging* is a dummy variable which equals one when the source of FDI is an emerging country. λ_t, μ_i and φ_j are time, source country and host country dummy variables.

[9] Baier and Bergstrand (2007) incorporate country-time effects, assuming that multilateral resistance terms are time varying. Bergstrand and Egger (2007) consider the effects to be "slow moving" so that pair fixed effects should capture "the (most important) cross sectional influence of these terms".

The dataset covers the period from 1978 to 2004.[10] Given the high fluctuation of annual bilateral FDI flows we calculate 3-year averages so as to smooth our dependent variable and, at the same time, ensure that we have enough variation in the data. All remaining negative flows are set at zero so as to maximize the number of applicable observations.[11]

Our sample includes 85 developing and emerging host countries as well as 25 developed host countries, which allows us to avoid sample selection bias.[12] The key element of our analysis is the separate treatment of emerging and developed source countries. Our database includes 11 non-traditional and 18 traditional sources. Appendices C and D provide lists of the source and host countries.

We include a fairly standard group of independent variables, based on previous literature.[13] Importantly, various variables are closely linked to the hypotheses introduced in Section 2. First, we consider a set of gravity-type variables to measure distance between the source and the host country. The distance in kilometers between both countries is calculated as the weighted average of the distances between their main cities (*logdistance*).[14] In addition, three dummy variables are set equal to one if the source and the host country share a common border (*contig*), a common language (*comlang*) or colonial ties (*colony*). All these variables are available from the Centre d'Etudes Prospectives et d'Informations Internationales (CEPII 2011). We expect the effect of distance to be significant and negative for both groups of source countries. However, hypothesis *H1* predicts that distance should discourage FDI from non-traditional sources more strongly than FDI from traditional sources. On the other hand, sharing a border, language or colonial ties should affect bilateral FDI flows positively. According to *H1*, this should apply particularly to FDI from emerging markets.

Several of our independent variables relate to hypothesis *H2* which claims that FDI from non-traditional sources is less discouraged by political uncertainty and economic instability. As for political uncertainty we enter *polcon* which measures the political constraints of the executive branch, as constructed by Henisz (2000). This variable is expected to have a positive effect on FDI as higher values imply stricter constraints and less political

[10] UNCTAD data on bilateral FDI flows are scarce for earlier years. We choose to start with 1978 to avoid any possible bias arising from small samples.
[11] More precisely, we took the natural logarithm of all positive flows of FDI and set the remaining flows at zero.
[12] We exclude offshore financial centers like Panama, the Bahamas or the Cayman Islands. Note that FDI channeled for tax reasons through financial centers to other host countries in our sample cannot be accounted for.
[13] For detailed definitions of the subsequent variables, data sources and summary statistics, see Appendices A and B.
[14] The population of the main cities is used as weights for calculating the average distance. In our pair fixed effects specification, we replace this time-invariant distance measure (and other time-invariant gravity variables) by an alternative distance measure that varies over time. Specifically, we follow Polak (1996) and Warin et al. (2009) and divide *logdistance* by the population of the host country (see below).

discretion. FDI from non-traditional source countries might be less affected by *polcon* due to the familiarity with less stable political environments. Inflation is expected to affect FDI negatively as it proxies macroeconomic instability. Again, investors from emerging markets might be less affected because of their familiarity with economic uncertainty. In addition, we introduce several dummy variables on bilateral and regional agreements that may help contain political and economic uncertainty, thereby inducing higher FDI flows. In particular, we control for bilateral investment treaties (*bit*), double taxation treaties (*dtt*) and regional trade agreements (*rta*) to which source-host pairs are members.

In order to assess hypothesis *H3* on market-seeking or horizontal FDI we include the host country's GDP (*loggdphost*) and GDP growth (*hostgrw*). Both market size and growth are widely expected to induce horizontal FDI as they signal the attractiveness of the country for the parent company to set up a production facility to serve the local market. As for *H4* on vertical or efficiency-seeking FDI we incorporate the difference in per-capita GDP between the source and the host country (*diffgpdpc*). In addition, we take into account that the host country's openness to trade (*hosttrade*) may induce vertical FDI.[15]

As concerns *H5* on resource-seeking FDI we include the depletion of natural resources in percent of gross national income of the host country (*resourcedeplet*), as available from the World Bank. This variable should have a positive sign if FDI is oriented to countries rich in natural resources where the rate of depletion is high.[16] In extended specifications, we also enter the intensity of patenting (*patents*) to capture the technological sophistication of the host country. Higher values of *patents* are supposed to induce asset-augmenting FDI so that this variable allows us to address hypothesis *H6.*

Finally, we account for the well-documented effect of agglomeration on FDI.[17] Agglomeration is proxied by the total stock of FDI from all sources in the host country (*logfdistock*). We expect investors from emerging markets to be attracted even more by agglomeration than investors from traditional source 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.

To test our hypotheses we make use of two different estimators. As an initial stage we analyze the determinants of a country to undertake any FDI at all in another country. For the

[15] Closed economies are hardly attractive to vertical FDI which involves fragmented production patterns and international trade in intermediates.
[16] More precisely, the odds or incidence rate ratios of the models introduced below should be significantly above one, though not necessarily for FDI from non-traditional sources according to *H5*.
[17] See, for example, the initial work of Head et al. (1995) and more recently Head and Mayer (2004) or Buch et al. (2005).

first stage we rely on a Logit model, where the dependent variable is discrete and set equal to one if a source country invests any positive amount in a host country.

At the second stage our dependent variable is the total amount in US dollars invested by a source country in a host country. Given the fact that bilateral FDI flows are zero for around three quarters of our observations we cannot use Ordinary Least Squares to estimate the model as results would be highly biased. We must use a non-linear model to account for the censored FDI data. As explained by Head and Ries (2008), the problem was originally tackled by Eaton and Tamura (1994) and later Wei (2000) by using a Tobit approach. Subsequently, Santos Silva and Tenreyro (2006) proved that the Tobit approach would yield biased results if the model suffered from heteroskedasticity. The authors suggest using Poisson Pseudo Maximum Likelihood (PML), which they prove to be robust and to yield consistent estimates. An additional advantage of the Poisson PML is that it incorporates the zero values of the dependent variable, as opposed to Tobit.[18] Against this backdrop we estimate a fixed effects Poisson PML model in the second stage of our analysis.

As noted before, we are primarily interested to identify the different impact of our independent variables on FDI decisions by traditional and non-traditional source countries. Instead of running separate regressions for the subsample of non-traditional sources of FDI and then comparing the results with some benchmark results for developed countries, we run pooled regressions with all source countries so as to increase the flexibility of testing for statistically significant differences between non-traditional and traditional sources. By introducing a dummy variable for the non-traditional source countries (*emerging*) and interacting this dummy with all independent variables introduced above we mirror separate regressions for each subsample.

The coefficients of interaction terms in non-linear models like Logit cannot be directly interpreted. However, as discussed in Gill (2001), it is possible to estimate the model in the odds of a successful outcome, instead of in probabilities. Specifically for our first stage estimation of bilateral FDI flows such specification would imply estimating the odds of a source country choosing to invest in a host country versus the odds of not choosing that host country. Mathematically this can be expressed as:

$$\log\left[\frac{P(Y_i)=1\,|\,X}{P(Y_i)=0\,|\,X}\right] \qquad (2)$$

[18] Wooldridge (2002, Chapter 19) details the properties of the Poisson PML for continuous and non-negative independent variables.

With this transformation the specification of interaction terms becomes straightforward as in linear models and can be estimated with standard numerical procedures like maximum likelihood. According to Gill (2001), if the fitness of the model improves by the introduction of interaction terms then at least part of the true interaction between the variables of the model will be captured by the estimation. Consequently, we specify our model in the log of odds so as to be able to interpret our results directly. We follow the same rationale for the Poisson PML model and estimate it in incidence rate ratios, which can be interpreted similarly as odds in Logit models.

4. Results

We present our estimation results in several steps. Table 1 summarizes the Logit results in terms of odds ratios in order to assess the decisions of foreign investors on whether or not to engage with FDI in a particular location. Location choices at this gatekeeping stage, as it is often called in the literature on the allocation of foreign aid, imply a binary dependent variable taking the value of one whenever FDI flows from a particular source country to a particular host country (independent of the size of the flow), and zero when there is no bilateral FDI flow in period *t*. In the next step, we present Poisson Pseudo Maximum Likelihood estimations in terms of exponentiated coefficients, i.e., incidence rate ratios (IRRs) with the log of bilateral FDI flows as the dependent variable (Table 2). Note that odds ratios and IRRs below one reveal a negative impact of the corresponding determinant on bilateral FDI flows, whereas ratios above one reveal a positive impact. It should also be recalled from Section 3 that all Logit and Poisson models in Tables 1 and 2 include time dummies as well as source-country and host-country fixed effects. In this way, we account for time-specific effects on bilateral FDI flows that essentially affect all source-host country pairs as well as unobserved heterogeneity among source and host countries of FDI. Finally, we extend the specification of the basic Poisson model (Table 3) and perform panel estimations with fixed effects for each source-host country pair (Table 4).

