NOTES D'ÉTUDES

ET DE RECHERCHE

REVISITING THE PROXIMITY-CONCENTRATION

TRADE-OFF: DISTANCE AND HORIZONTAL

FOREIGN INVESTMENT IN OECD COUNTRIES

Delphine Irac

August 2006

NER - E # 153

BANQUE DE FRANCE

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Revisiting the proximity-concentration trade-off:
Distance and Horizontal Foreign Direct Investment in OECD countries

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Résumé:

Ce document propose de nouvelles analyses du lien entre distance et investissement direct à l'étranger (IDE). On trouve que le lien entre IDE et distance, en introduisant les exportations comme variable de contrôle, est négatif et fortement significatif. Ce résultat est cohérent avec une équation de gravité alors que de dans le cadre d'un modèle de type 'concentration vs. proximité' le lien devrait être positif. Nous développons un modèle théorique réconciliant ces conclusions divergentes. Le modèle est testé en utilisant différents concepts de distance (géographique, monétaire, culturelle, financière et légale) sur les pays de l'OCDE (1997-2001) et l'impact des distances culturelles apparaît prédominant.

Mots-clés: investissements directs à l'étranger, arbitrage proximité-concentration, distance, gravité, variables culturelles, coûts fixes

Abstract :

This paper provides new insights in the link between distance and Foreign Direct Investment (FDI) in OECD countries. We find that the impact of distance on flows and stocks of FDI, controlling for exports, is negative and strongly significant, in line with gravity models, whereas in a standard proximity-concentration framework the impact should be positive. We propose a harmonized theoretical framework, allowing for distance increasing fixed costs, to reconcile these conflicting conclusions. This model is tested using alternative measures of distance (geographical/monetary/financial/legal/cultural) on OECD countries (1997-2001) and the impact of cultural distance appears strongly predominant in this setup.

The first motivation of this paper is to provide new insights in the empirical investigation of the link between distance and FDI for transition and developed countries. Indeed whereas there is a huge amount of literature about the effect of distance on bilateral trade, equivalent assessments for FDI are very limited. To our knowledge, analyzing the impact of distance on horizontal FDI at the aggregate level for a wide range of capital exporting countries has never been carefully implemented. This empirical investigation seems all the more important since existing studies lead to diverging theoretical and predictions. Brainard (1997) provides an empirical investigation of the proximity-concentration trade-off. Working on disaggregated data of trade flows and affiliate sales from the US Bureau of Economic Analysis and the Census Bureau, she finds a positive impact of freight costs on the share of affiliate outward sales in total outward sales, in line with the prediction of the proximity-concentration hypothesis. Similarly, Helpman *et alii* (2004) working with the ratio of the sales of US exporters to country j relative to US affiliates' in country j find a negative impact of freight costs. However, working with the levels of affiliate outward sales and controlling for exports, Brainard (1997) finds a point estimate of the freight factor that turns out negative. This negative impact of distance (as a proxy of transportation cost) on international investment decisions is confirmed by Wei (2001) who works on the logarithm of bilateral FDI and bank lending, using FDI from 13 sources to 30 host countries and bank lending from 13 lending to 83 borrowing countries on the period 1994-1996. Controlling for corruption and linguistic ties, he finds a negative impact of distance on FDI and on bank lending. Clausing (2002) estimates separate gravity equations for intra-firm trade and arm's length trade (on US data, BEA). She finds that distance has a more negative impact on intra-firm trade than on non-intra

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firm trade, interpreting the results as an evidence that distance tends to discourage FDI –
due for instance to information assymetries - more than it discourages extra-firm trade.
Buch *et alii* (2003) use data on the stocks of FDI by German firms abroad to estimate
gravity equations for each of the years of 1990-2000. They find a significant and negative
impact of distance on FDI. The role of distance in portfolio investment decisions has also
been explored by Portes and Rey (2000). The authors estimate a gravity equation on
cross-border equity flows on 14 developed countries and find that distance accounts for a
very significant proportion of the variance of the transaction flows[2].

The second motivation of this paper is to build a harmonized theoretical framework to
analyse the effects of distance on FDI, reconciling the conflicting conclusions of
proximity concentration trade-off and gravity models. The literature strand about the
proximity-concentration trade-off is marked by the seminal paper by Brainard (1993,
1997). The central idea of the trade-off relies on the fact that exporting compared to
setting up a foreign affiliate involves lower fixed costs but higher variable costs. The
comparison between these two costs involves an arbitrage, which gives rise to the so-
called proximity concentration trade-off. Since fixed costs are treated as country invariant
in this literature, investing abroad will be the most profitable option for distant countries.
Whereas this prediction stands in direct conflict with the predictions of a standard gravity
model, the latter is far from being strongly rejected in the empirical literature as we just
saw. Nevertheless, the lack of conceptual background of gravity equations for FDI has
not been addressed so far in the literature, while many papers endow this equation with

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[2] Similarly, Caves (1996) and Braunerhjelm and Lipsey (1998) establish that proximity is an important
determinant of FDI patterns.

theoretical foundations for trade flows (cf. Feenstra *et alii* 2001). An endeavor of this paper is to fill this blank by questioning the common assumption of country invariant fixed costs in a proximity-concentration model. Part of FDI related fixed costs are entry costs and there are strong grounds to believe that these entry costs increase with the degree of geographical/cultural/institutional remoteness of the country.