Logit model results

The Logit estimation shown in column I of Table 1 pools all traditional and non-traditional source countries without attempting to capture varying effects of FDI determinants between the two subgroups. However, we include a dummy variable set equal to one for non-traditional source countries (*emerging*) which reveals that the odds of engaging with bilateral FDI are significantly lower for non-traditional source countries. As can be seen, geography

and history clearly matter at the gatekeeping stage. The odds of engaging with bilateral FDI in a particular location are considerably lower for larger distances between a source-host country pair, while the odds are considerably higher for pairs sharing a common language (*comlang*) or past colonial ties (*colony*). At the same time, the conclusion of bilateral treaties (*dtt, bit*) is associated with significantly higher odds of bilateral FDI engagements. The odds of bilateral FDI engagements are also higher, at the five percent level of significance, where the political environment is less risky (reflected in higher values of *polcon*).

Column I provides little insight on the variables supposed to be relevant for different types of FDI. The proxies used to account for determinants of horizontal FDI, *loggdphost* and *hostgrw*, have the expected odds ratios above one but fail to pass conventional significance levels. The odds ratio of *diffgdppc* even turns out to be significantly below one, suggesting that the likelihood of vertical FDI decreases with higher income gaps between the source and the host country. The proxy for resource-seeking FDI, *resourcedeplet*, enters insignificant. All this is surprising even though the evidence resembles expectations more closely in the second stage of deciding on the size of FDI flows (see below). The weak evidence for major types of FDI at the gatekeeping stage may be partly because the pooling of traditional and non-traditional source countries in column I blurs the differences between the two subgroups. At the same time, the highly significant agglomeration variable, *logfdistock*, suggests that all types of FDI tend to flow where high FDI stocks accumulated from all sources in the past point to a particularly attractive location.

In columns II-IX we successively introduce the determinants of FDI plus the corresponding interaction terms with the dummy for non-traditional source countries. Some of the hypotheses presented in Section 2 are supported, while some other hypotheses are clearly rejected at the gatekeeping stage of FDI-related location choices. Empirical support is particularly strong for *H1* on the effects of geographical distance. The odds ratio of the interaction term *emerging_logdistance* is consistently below one at the one percent level of significance. This means that the discouraging effect of larger distances between the source and the host country on bilateral FDI flows is significantly stronger for FDI from non-traditional sources. The dummy variable for neighboring countries with a common border, *contig*, and its interaction with *emerging* does not offer significant information in addition to the distance variable. By contrast, the effect of a common language is significantly stronger for FDI from non-traditional sources in almost all specifications.

The widely held belief according to which FDI from non-traditional sources is less affected by political uncertainty and economic instability (*H2*) is not supported in Table 1.

The interaction of *emerging* with political uncertainty, reflected in *polcon*, proves to be insignificant at conventional levels. Economic instability, proxied by higher inflation (*hostinfl*), tends to discourage FDI from non-traditional sources, even though the interaction is only weekly significant.

According to the results reported in column IV of Table 1, the odds that host countries with larger local markets attract FDI from non-traditional sources are significantly higher than the benchmark, as revealed by the interaction term *emerging_loggdphost*.[19] This appears to be in conflict with *H3* on horizontal FDI. However, this effect is highly sensitive to minor changes in the specification of the Logit model. By contrast, the interaction with our proxy for vertical FDI, *emerging_diffgdppc*, is above one whenever included in the specification, at the five percent level or better (*H4*).[20] The result on *emerging_diffgdppc* is in line with Wells (1983) and Aykut and Ratha (2003) who stressed the role of cost motives for FDI from non-traditional sources, but it does not hold beyond the gatekeeping stage (see below). The agglomeration effect of already existing FDI stocks from all sources tends to be slightly stronger for bilateral FDI flows from relatively new sources; the interaction terms *emerging_logfdistock* prove to be significant at the ten percent level or better in the fully specified models.

In columns VIII and IX, we also account for resource-seeking FDI by introducing *resourcedeplet* as a proxy of the host countries' endowment of raw materials as well as its interaction with the dummy for non-traditional sources. While this variable per se does not appear to matter for the benchmark at the gatekeeping stage, the corresponding interaction term supports *H5* in that resource-seeking FDI seems to play a minor role for the location choices of direct investors from non-traditional source countries. The latter result is in line with country-specific studies such as Buckley et al. (2007) and Cheung et al. (2011).

Poisson model: basic results

Column I of Table 2 resembles the corresponding Logit estimation in several respects. At the second stage of deciding on FDI amounts, too, larger distances between the source and the host country discourage bilateral FDI. A common language, historical ties, and current

[19] The same result is shown in column IX of Table 1 where we replace *loggdphost* by *lmrp* as the proxy of the size of the relevant host-country market. As argued by Head and Mayer (2004) the market potential measure derives from Krugman's economic geography model (Krugman 1991) and includes demand from multiple locations discounted by distance, while at the same time incorporating the effects of borders as well as an adjustment from competition derived theoretically.

[20] Furthermore, the interaction with the host country's openness to trade has an odds ratio significantly above one. This also suggests that vertical FDI may figure more prominently for non-traditional source countries.

bilateral and regional treaties encourage larger FDI flows.[21] In some other respects, however, the Poisson results differ from the Logit results reported above. Most notably, we now find strong evidence for horizontal FDI. Both the size (*loggdphost*) and the growth (*hostgrw*) of local markets are associated with higher bilateral FDI flows at the one percent level of significance. We also find that host countries' endowment of natural resources (*resourcedeplet*) induces higher bilateral FDI flows.

Turning to the differences between traditional and non-traditional sources, Table 2 strengthens the support of *H1*. Similar to the gatekeeping stage, FDI from non-traditional sources is more sensitive to distance at the second stage of deciding on FDI amounts. In addition, larger amounts of FDI from non-traditional sources flow to neighboring countries, which is in striking contrast to the benchmark result on *contig* for the overall sample of source countries. The IRR on the interaction between *contig* and *emerging* and its statistical significance weakens when successively adding further FDI determinants and the corresponding interaction terms. Nevertheless, the IRR continues to be larger than one at the ten percent level of significance or better when estimating the fully specified model in columns VIII and IX. Likewise, FDI amounts from non-traditional sources are encouraged over-proportionately if the source and the host country share a common language (*emerging_comlang*).[22]

As concerns *H2*, the interaction terms capturing risk-related FDI determinants are again in conflict with the view that MNEs from non-traditional source countries are less risk adverse due to their familiarity with political uncertainty and economic instability at home. Almost all IRRs of the interaction terms with *polcon* and *hostinfl* are statistically insignificant at conventional levels.[23] The same holds for the interaction terms that are supposed to capture differential effects of bilateral treaties as well as regional agreements on FDI from non-traditional sources. DTTs, BITs and RTAs are widely perceived to reduce FDI-related risk. The results on *dtt, bit* and *rta* shown in columns VII-IX suggest that bilateral and regional agreements were effective in inducing higher bilateral FDI. The insignificant interaction terms indicate that the effectiveness of the agreements does not depend on the source of FDI. If

[21] In contrast to the Logit estimation, *contig* enters significantly below one in column I of Table 2. This is surprising even though economic relations between neighboring countries tend to be dominated by trade rather than FDI.

[22] By contrast, past colonial ties stimulate bilateral FDI flows from non-traditional sources less strongly than FDI from traditional sources. This is hardly surprising considering that the former colonial powers typically belong to the second group of source countries.

[23] The only exception is in column IX where host-country inflation appears to be associated positively with FDI from non-traditional sources, at the ten percent level of significance.

investors from non-traditional source countries had been less risk adverse, one could have expected IRRs significantly below one for these interaction terms.

It cannot be ruled out that the evidence on *polcon* as well as its interaction with the dummy variable for FDI from non-traditional sources is weak because this indicator does not capture the most relevant aspects of risk related to institutional void and poor governance. We performed a robustness test to account for this possibility. More precisely, we replaced *polcon* by an index on corruption in the host countries. The index is taken from the International Country Risk Guide (http://www.prsgroup.com/ICRG.aspx) and ranges from zero (highly corrupt) to six (not corrupt). The results for the other variables were hardly affected when re-estimating the fully specified model in column VIII of Table 2 with this modification.[24] The results on corruption largely resemble those on *polcon*. Importantly, the interaction of the corruption index with the dummy variable for FDI from non-traditional sources proved to be insignificant, corroborating the earlier conclusion that non-traditional investors are no less risk adverse than the benchmark of all source countries.

Table 2 provides mixed evidence concerning the differential impact of the driving forces of specific types of FDI. Findings are unambiguous for resource-seeking FDI. Similar to the gatekeeping stage, the Poisson model in columns VIII and IX of Table 2 reveals that the host countries' endowment of natural resources represents a less important driving force of FDI amounts from non-traditional sources. This provides another indication in support of *H5*, according to which resource-seeking FDI is unlikely to constitute a particularly large share in the FDI portfolio of non-traditional source countries.

The evidence is more ambiguous with respect to *H3* on horizontal FDI from non-traditional sources. The IRRs on the interaction term *emerging_loggdphost*, which accounts for the differential impact of local market size, are significantly above one in columns III and IV. However, they prove to be insignificant at conventional levels once the model is specified more fully. The insignificance of *emerging_loggdphost* in columns V-VIII is mainly due to the inclusion of our proxy of agglomeration effects and its interaction with the dummy for non-traditional source countries, *emerging_logfdistock.*[25] Agglomeration effects, which are particularly strong for FDI from non-traditional sources, are likely to induce different types of

[24] There is just one notable exception: The IRR on *resourcedeplet* is no longer significant in the estimation with corruption. This is probably because using the ICRG index results in the loss of almost 2,000 observations, mainly involving pairs with small, poor and resource-dependent host countries. Detailed results are not reported here for the sake of brevity, but are available on request.

[25] In additional estimations not shown in detail, we excluded the proxy of agglomeration effects from the specifications in columns V-VIII of Table 2. With this modification *emerging_loggdphost* proved to be significantly above one. Likewise, the interaction of the dummy for non-traditional sources with the alternative measure of market size, *emerging_lrmp*, proved to be significantly above one when excluding the proxy of agglomeration effects in column IX of Table 2.

FDI. Hence, they should be taken into account in order to avoid biased results for specific types of FDI. In other words, the results reported in Table 2 suggest that horizontal FDI plays a similarly important role for FDI from traditional and non-traditional sources.

As concerns vertical FDI, the IRRs of the interaction term *emerging_diffgdppc* do not differ significantly from one in Table 2. In contrast to the gatekeeping stage, we no longer find evidence suggesting that vertical FDI figures more prominently for MNEs based in non-traditional source countries. Nevertheless, the Poisson results still reject *H4* according to which larger income gaps between the source and the host country are driving (vertical) FDI mainly from traditional sources. We suspect that income gaps reflected in *diffgdppc* – though widely used in the literature on FDI determinants – are insufficient to distinguish vertical FDI from other types of FDI. On the one hand, productivity adjusted wage differentials would be required to better capture cost-oriented FDI motives of MNEs based in high-wage locations.[26] On the other hand, MNEs based in non-traditional source countries may undertake both vertical and horizontal FDI in lower-income countries, with horizontal FDI in these locations possibly serving as testing grounds and springboards for subsequent engagements in more developed markets. Furthermore, the results reported so far on the interaction term *emerging_diffgdppc* may also be shaped by asset-augmenting FDI.

Extended specification and pair fixed effects

The estimations shown in Tables 1 and 2 do not explicitly account for the possibility of asset-augmenting FDI flowing from relatively poor source countries to richer host countries (*H6*). Consequently, the positive correlation between *diffgdppc* and bilateral FDI that would result from vertical FDI may be biased downwards. Unless effectively controlled for, asset-augmenting FDI would imply a negative correlation between *diffgdppc* and bilateral FDI. This would primarily affect the interaction term *emerging_diffgdppc* if asset-augmenting FDI figured prominently in the FDI portfolio of non-traditional source countries.

We estimate an extended specification of the Poisson model to separate vertical FDI from asset-augmenting FDI at least tentatively. The number of patents per 1,000 inhabitants of the host country (*patents*) is added to the list of FDI determinants. We follow previous country studies, notably Buckley et al. (2007) and Pradhan (2011), in regarding the intensity of patenting as a proxy capturing the relevance of asset-augmenting FDI from non-traditional source countries. Data on patents are unavailable for various host countries in our sample so

[26] Data on unit labor cost are available for a small part of our sample of host countries only.

that the results in Table 3 are based on a much smaller number of observations. Nevertheless, the results on our standard list of FDI determinants are surprisingly robust.[27]

Most importantly, concerns that the results on *diffgdppc* and its interaction with *emerging* might be biased downwards in previous estimations appear to be unjustified. At the same time, the patent variable per se offers limited additional insights. One might suspect that the weak evidence on *patents* is due to collinearity with *diffgdppc.* This is not the case, however. Dropping *diffgdppc* from the list of FDI determinants hardly affects the results on *patents*.[28] The IRRs of the interaction between the patent variable and *emerging* are consistently below one, at the five percent level of significance or better, contradicting the view that asset-augmenting FDI figures more prominently for non-traditional source countries. As stated in *H6*, insufficient capabilities to absorb superior technology could have weakened the incentive of MNEs based in non-traditional source countries to undertake asset-augmenting FDI in higher-income countries. Country studies using the patent variable to assess the relevance of asset-augmenting FDI for Chinese and Indian MNEs come to similar conclusions (Buckley et al. 2007; Pradhan 2011).[29]

In the final step of our analysis, we test whether the results of Tables 2 and 3 are robust to the inclusion of fixed effects for each source-host country pair. Note that all time-invariant variables drop out of the Panel Poisson Pseudo Maximum Likelihood estimations reported in Table 4.[30] Following Warin et al. (2009), we keep a distance-related variable by relating the time-invariant *logdistance* to the host countries' population. The results on *logdistpop* per se are not particularly intuitive, which is most probably because of its minor variation within country pairs.[31] Nevertheless, the previous finding that distance primarily discourages FDI from non-traditional sources carries over to the panel estimation, as revealed by (three out of four) IRRs significantly below one for the interaction term *emerging_logdistpop*.

The benchmark results on economic instability (*hostinfl*) and political uncertainty (*polcon*) for the overall sample of source countries prove to be stronger in Table 4 than in the

[27] The most notable exception is that the evidence on resource-seeking FDI weakens considerably; all related variables prove to be insignificant at conventional levels in Table 3. The same applies to the interaction terms with the dummy variable for neighboring countries (*emerging_contig*) and for colonial ties (*emerging_colony*).
[28] Specifically, the IRRs on *patents* continue to be insignificant except for the specification in column II. The results achieved after excluding *diffgdppc* are not shown here, but are available on request.
[29] As noted by Buckley et al. (2007: 513), "the asset-seeking hypothesis is more likely to be supported for more recent years."
[30] The considerably reduced number of observations underlying the results reported in Table 4 is for technical reasons. In contrast to previous models, the panel estimations eliminate the entire observation if any explanatory variable is missing.
[31] For the same reason, several IRRs are no longer significantly different from one when assessing the impact of bilateral treaties (*dtt*, *bit*) and regional agreements (*rta*) within country pairs.

corresponding estimations reported in Tables 2 and 3.[32] IRRs significantly below one for *hostinfl* and IRRs significantly above one for *polcon* suggest that bilateral FDI within country pairs is generally discouraged under conditions of increasing economic instability and political uncertainty. All the same, the panel results in Table 4 reinforce the previous finding that FDI from non-traditional sources is as sensitive to economic instability and political uncertainty as FDI from traditional sources. None of the relevant interaction terms, *emerging_hostinfl* and *emerging_ polcon*, differs significantly from one in Table 4 – similar to the corresponding estimations in Tables 2 and 3 before.

Turning to major types of FDI, the benchmark results for all source countries in Table 4 are closely in line with previous results in the corresponding columns of Tables 2 and 3 on the driving forces of horizontal FDI. The IRRs for the size and growth of host-country GDP (*loggdphost, hostgrw*) as well as the real market potential (*lrmp*) are typically above one and highly significant. The evidence is less clear with regard to the interactions of these variables with the dummy variable for non-traditional source countries. The interactions with *loggdphost* suggest that horizontal FDI figures more prominently for FDI from non-traditional sources. Increasing market size (and, in some cases, also higher market growth) has stronger effects on FDI flows from non-traditional sources within country pairs. Yet the evidence for this type of FDI is not consistently in conflict with *H3*, taking into account that the interaction with *lrmp* proves to be insignificant at conventional levels of significance.

As concerns vertical FDI, the estimations with pair fixed effects in columns I and II of Table 4 indicate that the impact of differences in per-capita GDP (*diffgdppc*) tends to be blurred when pooling traditional and non-traditional source countries. Allowing for differential effects between traditional and non-traditional sources, the IRRs for *diffgdppc* per se prove to be significantly above one, while the IRRs for its interaction with the dummy variable for non-traditional sources prove to be significantly below one. This finding supports *H4*. While increasing income gaps within source-host country pairs are generally associated with higher (vertical) FDI flows, this effect is comparatively weak for pairs with non-traditional source countries.

Table 4 also supports *H5* that resource-seeking FDI is unlikely to constitute a particularly large share of FDI from non-traditional sources. As in Tables 2 and 3 before, the interaction between the host countries' endowment of raw materials and the dummy variable for FDI from non-traditional sources is either insignificant or below one (at the five percent level in column V of Table 4). In general, the results on *resourcedeplet* are less intuitive once

[32] The insignificant results for *hostinfl* in columns I, III and V of Table 4 (without *patents*) are an exception.

pair fixed effects are accounted for. This is probably because the endowment of raw materials varies only moderately within country pairs. Finally, the inclusion of the patent variable (*patents*) in columns II, IV and VI of Table 4 offers no additional insights.

5. Summary and conclusion

Proponents of globalization as well as prominent critics largely agree that FDI could bring considerable benefits to the host countries (e.g., OECD 2002; Stiglitz 2000). However, various locations where the need for foreign capital, technology and know-how appears to be greatest have traditionally been sidelined by multinational enterprises. According to the so-called Monterrey Consensus, achieved at the UN summit on financing for development in 2003, "a central challenge, therefore, is to create the necessary domestic and international conditions to facilitate direct investment flows (…) to developing countries, particularly Africa, least developed countries, small island developing states, and landlocked developing countries, and also to countries with economies in transition" (UN 2003: 9).