The third motivation of this paper is to investigate which variables are exactly at work behind the measure of distance we use to explain international investments flows. Introducing cultural variables suggests that cultural differences are strong drivers of FDI in the OECD area. No compelling evidence is found that financial and legal system asymmetries do really matter in multinationals' choices of locating their production.

The paper is organized as follows. Section 1 outlines our theoretical model which is based on an extension of the proximity concentration model with distance increasing fixed costs. In a second section, estimation of a standard gravity equation for FDI shows that geographical distance does play a significant negative role in FDI determination, which provides a strong support for the model we propose. Section 3 considers alternative types of distance (legal, monetary, geographical, financial, cultural), for which geographical distance could be a mere proxy.

Section 1 – A theoretical model reconciling the conflicting predictions of proximity concentration trade-off and gravity models

The standard starting point of theories of FDI is the analysis of the costs and advantages of doing business abroad relative to domestic firms in the host country. Indeed, firms can choose amongst many different options when extending their operations abroad: FDI, exporting, licensing, entering into a joint venture or a strategic alliance. A number of recent papers use this costs/advantages approach: Markusen (1984, 1997), Ethier (1986), Helpman (1984, 1985), Horstmann and Markusen (1987a,b; 1992), Brainard (1993) and Markusen and Venables (1998, 2000). In parallel with these micro-founded theories, gravity equations are a much-discussed success story in international economics. Gravity models in economics borrow from the Newtonian mechanics. The idea is that the force between two objects is proportional to the product of their masses divided by the square of the distance between them.

$$FDI_{ij} = \frac{\alpha size\_country_i size\_country_j}{\left(DIST_{ij}\right)^{\beta}} \quad (1)$$

Rephrasing this relation economically, it means that the amounts of transaction between two points is equal to the product of the economic masses (GDPs, populations etc) divided by some power of the distance. The first application of gravity model is Beckerman (1956) on intra-European trade. The 1990s witnessed a big revival of gravity models. Frankel and Wei (1993) used these models to study the impact of currency blocs on trade[3]. Although, gravity equations were used in many early studies of international

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[3] Gravity equations were also extensively used to project 'natural' bilateral trade relations (Wang and Winters 1991, Hamilton and Winters 1992 for the Central and Eastern European countries).

trade and perform well to describe bilateral flows for developed and developing countries (cf Hummels and Levinsohn 1995), these equations were often criticized for their lack of consistency with the predictions of the Hecksher-Ohlin model. Nevertheless it was shown that they can be derived from a wide range of theories[4]. Martin and Rey (2001) try to bring a theoretical foundation to the home bias and gravity equations for investment flows, demonstrating the importance of size of economies and transaction costs. The predictions of their model are consistent with empirical evidence on bilateral cross border equity flows (cf. Portes and Rey 1999).

Proximity-concentration trade-off

The proximity-concentration model concentrates on horizontal FDI and uses the assumption that countries have similar factor endowments, allowing no factor-price motives for vertical fragmentation across countries. On the other hand, Helpman's model of vertical multinational has to use the strong assumption of no-trade cost. Theoretical models combining both horizontal and vertical motives for FDI are not generally tractable analytically. In the so-called "knowledge capital model" of the MNE (Markusen 1997), both vertical and horizontal firms can arise endogenously due to the simultaneous existence of trade costs and different factor intensities across countries. But due to analytical difficulties, most results are derived from numerical simulations.

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[4] For a comprehensive discussion of the theoretical foundations of the gravity model for trade, we can refer to Feenstra, Markusen and Rose (2001). Gravity equations can arise from a model in which countries are fully specialized in differentiated goods – which is likely to apply to developed countries- and Feenstra, Markusen and Rose (2001) show that this equation can also apply to countries with homogenous goods (such as most developing countries).