FDI from non-traditional sources could help meet this challenge. Emerging economies play an increasingly important role as sources of FDI, notably in developing host countries. Moreover, FDI from these sources is widely perceived to be better adapted to local conditions in developing host countries. Yet it is open to question under which conditions host countries have more options available to lure FDI from different sources. Much depends on whether the determinants of FDI differ systematically between traditional and non-traditional source countries. We performed Logit and Poisson Pseudo Maximum Likelihood estimations on bilateral FDI flows for large samples of source and host countries to address this question.

We find little evidence that FDI from non-traditional sources is mainly resource seeking or asset augmenting. In contrast to widespread belief, the endowment of host countries with raw materials proved to be of minor importance for FDI from non-traditional sources, compared to FDI from traditional sources. In other words, it is not only resource-rich countries that have favorable chances to attract FDI from non-traditional sources. Asset-augmenting FDI may figure more prominently in the future once non-traditional source countries are less constrained in absorbing superior technologies available in more advanced host countries. In the past, however, a few large and publicized acquisitions of European and US firms by investors from emerging markets (e.g., the acquisitions of Arcelor by Mittal in the steel industry and IBM's PC business by Lenovo) tend to disguise that the availability of superior technologies was a minor driving force of FDI from non-traditional sources.

Nevertheless, various host countries will find it as difficult to attract FDI from non-traditional sources as before from traditional sources. First of all, we find strong empirical support for the hypothesis that direct investors based in emerging markets are more discouraged than their peers based in developed countries to engage in more distant host countries. This holds for both stages of location choice, i.e., the decision to undertake any FDI at all as well as the decision on the amount of FDI in host countries having passed the gatekeeping stage. Accordingly, investment promotion agencies are well advised to target new sources of FDI in the closer neighborhood.

The evidence on the driving forces of horizontal and vertical FDI is more ambiguous. It appears that cost savings do not only motivate vertical FDI flows from the most advanced source countries, even though the impact on FDI amounts tends to be weaker for non-traditional sources. By contrast, large and growing local markets are no less attractive for FDI from non-traditional sources than for FDI from traditional sources. This suggests that the chances are slim for small host countries with limited purchasing power to target new investors based in emerging markets as alternative sources of FDI. This conclusion is corroborated by particularly strong agglomeration effects on FDI from non-traditional sources.

Most strikingly perhaps, our findings contradict the view that non-traditional investors are less risk adverse than their peers based in advanced source countries. In other words, the familiarity of non-traditional investors with macroeconomic instability, political discretion and corruption at home does not imply that the choice of foreign locations is less affected by such risk factors. Consequently, it would be self-defeating if host countries gave less priority to macroeconomic stabilization and containing political uncertainty by institutional reforms and better governance. This would not only deter traditional investors but also investors from emerging markets, even though future research may reveal that direct investors operating under difficult political and economic conditions at home may react differently to specific aspects of risk.

References:

Anderson, James and Eric van Wincoop (2003). Gravity with gravitas: A solution to the border puzzle. *American Economic Review* 93 (1): 170–192.

Aykut, Dilek and Dilip Ratha (2003). South-south FDI flows: How big are they? *Transnational Corporations* 13 (1): 149–176.

Baier, Scott L. and Jeffrey H. Bergstrand (2007). Do free trade agreements actually increase members' international trade? *Journal of International Economics* 71 (1): 72–95.

Bergstrand, Jeffrey H. and Peter Egger (2007). A knowledge-and-physical-capital model of international trade flows, foreign direct investment, and multinational enterprises. *Journal of International Economics* 73 (2): 278–308.

Blonigen, Bruce A. (2005). A review of the empirical literature on FDI determinants. *Atlantic Economic Journal* 33 (4): 383–403.

Blonigen, Bruce A., Ronald B. Davies, Glen R. Waddell and Helen T. Naughton (2007). FDI in space: Spatial autoregressive relationships in foreign direct investment. *European Economic Review* 51 (5): 1303–1325.

Boston Consulting Group (2006). *The New Global Challengers: How 100 Top Companies from Rapidly Developing Economies are Challenging the World.* Boston (Boston Consulting Group).

Buch, Claudia M., Jörn Kleinert, Alexander Lipponer and Farid Toubal (2005). Determinants and effects of foreign direct investment: Evidence from German firm-level data. *Economic Policy* 20 (1): 52–110.

Buckley, Peter J., L. Jeremy Clegg, Adam R. Cross, Xin Liu, Hinrich Voss and Ping Zheng (2007). The determinants of Chinese outward foreign direct investment. *Journal of International Business Studies* 38 (4): 499–518.

Busse, Matthias, Jens Königer and Peter Nunnenkamp (2010). FDI promotion through bilateral investment treaties: More than a bit? *Review of World Economics* 146 (1): 146–177.

Carr, David L., James R. Markusen, and Keith E. Maskus (2001). Estimating the knowledge-capital model of the multinational enterprise. *American Economic Review* 91(3): 693–708.

CEPII (2011). The CEPII Gravity Dataset. Internet Posting: http://www.cepii.fr/anglaisgraph/bdd/distances.htm (accessed 12 December 2011).

Chakrabarti, Avik (2001). The determinants of foreign direct investment: Sensitivity analyses of cross-country regressions. *Kyklos* 54 (1): 89–114.

Cheung, Yin-Wong, Jakob de Haan, Xing Wang Qian and Shu Yu (2011). China's outward direct investment in Africa. Hong Kong Institute for Monetary Research, Working Paper 13/2011, forthcoming in *Review of International Economics.*

Chudnovsky, Daniel and Andrés López (2000). A third wave of FDI from developing countries: Latin American TNCs in the 1990s. *Transnational Corporations* 9 (2): 31–73.

Dunning, John H. (1981). Explaining the international direct investment position of countries: Towards a dynamic or developmental approach. *Weltwirtschaftliches Archiv* 117 (1): 30–64.

Dunning, John H. (2001). The eclectic (OLI) paradigm of international production: Past, present and future. *International Journal of the Economics of Business* 8 (2): 173–190.

Dunning, John H., Roger van Hoesel and Rajneesh Narula (1998). Third World multinationals revisited: New developments and theoretical implications. In: John H. Dunning (ed.), *Globalization, Trade and Foreign Direct Investment.* Amsterdam (Elsevier): 255–286.

Dunning, John H., Changsu Kim and Donghyun Park (2008). Old wine in new bottles: A comparison of emerging-market TNCs today and developed-country TNCs thirty years ago. In: Karl P. Sauvant (ed.), *The Rise of Transnational Corporations from Emerging Markets: Threat or Opportunity?* Cheltenham (Edward Elgar): 158–180.

Eaton, Jonathan and Akiko Tamura (1994). Bilateralism and regionalism in Japanese and U.S. trade and direct foreign investment patterns. *Journal of the Japanese and International Economies* 8 (4): 478–510.

Egger, Peter (2000). A note on the proper econometric specification of the gravity equation. *Economics Letters* 66 (1): 25–31.

Feenstra, Robert (2004). *Advanced International Trade: Theory and Evidence*. Princeton (Princeton University Press).

Gao, Ting (2005). Foreign direct investment from developing Asia: Some distinctive features. *Economics Letters* 86 (1): 29–35.

Gill, Jeff (2001). Interpreting interactions and interaction hierarchies in generalized linear models: Issues and applications. Paper presented at the Annual Meeting of the American Political Science Association, San Francisco.

Head, Keith and Thierry Mayer (2004). Market potential and the location of Japanese investment in the European Union. *Review of Economics and Statistics* 86 (4): 959–972.

Head, Keith and John Ries (2008). FDI as an outcome of the market for corporate control: Theory and evidence. *Journal of International Economics* 74 (1): 2–20.

Head, Keith, John Ries and Deborah Swenson (1995). Agglomeration benefits and location choice: Evidence from Japanese manufacturing investment in the United States. *Journal of International Economics* 38 (3–4): 223–247.

Helpman, Elhanan, Marc J. Melitz and Stephen R. Yeaple (2004). Export versus FDI with heterogeneous firms. *American Economic Review* 94 (1): 300–316.

Henisz, Witold (2000). The institutional environment for multinational investment. *Journal of Law, Economics and Organization* 16 (2): 334–364.

Hernández, Zenaida (2008). Outward foreign direct investment from emerging markets: An annotated bibliography. In: Karl P. Sauvant (ed.), *The Rise of Transnational Corporations from Emerging Markets: Threat or Opportunity?* Cheltenham (Edward Elgar): 339–373.

Hymer, Stephen H. (1976). *The International Operations of National Firms: A Study of Direct Investment*. Cambridge, MA (MIT Press).

Krugman, Paul (1991). Increasing returns and economic geography. *Journal of Political Economy* 99 (3): 483–499.

Lall, Sanjaya (1983). *The New Multinationals: The Spread of Third World Enterprises.* Chichester (John Wiley & Sons).

Liu, Wan-Hsin and Peter Nunnenkamp (2011). Domestic repercussions of different types of FDI: Firm-level evidence for Taiwanese manufacturing. *World Development* 39 (5): 808–823.

Luo, Yadong and Rosalie L. Tung (2007). International expansion of emerging market enterprises: A springboard perspective. *Journal of International Business Studies* 38 (4): 481–498.

Mátyás, László (1997). Proper econometric specification of the gravity model. *World Economy* 20 (3): 363–368.

Moon, Hwy-Chang and Thomas W. Roehl (2001). Unconventional foreign direct investment and the imbalance theory. *International Business Review* 10 (2): 197–215.

OECD (2002). *Foreign Direct Investment for Development: Maximising Benefits, Minimising Costs.* Paris (Organisation for Economic Co-operation and Development).

Pradhan, Jaya Prakash (2011). Emerging multinationals: A comparison of Chinese and Indian outward foreign direct investment. *International Journal of Institutions and Economies* 3 (1): 113–148.

Polak, Jacques (1996). Is APEC a natural regional trading bloc? A critique of the 'gravity model' of international trade. *World Economy* 19 (5): 533–543.

Ramamurti, Ravi (2009a). Why study emerging market multinationals? In: Ravi Ramamurti and Jitendra V. Singh (eds.), *Emerging Multinationals in Emerging Markets.* Cambridge (Cambridge University Press): 3–22.

Ramamurti, Ravi (2009b). What have we learned about emerging-market MNEs? In: Ravi Ramamurti and Jitendra V. Singh (eds.), *Emerging Multinationals in Emerging Markets.* Cambridge (Cambridge University Press): 399–426.

Reisen, Helmut and Jan Rieländer (2011). Africa attracts FDI – but does it help? Columbia FDI Perspectives, forthcoming.

Rugman, Alan M. (2009). Theoretical aspects of MNEs from emerging economies. In: Ravi Ramamurti and Jitendra V. Singh (eds.), *Emerging Multinationals in Emerging Markets.* Cambridge (Cambridge University Press): 42–63.

Santiso, Javier (2007). The emergence of Latin multinationals. Deutsche Bank Research, Current Issues, March 7. Frankfurt.

Santos Silva, Joao and Silvana Tenreyro (2006). The log of gravity. *Review of Economics and Statistics* 88 (4): 641–658.

Sauvant, Karl P. (2008). The rise of TNCs from emerging markets: The issues. In: Karl P. Sauvant (ed.), *The Rise of Transnational Corporations from Emerging Markets: Threat or Opportunity?* Cheltenham (Edward Elgar): 3–14.

Stiglitz, Joseph E. (2000). Capital market liberalization, economic growth, and instability. *World Development* 28 (6): 1075–1086.

The Economist (2008). The challengers: A new breed of multinational company has emerged. January 12: 58–60.

UN (2003). *Monterrey Consensus of the International Conference on Financing for Development*. New York: A/CONF, 198/11, chapter 1, resolution 1, annex. http://www.un.org/esa/ffd/monterrey/MonterreyConsensus.pdf (accessed 5 January 2012).

UNCTAD (2006). *World Investment Report 2006. FDI from Developing and Transition Economies: Implications for Development.* New York and Geneva (United Nations).

UNCTAD (2011). *World Investment Report 2011.* New York and Geneva (United Nations).

Warin, Thierry, Phanindra V. Wunnava and Hubert Janicki (2009). Testing Mundell's intuition of endogenous OCA theory. *Review of International Economics* 17 (1): 74–86.

Wei, Shang-Jin (2000). How taxing is corruption on international investors? *Review of Economics and Statistics* 82 (1): 1–11.

Wells jr., Louis T. (1983). *Third World Multinationals: The Rise of Foreign Investment from Developing Countries.* Cambridge, MA (MIT Press).

Wells jr., Louis T. (2009). Third World multinationals: A look back. In: Ravi Ramamurti and Jitendra V. Singh (eds.), *Emerging Multinationals in Emerging Markets.* Cambridge (Cambridge University Press): 23–41.

Wooldridge, Jeffrey M. (2002). *Econometric Analysis of Cross Section and Panel Data*. Cambridge, MA (MIT Press).

TABLE 1 – Logit model with country fixed effects

VARIABLES	I Odds ratio	II Odds ratio	III Odds ratio	IV Odds ratio	V Odds ratio	VI Odds ratio	VII Odds ratio	VIII Odds ratio	IX Odds ratio
logdistance	0.315***	0.356***	0.353***	0.341***	0.336***	0.337***	0.388***	0.382***	0.377***
	(0.0171)	(0.0178)	(0.0177)	(0.0178)	(0.0180)	(0.0182)	(0.0260)	(0.0263)	(0.0261)
contig	1.251	0.962	0.970	0.974	0.892	0.923	1.047	1.220	1.190
	(0.237)	(0.249)	(0.251)	(0.255)	(0.240)	(0.253)	(0.286)	(0.347)	(0.338)
comlang	2.456***	2.264***	2.248***	2.210***	2.224***	2.226***	2.073***	2.007***	1.992***
	(0.246)	(0.258)	(0.257)	(0.253)	(0.257)	(0.259)	(0.242)	(0.239)	(0.238)
colony	2.069***	2.538***	2.536***	2.594***	2.528***	2.546***	2.299***	2.321***	2.346***
	(0.280)	(0.349)	(0.349)	(0.359)	(0.355)	(0.362)	(0.330)	(0.346)	(0.350)
loggdphost	1.079		1.013	1.026	1.128	1.128	1.088	1.073	
	(0.130)		(0.105)	(0.116)	(0.134)	(0.135)	(0.130)	(0.131)	
hostgrw	1.009		1.031***	1.032***	1.011	1.008	1.010	1.010	1.010
	(0.00815)		(0.00742)	(0.00804)	(0.00855)	(0.00856)	(0.00857)	(0.00875)	(0.00888)
hostinfl	0.994			1.014	0.995	0.995	0.996	1.010	1.003
	(0.0251)			(0.0248)	(0.0253)	(0.0253)	(0.0255)	(0.0270)	(0.0267)
diffgdppc	0.980**			0.996	0.994	0.991	0.987	0.984*	0.984*
	(0.00877)			(0.00847)	(0.00891)	(0.00898)	(0.00915)	(0.00937)	(0.00914)
hosttrade	1.003			1.003	1.003	1.003	1.002	1.002	1.001
	(0.00229)			(0.00206)	(0.00226)	(0.00229)	(0.00229)	(0.00234)	(0.00236)
logfdistock	1.123***				1.120***	1.123***	1.096***	1.100***	1.099***
	(0.0336)				(0.0283)	(0.0286)	(0.0285)	(0.0343)	(0.0339)
polcon	1.671**					1.605*	1.542*	1.609*	1.631*
	(0.405)					(0.395)	(0.382)	(0.412)	(0.418)
rta	1.025						1.376**	1.320**	1.328**
	(0.114)						(0.181)	(0.177)	(0.178)
dtt	1.703***						1.679***	1.693***	1.683***
	(0.128)						(0.144)	(0.148)	(0.147)
bit	1.311***						1.274***	1.286***	1.284***
	(0.0938)						(0.106)	(0.108)	(0.108)
resourcedeplet	0.629							0.922	0.939
	(0.471)							(0.696)	(0.715)
lrmp									1.052
									(0.119)
emerging	0.224***	23.61***	17.86***	3.044	4.155	4.042	4.733	3.475	0.750
	(0.0677)	(21.68)	(17.57)	(3.362)	(4.840)	(4.717)	(5.895)	(4.436)	(1.126)
emerging_logdistance		0.604***	0.584***	0.598***	0.593***	0.588***	0.568***	0.590***	0.606***
		(0.0604)	(0.0600)	(0.0622)	(0.0640)	(0.0638)	(0.0693)	(0.0739)	(0.0760)
emerging_contig		1.040	0.998	1.122	1.206	1.134	0.981	0.882	0.943
		(0.373)	(0.359)	(0.410)	(0.452)	(0.431)	(0.376)	(0.346)	(0.370)
emerging_comlang		1.372	1.399	1.646**	1.718**	1.714**	1.586*	1.663**	1.657**
		(0.307)	(0.322)	(0.387)	(0.412)	(0.413)	(0.385)	(0.411)	(0.403)
emerging_colony		0.882	0.851	0.823	0.737	0.732	0.847	0.818	0.797
		(0.335)	(0.327)	(0.317)	(0.287)	(0.286)	(0.333)	(0.323)	(0.315)
emerging_loggdphost			1.047	1.172***	1.089	1.085	1.086	1.078	
			(0.0343)	(0.0531)	(0.0703)	(0.0706)	(0.0724)	(0.0756)	
emerging_hostgrw			1.004	0.982	0.990	0.992	0.991	0.992	0.996
			(0.0131)	(0.0133)	(0.0142)	(0.0144)	(0.0144)	(0.0151)	(0.0153)
emerging_hostinfl				0.909**	0.924*	0.925*	0.932*	0.929*	0.949
				(0.0357)	(0.0374)	(0.0376)	(0.0381)	(0.0391)	(0.0407)
emerging_diffgdppc				1.023***	1.018**	1.019**	1.021**	1.024**	1.027***
				(0.00897)	(0.00901)	(0.00921)	(0.00969)	(0.00979)	(0.00974)