The main motive of "horizontal" FDI in the proximity concentration trade-off is market access. Firms can serve their foreign buyers through two channels: exporting or building foreign subsidiaries. Firms opt for foreign investments when the gains from avoiding transports costs related to exports outweigh the fixed entry costs of new building capacities abroad. Brainard (1993) describes firm's choice between exports and "horizontal" FDI. The model considers a setting with two countries (A and B), two sectors (agriculture and manufacturing) and two factors (land and labor). The two countries have the same factor endowments and are at a distance D apart. Wages, w, are the same in the two countries, pinned down by the labor productivity in the agricultural sector. The manufactured sector produces a differentiated good q and faces three types of costs. First there are firm-level corporate costs, C^r, such as R&D or advertising, which are similar to a public good. Secondly, plant-level productions costs are driven by a fixed cost F and a variable cost V, which is pinned down by the fixed wages:

$$C^q(q_i) = F + V q_i \quad (2)$$

The price of a good produced in a and sold in j is given by[5]:

$$p_{aj} = markup.V.S_{aj} \quad (3)$$

with S_{aj} being the transport cost between country a and j. The corresponding quantities, q_{aj}, are a decreasing function of these prices. The variable profit ($\pi_{aj} = p_{aj} q_{aj}$) is a decreasing function of distance. These elements give the appropriate framework to analyze the formation of a multinational. Let us consider a firm in A which has plants only in the national market, serving both its domestic market A and the foreign market B, via exports. This firm will open a second production facility in B if the increase in its

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[5] For a complete derivation of these equations, we can refer to Brainard (1997).

variable profit (due to lower transport cost) that follows will exceed the additional fixed cost of opening a new plant. By comparing the profits generated by different production strategies, it is easy to show that the condition for FDI to occur has the following form:

$$\left(1+\frac{C^r}{F}\right)^{-1} < \psi(\overset{+}{S}) \quad (4)$$

Where ψ is an increasing function of transport costs S, and therefore of distance.

Distance increasing fixed costs

In Brainard (1997), F is only a function of w, which is fixed and therefore FDI is a positive function of distance through transport costs. In our model, we consider more realistic to assume that F increases with some measure of distance D^F. What is the rationale behind this assumption? The importance of location-sensitivity in business transactions has been intensively documented in the international business literature[6]. The fixed cost of investment is the portion of total cost which does not depend on quantity. It includes rental/mortgage payment on office/factory space, as well as advertising, research, wages of the managers etc Clearly part of this cost has no reason to be dependant on distance, like, for instance, rental payment on factory. However, to our view, the fixed cost includes at least three components that are likely to depend heavily on distance. First, part of the managerial team generally comes from the host country and receives an expatriate premium that may depend on the remoteness of the foreign country. Secondly, the higher the distance, the higher the entry costs, such as setting up the basic organizational structure of the firm, developing a good grasp of the foreign market etc The transaction costs of FDI are likely to increase with distance due to bigger

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[6] For a recent study on this matter we can refer to Ghemawat (2002).

barriers-to-invest such as language, legal asymmetries etc. A T Kearney (2004) stresses the importance of working with intermediaries in the process of outsourcing. The importance of entry cost in the decision of investing abroad is also highlighted by the large industrial groupings in Japan and Korea (keiretsu and chaebol). Blonigen (2005) shows that the sharing of information across keiretsu firms significantly reduces the entry cost for subsequent FDI. Thirdly, transportation of knowledge-based assets (skilled engineers, blueprints) to foreign plants is probably easier than physical assets but involves some costs however, which are likely to increase with distance. These costs include translating the blueprints, training engineers and managers etc Also, fixed costs are bound up with organization/transaction costs that can be described along two dimensions (Milgrom and Roberts 1992): coordination costs (costs of obtaining information, costs of measurements) and motivation costs (costs of inducing specialized agents to align their interest). We can think that these two costs increase with distance between parent company and subsidiary.

Empirical works on transports costs (Hummels 1999) show that it is reasonable to assume that transport costs increase with geographical distance, D. Concerning fixed costs, we will assume that they are positively determined by some measure of distance, D_F, that may encapsulate geographical distance as well as many other types of distance such as differences between legal system, cultural backgrounds, language etc

Section 2. Testing the model: geographical distance appears as a strong and negative determinant of horizontal FDI

First we will assume that the only source of distance is geographical ($D_F=D$) and consider two testable implication of the model we outlined in section 1.

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(5) \quad \begin{aligned} \ln(FDI_{A,B}) &= \alpha_1 \ln(X_{A,B}) + \alpha_2 \ln(D_{A,B}) + \alpha_3 \ln(GDP_A) \\ &+ \alpha_4 \ln(GDP_B) + Control\_Variables \end{aligned}
$$

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(6) \quad \begin{aligned} \ln(K_{A,B}/X_{A,B}) &= \alpha_2 \ln(D_{A,B}) + \alpha_3 \ln(GDP_A) \\ &+ \alpha_4 \ln(GDP_B) + Control\_Variables \end{aligned}
$$

Whereas the first equation looks directly at the determinants of the FDI flows, the second equations deals with the outward position of country A in country B (K). X denotes exports, GDP growth domestic product and D distance. Under the assumption that total sales in B of affiliates with parent company in A is proportional to the stock of foreign investment from A to B[7], the dependent variable of equation (6) is proportional to the ratio of sales of foreign affiliates to exports. This ratio is used in Brainard (1997) as well as Helpman *et alii* (2004). Our dependent variables are the outflows of FDI[8] from a country A to a country B, *FDI_{A,B}*, and the stock of foreign investment of A in B, *K_{A,B}*, provided by the International investment database (OECD). The dataset covers the period 1997-2001 and 29 OECD countries (2714 observations). The distance is defined by the distance between capital cities[9].