TABLE 1 – continued

	I	II	III	IV	V	VI	VII	VIII	IX
VARIABLES	Odds ratio	Odds ratio	Odds ratio	Odds ratio	Odds ratio	Odds ratio	Odds ratio	Odds ratio	Odds ratio
emerging_hosttrade				1.009***	1.007***	1.007***	1.007***	1.008***	1.006***
				(0.00179)	(0.00193)	(0.00196)	(0.00199)	(0.00205)	(0.00170)
emerging_logfdistock					1.065	1.065	1.077	1.092*	1.109***
					(0.0504)	(0.0507)	(0.0518)	(0.0576)	(0.0435)
emerging_polcon						1.212	1.319	1.029	1.014
						(0.411)	(0.454)	(0.372)	(0.366)
emerging_rta							0.770	0.787	0.787
							(0.206)	(0.212)	(0.210)
emerging_dtt							0.977	0.955	0.960
							(0.153)	(0.153)	(0.151)
emerging_bit							1.032	0.982	0.970
							(0.166)	(0.160)	(0.158)
emerging_resourcedeplet								0.111**	0.191*
								(0.101)	(0.177)
emerging_lrmp									1.144**
									(0.0711)
Observations	19,215	21,175	21,102	20,967	20,042	19,868	19,868	19,215	19,215
Country FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year Dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES
Interactions	NO	YES	YES	YES	YES	YES	YES	YES	YES
Pseudo R-squared	0.479	0.478	0.480	0.480	0.479	0.480	0.483	0.482	0.482

Notes: Standard errors in parentheses; coefficients for the year, source and host dummies are not shown; ***, ** and * denote significance at the one, five, and ten percent level, respectively.

TABLE 2 – Poisson Pseudo Maximum Likelihood model with country fixed effects

	I	II	III	IV	V	VI	VII	VIII	IX
VARIABLES	IRR	IRR	IRR	IRR	IRR	IRR	IRR	IRR	IRR
logdistance	0.595***	0.608***	0.608***	0.605***	0.607***	0.610***	0.649***	0.641***	0.637***
	(0.0158)	(0.0142)	(0.0141)	(0.0143)	(0.0143)	(0.0144)	(0.0201)	(0.0202)	(0.0204)
contig	0.685***	0.676***	0.683***	0.681***	0.674***	0.669***	0.710***	0.707***	0.711***
	(0.0367)	(0.0390)	(0.0392)	(0.0387)	(0.0384)	(0.0384)	(0.0415)	(0.0411)	(0.0412)
comlang	1.406***	1.330***	1.325***	1.322***	1.336***	1.354***	1.273***	1.270***	1.258***
	(0.0646)	(0.0676)	(0.0666)	(0.0660)	(0.0665)	(0.0674)	(0.0630)	(0.0629)	(0.0624)
colony	1.417***	1.492***	1.503***	1.508***	1.509***	1.479***	1.519***	1.520***	1.520***
	(0.0749)	(0.0848)	(0.0839)	(0.0837)	(0.0825)	(0.0812)	(0.0824)	(0.0833)	(0.0834)
loggdphost	1.372***		1.245***	1.356***	1.441***	1.436***	1.324***	1.362***	
	(0.0931)		(0.0732)	(0.0852)	(0.0958)	(0.0952)	(0.0883)	(0.0936)	
hostgrw	1.013***		1.030***	1.027***	1.015***	1.014***	1.015***	1.014***	1.015***
	(0.00476)		(0.00447)	(0.00464)	(0.00484)	(0.00486)	(0.00484)	(0.00497)	(0.00505)
hostinfl	0.997			1.001	0.988	0.987	0.987	0.996	0.987
	(0.0142)			(0.0139)	(0.0143)	(0.0142)	(0.0145)	(0.0146)	(0.0145)
diffgdppc	1.003			1.024***	1.018***	1.015***	1.003	1.006	1.001
	(0.00478)			(0.00452)	(0.00465)	(0.00472)	(0.00482)	(0.00497)	(0.00489)
hosttrade	1.000			1.002	1.002	1.002	1.001	1.000	0.999
	(0.00123)			(0.00119)	(0.00124)	(0.00125)	(0.00124)	(0.00124)	(0.00128)
logfdistock	1.053***				1.061***	1.063***	1.045***	1.041**	1.055***
	(0.0201)				(0.0171)	(0.0174)	(0.0161)	(0.0186)	(0.0199)
polcon	1.208					1.385**	1.316**	1.228	1.267*
	(0.164)					(0.185)	(0.176)	(0.170)	(0.175)
rta	1.180***						1.274***	1.248***	1.238***
	(0.0709)						(0.0825)	(0.0819)	(0.0813)
dtt	1.764***						1.633***	1.688***	1.708***
	(0.0833)						(0.0824)	(0.0884)	(0.0900)
bit	1.428***						1.372***	1.363***	1.366***
	(0.0519)						(0.0564)	(0.0566)	(0.0571)
resourcedeplet	4.691**							6.781***	4.805**
	(3.106)							(4.452)	(3.207)
lrmp									1.171***
									(0.0647)
emerging	0.0922***	0.276**	0.108***	0.109***	0.524	0.519	0.228*	0.322	0.0551***
	(0.0142)	(0.169)	(0.0758)	(0.0868)	(0.446)	(0.439)	(0.195)	(0.289)	(0.0537)
emerging_logdistance		0.835***	0.814***	0.821***	0.739***	0.732***	0.770***	0.768***	0.805***
		(0.0531)	(0.0548)	(0.0563)	(0.0526)	(0.0524)	(0.0583)	(0.0612)	(0.0612)
emerging_contig		1.907***	1.876***	1.919***	1.613***	1.598***	1.285	1.320*	1.387**
		(0.287)	(0.285)	(0.295)	(0.252)	(0.251)	(0.209)	(0.217)	(0.228)
emerging_comlang		2.078***	2.324***	2.363***	2.139***	2.102***	2.050***	2.162***	2.301***
		(0.259)	(0.295)	(0.299)	(0.275)	(0.269)	(0.262)	(0.295)	(0.311)
emerging_colony		0.719	0.560**	0.570**	0.669*	0.678*	0.718*	0.715*	0.661**
		(0.166)	(0.140)	(0.140)	(0.155)	(0.157)	(0.140)	(0.138)	(0.129)
emerging_loggdphost			1.103***	1.127***	0.905	0.904	0.946	0.923	
			(0.0238)	(0.0325)	(0.0595)	(0.0596)	(0.0571)	(0.0633)	
emerging_hostgrw			0.982*	0.980*	0.978*	0.979*	0.988	0.990	0.991
			(0.0102)	(0.0106)	(0.0120)	(0.0122)	(0.0121)	(0.0129)	(0.0126)
emerging_hostinfl				0.994	1.018	1.021	1.036	1.039	1.050*
				(0.0257)	(0.0281)	(0.0278)	(0.0281)	(0.0292)	(0.0305)
emerging_diffgdppc				1.000	0.998	0.999	1.001	1.001	1.007
				(0.00518)	(0.00519)	(0.00537)	(0.00536)	(0.00558)	(0.00578)

TABLE 2 – continued

VARIABLES	I IRR	II IRR	III IRR	IV IRR	V IRR	VI IRR	VII IRR	VIII IRR	IX IRR
emerging_hosttrade				1.002*	0.999	0.999	0.998	0.999	1.000
				(0.00108)	(0.00130)	(0.00134)	(0.00132)	(0.00142)	(0.00107)
emerging_logfdistock					1.226***	1.227***	1.173***	1.198***	1.127***
					(0.0747)	(0.0756)	(0.0656)	(0.0776)	(0.0383)
emerging_polcon						1.108	0.925	0.726	0.711
						(0.262)	(0.218)	(0.192)	(0.187)
emerging_rta							0.991	0.962	0.999
							(0.155)	(0.150)	(0.156)
emerging_dtt							1.002	0.915	0.906
							(0.107)	(0.102)	(0.102)
emerging_bit							1.116	1.091	1.074
							(0.102)	(0.102)	(0.102)
emerging_resourcedeplet								0.0598***	0.0828***
								(0.0500)	(0.0709)
emerging_lrmp									1.054
									(0.0428)
Observations	19,215	21,175	21,102	20,967	20,042	19,868	19,868	19,215	19,215
Country FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year Dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES
Interactions	NO	YES	YES	YES	YES	YES	YES	YES	YES
Pseudo R-squared	0.537	0.534	0.536	0.536	0.535	0.535	0.542	0.542	0.541

Notes: Standard errors in parentheses are corrected for heteroskedasticity; coefficients for the year, source and host dummies are not shown; ***, ** and * denote significance at the one, five, and ten percent level, respectively.

TABLE 3 – Poisson Pseudo Maximum Likelihood model with country fixed effects: extended specification

VARIABLES	I IRR	II IRR	III IRR	IV IRR	V IRR	VI IRR	VII IRR
logdistance	0.609***	0.609***	0.613***	0.616***	0.646***	0.646***	0.641***
	(0.0166)	(0.0151)	(0.0153)	(0.0154)	(0.0210)	(0.0210)	(0.0211)
contig	0.718***	0.723***	0.722***	0.717***	0.755***	0.756***	0.754***
	(0.0386)	(0.0411)	(0.0411)	(0.0410)	(0.0437)	(0.0436)	(0.0435)
comlang	1.337***	1.249***	1.252***	1.265***	1.198***	1.202***	1.196***
	(0.0640)	(0.0645)	(0.0647)	(0.0653)	(0.0611)	(0.0612)	(0.0609)
colony	1.366***	1.446***	1.450***	1.427***	1.468***	1.460***	1.459***
	(0.0736)	(0.0820)	(0.0814)	(0.0806)	(0.0822)	(0.0815)	(0.0815)
loggdphost	1.206**	1.261***	1.287***	1.291***	1.166**	1.203**	
	(0.0915)	(0.0902)	(0.0953)	(0.0957)	(0.0874)	(0.0923)	
hostgrw	1.011*	1.023***	1.014**	1.013**	1.013**	1.013**	1.013**
	(0.00566)	(0.00563)	(0.00587)	(0.00591)	(0.00591)	(0.00590)	(0.00595)
hostinfl	0.973*	1.003	0.986	0.984	0.973*	0.973	0.965**
	(0.0158)	(0.0155)	(0.0161)	(0.0161)	(0.0162)	(0.0162)	(0.0159)
hosttrade	1.001	1.002	1.001	1.001	1.001	1.001	1.000
	(0.00131)	(0.00134)	(0.00134)	(0.00134)	(0.00133)	(0.00132)	(0.00138)
patents	1.080	1.104*	1.090	1.088	1.089	1.090	1.075
	(0.0700)	(0.0658)	(0.0727)	(0.0725)	(0.0705)	(0.0699)	(0.0696)
diffgdppc	1.002	1.027***	1.021***	1.018***	1.003	1.005	1.002
	(0.00520)	(0.00495)	(0.00510)	(0.00522)	(0.00531)	(0.00541)	(0.00527)
logfdistock	1.056***		1.102***	1.104***	1.082***	1.048**	1.055***
	(0.0215)		(0.0225)	(0.0232)	(0.0219)	(0.0199)	(0.0211)
polcon	1.182			1.337**	1.332**	1.207	1.228
	(0.170)			(0.195)	(0.194)	(0.177)	(0.180)
rta	1.159**				1.217***	1.205***	1.197***
	(0.0707)				(0.0809)	(0.0803)	(0.0800)
dtt	1.736***				1.632***	1.642***	1.640***
	(0.0872)				(0.0899)	(0.0910)	(0.0911)
bit	1.431***				1.378***	1.368***	1.371***
	(0.0538)				(0.0593)	(0.0589)	(0.0592)
resourcedeplet	1.823					2.340	1.657
	(1.804)					(2.293)	(1.613)
lrmp							1.126**
							(0.0672)
emerging	0.0875***	0.260	0.588	0.589	0.153*	0.162*	0.0436***
	(0.0147)	(0.224)	(0.559)	(0.558)	(0.151)	(0.160)	(0.0478)
emerging_logdistance		0.733***	0.699***	0.700***	0.767***	0.765***	0.782***
		(0.0550)	(0.0550)	(0.0559)	(0.0674)	(0.0677)	(0.0674)
emerging_contig		1.325*	1.241	1.261	1.098	1.095	1.116
		(0.226)	(0.215)	(0.223)	(0.203)	(0.205)	(0.209)
emerging_comlang		2.223***	2.074***	2.044***	2.133***	2.119***	2.179***
		(0.325)	(0.313)	(0.309)	(0.312)	(0.309)	(0.321)
emerging_colony		0.808	0.851	0.867	0.834	0.837	0.799
		(0.172)	(0.182)	(0.184)	(0.151)	(0.151)	(0.145)
emerging_loggdphost		1.174***	0.982	0.982	1.034	1.029	
		(0.0373)	(0.0771)	(0.0771)	(0.0779)	(0.0778)	
emerging_hostgrw		0.975*	0.976*	0.976*	0.985	0.984	0.988
		(0.0129)	(0.0136)	(0.0138)	(0.0140)	(0.0140)	(0.0140)
emerging_hostinfl		0.957	0.996	0.997	1.020	1.020	1.034
		(0.0298)	(0.0314)	(0.0314)	(0.0318)	(0.0316)	(0.0332)
emerging_hosttrade		1.002	1.000	1.000	1.000	1.000	0.999
		(0.00110)	(0.00143)	(0.00149)	(0.00148)	(0.00150)	(0.00109)

TABLE 3 – continued

VARIABLES	I IRR	II IRR	III IRR	IV IRR	V IRR	VI IRR	VII IRR
emerging_patents		0.641***	0.730***	0.736***	0.804**	0.808**	0.809**
		(0.0636)	(0.0738)	(0.0741)	(0.0769)	(0.0775)	(0.0753)
emerging_diffgdppc		0.989*	0.992	0.991	0.997	0.997	1.002
		(0.00614)	(0.00628)	(0.00640)	(0.00630)	(0.00634)	(0.00651)
emerging_logfdistock			1.180**	1.176**	1.124	1.132*	1.132***
			(0.0864)	(0.0872)	(0.0810)	(0.0822)	(0.0443)
emerging_polcon				0.909	0.708	0.711	0.721
				(0.242)	(0.186)	(0.199)	(0.201)
emerging_rta					0.936	0.944	0.962
					(0.159)	(0.160)	(0.162)
emerging_dtt					1.061	1.052	1.059
					(0.124)	(0.123)	(0.125)
emerging_bit					1.024	1.030	1.012
					(0.100)	(0.101)	(0.100)
emerging_resourcedeplet						0.888	1.646
						(0.871)	(1.632)
emerging_lrmp							1.093**
							(0.0485)
Observations	13,124	13,988	13,431	13,344	13,344	13,124	13,124
Country FE	YES	YES	YES	YES	YES	YES	YES
Year Dummies	YES	YES	YES	YES	YES	YES	YES
Interactions	NO	YES	YES	YES	YES	YES	YES
Pseudo R-squared	0.501	0.503	0.501	0.502	0.509	0.506	0.506

Notes: Standard errors in parentheses are corrected for heteroskedasticity; coefficients for the year, source and host dummies are not shown; ***, ** and * denote significance at the one, five, and ten percent level, respectively.

TABLE 4 – Poisson Pseudo Maximum Likelihood model with country pair fixed effects

	I	II	III	IV	V	VI
VARIABLES	IRR	IRR	IRR	IRR	IRR	IRR
logdistpop	0.940	0.855	1.453	1.256	1.290	1.178
	(0.242)	(0.267)	(0.398)	(0.415)	(0.338)	(0.368)
loggdphost	1.387***	1.286***	1.366***	1.271***		
	(0.0660)	(0.0669)	(0.0652)	(0.0670)		
hostgrw	1.013***	1.010**	1.010**	1.007	1.015***	1.011**
	(0.00404)	(0.00472)	(0.00419)	(0.00499)	(0.00436)	(0.00512)
hostinfl	0.982	0.952***	0.985	0.956***	0.980	0.953***
	(0.0124)	(0.0134)	(0.0131)	(0.0146)	(0.0131)	(0.0144)
diffgdppc	1.006	1.003	1.019***	1.016**	1.015**	1.013**
	(0.00540)	(0.00592)	(0.00608)	(0.00684)	(0.00586)	(0.00656)
patents		0.998		1.001		0.963
		(0.0676)		(0.0692)		(0.0662)
hosttrade	1.001	1.001	1.002	1.002	1.000	1.000
	(0.00118)	(0.00125)	(0.00126)	(0.00135)	(0.00130)	(0.00135)
logfdistock	1.067***	1.074***	1.066***	1.073***	1.084***	1.084***
	(0.0193)	(0.0219)	(0.0189)	(0.0212)	(0.0179)	(0.0190)
polcon	1.436***	1.377**	1.410***	1.379**	1.468***	1.414**
	(0.176)	(0.184)	(0.179)	(0.194)	(0.186)	(0.198)
rta	0.977	0.943	0.925	0.901	0.919	0.898
	(0.0664)	(0.0631)	(0.0641)	(0.0635)	(0.0628)	(0.0623)
dtt	1.118*	1.122*	1.110	1.101	1.106	1.087
	(0.0736)	(0.0763)	(0.0799)	(0.0818)	(0.0793)	(0.0801)
bit	1.189***	1.208***	1.143*	1.175*	1.130	1.171*
	(0.0785)	(0.0860)	(0.0854)	(0.0967)	(0.0856)	(0.0970)
resourcedeplet	0.961	0.154**	1.449	0.214*	1.237	0.178*
	(0.664)	(0.136)	(1.000)	(0.200)	(0.927)	(0.165)
lrmp					1.268***	1.226***
					(0.0456)	(0.0464)
emerging_logdistpop			0.201*	0.191	0.0833***	0.0558***
			(0.173)	(0.202)	(0.0707)	(0.0548)
emerging_loggdphost			1.652**	1.771***		
			(0.329)	(0.392)		
emerging_hostgrw			1.027**	1.017	1.027*	1.017
			(0.0137)	(0.0137)	(0.0152)	(0.0149)
emerging_hostinfl			0.991	0.980	0.991	0.981
			(0.0407)	(0.0418)	(0.0407)	(0.0432)
emerging_diffgdppc			0.965**	0.960**	0.960***	0.957***
			(0.0139)	(0.0152)	(0.0133)	(0.0145)
emerging_patents				0.647		0.680
				(0.213)		(0.222)
emerging_hosttrade			0.995	0.995	0.996	0.994*
			(0.00330)	(0.00337)	(0.00353)	(0.00350)
emerging_logfdistock			0.935	0.933	0.995	0.999
			(0.0796)	(0.0925)	(0.110)	(0.125)
emerging_polcon			0.864	0.708	0.925	0.742
			(0.353)	(0.302)	(0.386)	(0.329)
emerging_rta			1.295	1.264	1.261	1.235
			(0.300)	(0.290)	(0.290)	(0.280)
emerging_dtt			0.857	0.881	0.925	0.946