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[7] Namely : *sales_{A,B}=vK_{A,B}*
[8] It's noteworthy that inward and outward FDI, stocks and flows, tend to go together across countries and over time. Besides, the determinants of both flows tend to be the same.
[9] The main drawback of this measure is that it also captures the geographical size of each country.

Vertical vs. horizontal FDI

As we highlighted in the previous section, our empirical investigation should only include FDI for horizontal motives. Indeed "vertical" motives for FDI, which refer to fragmentation of production across countries, don't seem very appropriate to study investment decisions in developed countries, such as OECD countries. Unfortunately, the OECD dataset does not make the distinction between vertical and horizontal FDI. However, both empirical (Brainard 1997) and theoretical (Markusen 1997) evidence show that horizontal firms should be concentrated among countries that are relatively similar both in size and in relative endowments. Intuitively, if two countries are different in relative factor endowments, country A being relatively skilled labor abundant for instance, vertical firms are likely to be the dominant type, with headquarters located in A and plants in B. Graph 1 shows the distribution of the difference in skilled workers for our set of countries (source: World Development Indicator). The four less skilled abundant countries in our sample include Mexico, Korea and New Zealand and Portugal. As we see, the distribution is somewhat bimodal and two types of investment flows coexist in our sample: flows between countries of similar skilled labor endowments and flows between very different countries. The second criterion we can apply to discriminate between horizontal and vertical motives for FDI is the difference in country size. Plotting the same distribution, it seems difficult to establish the same distinction. Moreover, this criterion has to be used with a pinch of salt since even a small country can be used as a platform for supplying a given region and can be a destination for horizontal FDI. In our estimation, we exclude flows between countries A and B that substantially differ in skilled labor endowments. We make the assumption that the remaining flows correspond

to horizontal FDI. It is generally acknowledged that FDI in the world are generally for horizontal motives. Since we concentrate on OECD countries with similar factor endowments, we consider that this assumption is extremely mild.

Estimation strategy

The fixed-effect estimator would be always consistent to estimate this model but it wipes out all the time-invariant effects and cannot be implemented for this reason. Our strategy is therefore to assume that we can control for a large set of fixed exporter and importer effects and run random effect estimations. As table 1 shows, we indeed control for a large set of country characteristics: indicators developed by the international country risk database (socio-eco, politics, conflicts), as well as country credit ratings. Unit labor costs are not included in the regressions because they turn out non significant. Although FDI might be influenced by tax minimization strategies, we don't include tax variables in our regression, due to the lack of accurate data.

In order to cleanse the exports regressor from its endogeneity, we implement a two stage least squares strategy. As excluded instruments for the exports, we use egional trade agreements (ANZCERTA, CEFTA, EEA, EU) dummies and a indirect measure of transportation costs based on cif/fob ratios (OECD database, International trade by commodity). Since long term series of directly measured shipping costs are only available for the US and New Zealand, the cif/fob based method has been commonly used by several authors in trade economics for other countries. Unfortunately the costs we obtain seem to be afflicted by a strong degree of error measurement, included between 0 and 25% for 40% of the flows only and negative for 35% of them. These

errors may come from various sources: inflows of goods and services are likely to be reported in a relatively more precise way by importers, who are motivated by the levy of tariffs. The fob valuations may not be fully consistent within exporters that may include variable part of inland shipping of the good (from being taken out of the factory gate to being placed on board of the ship). Despite this error measurement drawback, Hummels (2003) shows that this cif/fob ratio on transportation costs can be usefully and relevantly exploited by researchers in cross-sectional data. We find that the cost ratio we obtain is positively correlated with distance and negatively correlated with the square of the distance. We do not find a negative impact of the oil price, as could be expected, nor any decrease of our measure of shipping cost over time, which is in line with the controversy about the decline in transportation costs over the past decades (cf. Hummels 1999).

The main finding that we can draw from table 2 is that the coefficient of distance is negative and significant at 1% level in the least square regressions. This result strongly conflicts with the predictions of Brainard (1997) and supports the model we presented in section 1.

Section 3 – Considering alternative types of distance: financial, monetary and cultural distances

In this section, we relax the assumption that FDI depends on geographic distance only and allow for other types of distance D^F: difference in legal systems; financial information assymmetries ; currency blocs ; cultural differences.

The equations we estimate are the following:

$$(7) \quad \ln(FDI_{A,B}) = \alpha_1 \ln(X_{A,B}) + \alpha_2 \ln(D_{A,B}) + \alpha_3 \ln(D_{A,B}^F)$$
$$+ \alpha_4 \ln(GDP_A) + \alpha_5 \ln(GDP_B) + Control\_Variables$$

$$(8) \quad \ln(K_{A,B}/X_{A,B}) = \alpha_2 \ln(D_{A,B}) + \alpha_3 \ln(D_{A,B}^F)$$
$$+ \alpha_4 \ln(GDP_A) + \alpha_5 \ln(GDP_B) + Control\_Variables$$

Legal asymmetries

Empirical evidence (cf. La Porta *et alii* 1998) suggests that legal origin helps explain differences in financial development (cf. Beck *et alii* 2002). Different reasons can be put forward to explain this effect of legal origin. The French Civil Law is likely to attach a lower priority to private property rights (vs. the State), with adverse implications for financial development. French legal origin countries are likely to be more rigid and less adaptable to changing economic and commercial conditions. The variable 'law' we use is supposed to reflect if both countries A and B have either a British common law, a French civil law, a German civil law or a Scandinavian civil law.

Financial and monetary asymmetries

FDI, together with debt and portfolios allocation, are generally used to construct financial integration indexes[10]. We implement two methods to empirically estimate the relationship between FDI and finance. As a direct method, we use of measures of bank overhead cost and of bank concentration to reflect the quality of the financial system. But these variables appear non significant or with the wrong sign. A more indirect method is provided by Froot and Stein (1991) who develop a model where wealth, and

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[10] For instance, Lane and Milesi-Feretti (2003) consider a volume based measure of international financial integration including the stocks of aggregate foreign assets and liabilities. Similarly, Edison and Warnock (2001) construct the following International Finance Corporation Index as the ratio of market capitalization taking into account foreign firms over total market capitalization.

consequently exchange rates, are explanatory variables of FDI under the hypothesis that incomplete information and imperfections in capital mobility play a very important role in firms' choices. One of the testable implications of the Froot and Stein model is that the effects of a change in exchange rate on inflows of FDI in a given country will be high if the informational cost associated with this country we study is high. As countries become more integrated, the link between FDI and exchange rate should get looser. Table 2 shows that the effect of exchange rate on FDI for our set of countries is non significant. Clearly the effect of financial information asymmetries on FDI flows is not very clear-cut in the OECD countries. We also capture membership to a common currency bloc by the variance of bilateral exchange rate. It is necessary to bear in mind that these estimations are affected by a problem of reversed causality, since a government may make deliberate efforts to promote exchange rate stability with major economic partners[11]. As table 2 shows, the effect of exchange rate variance is significant and negative when we work with outward position. Legal system similarities do not seem to matter to international investment decision whereas expenditure in IT seem to positively impact investment flows between two countries.

Cultural distance

In table 3, we introduce three 'cultural' variables: respectively a dummy controlling for common language, and discrete variables controlling for the study exchanges and the touristic exchanges. These three variables appear as significant drivers of FDI. Culture

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[11] The effects of exchange rate variance on FDI have been studied by Cushman (1985), Goldberg and Kolstad (1995) and Calderon-Rossell (1985). For trade flows, lower exchange rate risks may foster imports and exports and promote stronger trade links. Using the gravity model, Frankel and Wei (1993) show cross-sectional evidence that bilateral exchange rate stability may have an effect on trade.

can be seen as a significant contributor to cross-country linkages since cultural barriers are likely to increase transportation/transaction costs (*S* in our model). Information about investment opportunities is more easily disseminated within countries sharing the same cultural affinities, which may decrease the sunk cost of investment, *F*. Also, the variables *study* and *tourism* capture an effect of migration. Immigrants are likely to carry out investments in their native countries[12]. Interestingly, introducing study and touristic links strongly decreases the significance of distance.

Conclusion

In this paper, we propose an extension of the proximity concentration trade off in which distance effects go through two channels: higher distance increases the variable transport costs but also the fixed costs of FDI. We show that this model performs well in explaining FDI. We then show that institutional similarities do play a big role in FDI determination but that cultural links promote investment flows considerably.