TABLE 4 – continued

VARIABLES	I IRR	II IRR	III IRR	IV IRR	V IRR	VI IRR
			(0.160)	(0.176)	(0.173)	(0.191)
emerging_bit			0.955	0.927	0.986	0.948
			(0.156)	(0.157)	(0.162)	(0.160)
emerging_resourcedeplet			0.0282	1.046	0.00196**	0.231
			(0.0653)	(2.496)	(0.00494)	(0.623)
emerging_lrmp					0.965	1.040
					(0.146)	(0.165)
Observations	7,139	5,842	7,139	5,842	7,139	5,842
Number of pairs	1,131	1,005	1,131	1,005	1,131	1,005
Pair Fixed Effects	YES	YES	YES	YES	YES	YES
Interactions	NO	NO	YES	YES	YES	YES

Notes: Standard errors in parentheses are corrected for heteroskedasticity; coefficients for the year and source-host dummies are not shown; ***, ** and * denote significance at the one, five, and ten percent level, respectively.

Appendix A: Definition of variables and data sources

Variable	Definition	Source
logfdi	Bilateral Foreign Direct Investment flows from source to host country in US dollars, including zeros	UNCTAD; http://www.unctad.org/Templates/StartPage.asp?intItemID=2921&lang=1
logdistance	Log of distance between two countries 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
contig	Dummy variable, set equal to one in the case of host and source countries sharing a common border	CEPII Gravity Dataset; http://www.cepii.fr/anglaisgraph/bdd/distances.htm
comlang	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
colony	Dummy variable, set equal to one in the case of host and source countries sharing colonial ties	CEPII Gravity Dataset; http://www.cepii.fr/anglaisgraph/bdd/distances.htm
loggdphost	Log of GDP of the host country, in US dollars	World Bank, World Development Indicators
hostgrw	Real GDP growth rate of host country in percent	World Bank, World Development Indicators
diffgdppc	Difference between source and host countries' GDP per capita, in US dollars	World Bank, World Development Indicators
hostinfl	Inflation rate of the host country in percent (GDP deflator)	World Bank, World Development Indicators
hosttrade	Sum of imports and exports of the host country in percent of GDP	World Bank, World Development Indicators
polcon	Political constraints III, Henisz database, range from 0 to 1	Henisz (2000)
dtt	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
bit	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
rta	Dummy variable, set equal to one in the case of a regional trade agreement with source and host country as members	WTO; http://www.wto.org/english/tratop_e/region_e/region_e.htm
logfdistock	Log of the stock of Foreign Direct Investment in the host country in US dollars	UNCTAD http://unctadstat.unctad.org/ReportFolders/reportFolders.aspx
patents	Patent applications by residents and non-residents, divided by total population in thousands	World Intellectual Property Organization http://www.wipo.int/ipstats/en/statistics/patents/
resourcedeplet	Natural resources depletion in percent of Gross National Income; sum of net forest depletion, energy depletion, and mineral depletion.	World Bank, World Development Indicators
lrmp	Log of Real Market Potential computed using Head and Mayer (2004)'s method	Market Potential and Development CEPII working paper N° 2009-24. http://www.cepii.fr/anglaisgraph/bdd/marketpotentials.htm
emerging	Dummy variable, set equal to one when the source country is an emerging economy	

Appendix B: Descriptive statistics

Variable	Observations	Mean	Std. Dev.	Minimum	Maximum
logfdi	21,175	0.81	1.87	0.00	10.98
logdistance	21,175	8.78	0.81	5.08	9.89
contig	21,175	0.02	0.15	0.00	1.00
comlang	21,175	0.11	0.31	0.00	1.00
colony	21,175	0.03	0.18	0.00	1.00
loggdphost	21,102	10.13	2.10	3.47	16.22
hostgrw	21,102	3.28	4.94	-18.20	77.70
hostinfl	20,967	2.72	1.63	-3.26	9.44
diffgdppc	20,967	9.29	11.21	-32.20	37.09
hosttrade	20,967	72.39	37.92	9.31	245.81
logfdistock	20,042	7.80	2.59	-4.61	14.84
polcon	19,868	0.31	0.21	0.00	0.71
rta	19,868	0.13	0.33	0.00	1.00
dtt	19,868	0.33	0.47	0.00	1.00
bit	19,868	0.15	0.35	0.00	1.00
resourcedeplet	19,215	0.05	0.10	0.00	0.94
lrmp	19,215	15.02	1.42	12.33	19.66
patents	13,988	0.28	0.49	0.00	3.31

Appendix C: Source country sample

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

Note: Emerging source countries in *italics*.

Appendix D: Host country sample

Albania, Algeria, Angola, Argentina, Australia, Austria, Azerbaijan, Bangladesh, Belgium-Luxembourg, Bolivia, Botswana, Brazil, Bulgaria, Burkina Faso, Cameroon, Canada, Chile, China, Colombia, Congo, Republic, Costa Rica, Côte d'Ivoire, Croatia, Czech Republic, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Equatorial Guinea, Estonia, Ethiopia, Finland, France, Gambia, Germany, Ghana, Greece, Guatemala, Guinea, Guyana, Haiti, Honduras, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Japan, Jordan, Kazakhstan, Kenya, Republic of Korea, Latvia, Lithuania, Madagascar, Malaysia, Mali, Mauritius, Mexico, Mongolia, Morocco, Mozambique, Namibia, Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Portugal, Romania, Russian Federation, Saudi Arabia, Senegal, Seychelles, Slovakia, Slovenia, Spain, Sri Lanka, Sudan, Swaziland, Sweden, Switzerland, Syrian Arab Republic, Taiwan, Tanzania, Thailand, Togo, Trinidad and Tobago, Tunisia, Turkey, Uganda, Ukraine, United Kingdom, United States, Uruguay, Venezuela, Vietnam, Zambia, Zimbabwe.

HWWI Research Papers

since 2011

113 On the predictive content of nonlinear transformations of lagged autoregression residuals and time series observations
Anja Rossen, Hamburg, October 2011

112 Regional labor demand and national labor market institutions in the EU15
Helmut Herwartz, Annekatrin Niebuhr, Hamburg, October 2011

111 Unemployment Duration in Germany – A comprehensive study with dynamic hazard models and P-Splines
Torben Kuhlenkasper, Max Friedrich Steinhardt, Hamburg, September 2011

110 Age, Life-satisfaction, and Relative Income
Felix FitzRoy, Michael Nolan, Max Friedrich Steinhardt, Hamburg, July 2011

109 The conjoint quest for a liberal positive program: "Old Chicago", Freiburg and Hayek
Ekkehard Köhler, Stefan Kolev, Hamburg, July 2011

108 Agglomeration, Congestion, and Regional Unemployment Disparities
Ulrich Zierahn, Hamburg, July 2011

107 Efficient Redistribution: Comparing Basic Income with Unemployment Benefit
Felix FitzRoy, Jim Jin, Hamburg, March 2011

106 The Resource Curse Revisited: Governance and Natural Resources
Matthias Busse, Steffen Gröning, Hamburg, March 2011

105 Regional Unemployment and New Economic Geography
Ulrich Zierahn, Hamburg, March 2011

104 The Taxation-Growth-Nexus Revisited
K. P. Arin, M. Berlemann, F. Koray, T. Kuhlenkasper, Hamburg, January 2011

The **Hamburg Institute of International Economics (HWWI)** is an independent economic research institute, based on a non-profit public-private partnership, which was founded in 2005. The University of Hamburg and the Hamburg Chamber of Commerce are shareholders in the Institute .

The HWWI's main goals are to:
- Promote economic sciences in research and teaching;
- Conduct high-quality economic research;
- Transfer and disseminate economic knowledge to policy makers, stakeholders and the general public.

The HWWI carries out interdisciplinary research activities in the context of the following research areas:
- Economic Trends and Global Markets,
- Regional Economics and Urban Development,
- Sectoral Change: Maritime Industries and Aerospace,
- Institutions and Institutional Change,
- Energy and Raw Material Markets,
- Environment and Climate,
- Demography, Migration and Integration,
- Labour and Family Economics,
- Health and Sports Economics,
- Family Owned Business, and
- Real Estate and Asset Markets.

Hamburg Institute of International Economics (HWWI)

Heimhuder Str. 71 | 20148 Hamburg | Germany
Phone: +49 (0)40 34 05 76 - 0 | Fax: +49 (0)40 34 05 76 - 776
info@hwwi.org | www.hwwi.org