This result is in line with the findings of Frankel (2000) whereby two countries that speak the same language trade about 50% more than two otherwise similar countries. The multitude of languages is one of the reasons why economic integration is far from complete in the European Union. " Globalization seems less pervasive than most non-economists think. (…) National borders and geography still impede trade and investment substantially (…). Such barriers are differences in currencies, languages, political

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[12] This strong effect of cultural variables may also be interpreted in light of the theories developed by Lipsey (2002), whereby 'FDI transfers the ownership of existing productive assets from one set of owners to other willing to pay more for them, possibly from less efficient owners to more efficient owners. This view of FDI as a way of reshuffling ownerships without much consequence on capital formation implies that the sunk cost of FDI is likely to be related to knowledge and cultural barriers more than physical impediments.

systems." Infering from the standard of 100 years ago and on the hypothetical implications of a perfect international integration, Frankel (2000) shows that the ratio of trade to output should experience a six fold increase in order for the external American trade to be in line with trade volume within the US.

These results also support the idea that FDI are more a vehicle for transfers of knowledge capital – which encompasses entrepreneurial abilities as well as R&D and marketing strategies - than for transfers of financial and physical capital. However exporting knowledge-based assets to set up a new subsidiary involves a fixed entry cost which increases with cultural differences especially. To our view, this fixed entry cost is not sufficiently accounted for in the recent models of the MNF.

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APPENDIX

Table 1: *Variable definition*

Variable	Definition	Source
FDI value	outflows of FDI national currency	OECD
K	Outward position (K)	OECD
Currency	exchange rate vis-à-vis USD	IFS, OECD (euro)
Exports_vol	Bilateral exports volume	OECD
FDI	fdi_out*currency	
Population	Population	IFS
Growth	GDP growth rate	OECD
Language	Linguistic tie	Franklin and Wei database
Distance	Distance between capitals	Franklin and Wei database
Adjacency	Adjacency	Franklin and Wei database
Socioeco	Socio-economic indicator	ICRG
Corruption	Corruption	ICRG
Stability government	Government stability	ICRG
law	Legal system	Levine *et alii*
Cost	Bank overhead cost	Levine *et alii*
Itexpper GDP	IT expenditure per capita	WDI database
Credit_rating	WTO	Harvey, ICRG
d_anzcerta	Dummy equal to 1 if both countries belong to ANZCERTA	
d_cefta	Dummy equal to 1 if both countries belong to CEFTA	
D_eea	Dummy equal to 1 if both countries belong to EEA	
D_eu	Dummy equal to 1 if both countries belong to EU	
D_tourism	Discrete variable equal to 1 if A (resp. B) is the main touristic destination for B (resp. A), to 2 if it is true in both directions	UNESCO
D_studyAinB	Discrete variable quantifying the importance of B as a study country for A	UNESCO

Graph 1:
Differences in the share of workers with more than primary education
between countries A and B (in 2001)
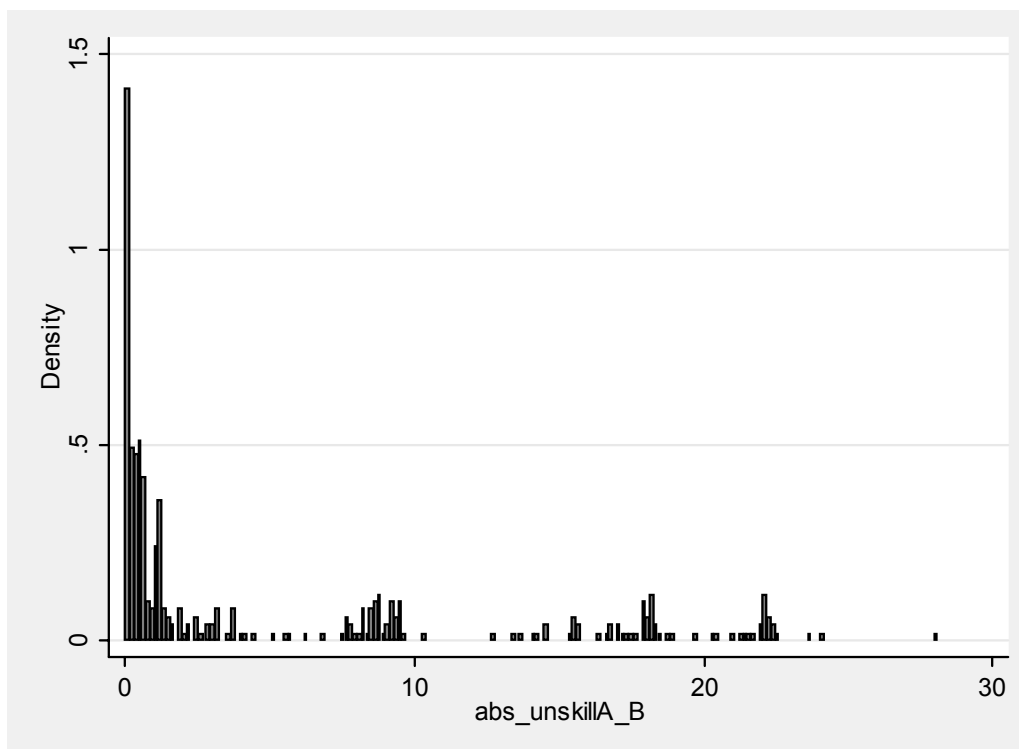
Number of (A,B) such that $|L_{AS}/L_A - L_{BS}/L_B| > 5$: 356.

Table 2: *Random effect estimations (2SLS)*
OECD countries with similar factor endowments[13]. 1997-2001

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	Log(FDI A to B)	Log(K of A in B / exports from A to B)	Log(FDI A to B)	Log(K of A in B / exports from A to B)	Log(FDI A to B)	Log(K of A in B / exports from A to B)
Log(exports from A to B)	-1.434e+00 (3.86)***		-1.317e+00 (3.21)***		-1.689e+00 (3.50)***	
Log(GDP in A)	-1.500e-03 (0.02)	6.401e-01 (9.61)***	3.000e-02 (0.35)	6.550e-01 (9.86)***	-7.888e-02 (0.75)	6.475e-01 (9.93)***
Log(GDP in B)	-6.693e-03 (0.10)	1.513e-01 (2.44)**	-4.083e-02 (0.47)	2.253e-01 (3.42)***	-6.978e-02 (0.76)	1.556e-01 (2.57)**
Distance	-1.131e-04 (3.63)***	-7.463e-05 (2.68)***	-1.057e-04 (3.25)***	-8.171e-05 (2.97)***	-1.490e-04 (3.40)***	-9.214e-05 (3.34)***
Socioeconomic indicator in A	1.082e-01 (1.76)*	9.776e-02 (3.93)***	1.198e-01 (2.00)**	9.149e-02 (3.65)***	7.500e-02 (1.32)	9.781e-02 (3.80)***
Socioeconomic indicator in B	-7.708e-02 (1.24)	-4.260e-03 (0.17)	-5.312e-02 (0.91)	-6.763e-03 (0.27)	-5.198e-02 (0.96)	-3.860e-03 (0.16)
Corruption indicator in A	8.205e-02 (0.84)	1.440e-01 (2.93)***	7.924e-02 (0.83)	1.402e-01 (2.84)***	5.062e-02 (0.55)	1.207e-01 (2.42)**
Corruption indicator in B	-1.134e-01 (1.34)	4.961e-02 (1.22)	-1.064e-01 (1.26)	5.748e-02 (1.41)	-1.045e-01 (1.18)	3.952e-02 (0.96)
Government stability indicator in A	1.325e-01 (2.33)**	2.042e-02 (0.81)	1.117e-01 (2.01)**	7.954e-03 (0.31)	9.579e-02 (1.86)*	3.644e-02 (1.41)
Government stability indicator in B	1.205e-01 (2.25)**	-1.437e-02 (0.61)	9.750e-02 (1.87)*	-6.516e-03 (0.27)	4.903e-02 (1.00)	-3.770e-03 (0.16)
Credit rating country A	6.142e-02 (9.01)***	1.971e-02 (6.71)***	5.861e-02 (8.98)***	2.014e-02 (6.80)***	4.202e-02 (6.56)***	2.016e-02 (6.79)***
Credit rating country B	3.272e-02 (4.43)***	9.582e-03 (2.84)***	3.264e-02 (4.44)***	8.294e-03 (2.44)**	2.602e-02 (3.52)***	9.791e-03 (2.87)***
Dummy for 1997	-1.063e-01 (0.44)	-1.873e-01 (2.37)**	4.527e-02 (0.18)	-2.045e-01 (2.33)**	4.428e-01 (1.61)	1.944e-01 (1.37)
Dummy for 1998	1.315e-01 (0.57)	-1.650e-01 (2.20)**	2.690e-01 (1.17)	-1.885e-01 (2.36)**	5.866e-01 (2.65)***	7.627e-02 (0.70)
Dummy for 1999	3.174e-01 (1.69)*	-1.072e-02 (0.17)	4.261e-01 (2.29)**	-1.881e-02 (0.28)	6.399e-01 (3.57)***	1.673e-01 (1.94)*
Dummy for 2000	6.536e-01 (5.17)***	1.727e-02 (0.34)	6.881e-01 (5.63)***	-8.376e-03 (0.16)	6.948e-01 (6.19)***	4.409e-02 (0.84)
Bank concentration in A			5.398e-01 (0.88)	1.380e-01 (0.44)		
Bank concentration in B			1.952e-01 (0.33)	-5.916e-01 (1.95)*		
Internet users in A					8.650e-09 (1.86)*	-1.737e-09 (0.94)
Internet users in B					1.488e-08 (3.77)***	1.035e-09 (0.55)
IT expenditure (% of gdp) in A					2.036e-01 (2.70)***	8.792e-02 (2.33)**
i IT expenditure (% of gdp) in B					2.310e-02 (0.40)	9.014e-02 (2.94)***
Legal system diffence dummy			1.182e-01 (1.41)	-1.964e-04 (0.01)		
Bank overhead cost in A			2.679e+00 (0.47)	7.537e+00 (2.88)***		
Bank overhead cost in B			4.820e+00 (0.90)	-1.479e+00 (0.59)		
Bilateral exchange rate - level			-2.762e-03 (0.53)	2.916e-03 (1.01)		
Bilateral exchange rate - variance			6.823e-02 (1.35)	-1.307e-01 (3.96)***		
Constant	1.330e+01 (2.09)**	-2.201e+01 (15.45)***	1.134e+01 (1.56)	-2.286e+01 (15.25)***	1.990e+01 (2.38)**	-2.369e+01 (16.36)***
First stage reg (Wald test)	137 (0.00)		162 (0.00)		158 (0.00)	

Notes: i) Absolute value of z statistics in parentheses * significant at 10%; ** significant at 5%; *** significant at 1% ; (ii) Excluded instruments for Log(exports from A to B): transport costs between A to B (cif/fob ratios), RTA dummies (ANZCERTA, CEFTA, EEA, EU) ; (iii) Introducing adjacency in the regression does not modify the results significantly.

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[13] Some of the investment flows to the four less skilled abundant countries in our sample (Mexico, Korea and New Zealand and Portugal) are excluded since we suspect that they correspond to vertical FDI.

Table 3: *Random effect estimations (2SLS)*
OECD countries with similar factor endowments[14]. 1997-2001

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	Log(FDI A to B)	Log(K of A in B / exports from A to B)	Log(FDI A to B)	Log(K of A in B / exports from A to B)	Log(FDI A to B)	Log(K of A in B / exports from A to B)
Log(exports from A to B)	-1.114e+00		-1.537e+00		-9.601e-01	
	(3.68)***		(4.14)***		(3.65)***	
Log(GDP in A)	5.618e-02	6.458e-01	-6.568e-02	5.986e-01	3.277e-02	6.003e-01
	(0.87)	(9.86)***	(0.82)	(8.99)***	(0.55)	(9.05)***
Log(GDP in B)	2.128e-02	1.606e-01	-8.037e-02	1.169e-01	-1.985e-02	1.207e-01
	(0.36)	(2.63)***	(1.12)	(1.90)*	(0.36)	(1.96)**
Distance	-9.170e-05	-6.726e-05	-6.769e-05	-3.612e-05	-4.039e-05	-2.752e-05
	(3.38)***	(2.34)**	(2.20)**	(1.27)	(1.68)*	(0.96)
Language dummy	1.994e+00	2.299e+00				
	(4.25)***	(4.57)***				
Adjacency	1.305e+00	1.194e+00	9.494e-01	1.432e+00	6.991e-01	1.205e+00
	(2.91)***	(2.31)**	(1.89)*	(2.89)***	(1.71)*	(2.29)**
Socioeconomic indicator in A	1.209e-01	9.436e-02	5.360e-02	9.214e-02	1.303e-01	9.605e-02
	(2.05)**	(3.81)***	(0.84)	(3.73)***	(2.33)**	(3.88)***
Socioeconomic indicator in B	-8.310e-02	-7.178e-03	-1.232e-01	-1.048e-02	-7.539e-02	-6.381e-03
	(1.36)	(0.29)	(1.93)*	(0.43)	(1.29)	(0.26)
Corruption indicator in A	8.123e-02	1.523e-01	1.523e-01	1.583e-01	8.158e-02	1.514e-01
	(0.88)	(3.11)***	(1.55)	(3.24)***	(0.93)	(3.09)***
Corruption indicator in B	-1.027e-01	4.979e-02	-1.090e-01	4.821e-02	-1.032e-01	4.774e-02
	(1.34)	(1.23)	(1.31)	(1.20)	(1.43)	(1.18)
Government stability indicator in A	1.403e-01	1.855e-02	1.117e-01	1.751e-02	1.346e-01	1.913e-02
	(2.57)**	(0.74)	(2.00)**	(0.70)	(2.57)**	(0.76)
Government stability indicator in B	1.366e-01	-1.523e-02	1.078e-01	-1.538e-02	1.344e-01	-1.437e-02
	(2.65)***	(0.65)	(2.04)**	(0.66)	(2.72)***	(0.62)
Credit rating country A	6.688e-02	1.957e-02	5.162e-02	1.875e-02	6.517e-02	1.932e-02
	(10.39)***	(6.69)***	(7.75)***	(6.41)***	(10.70)***	(6.60)***
Credit rating country B	3.415e-02	9.046e-03	2.430e-02	8.171e-03	3.066e-02	8.973e-03
	(4.97)***	(2.69)***	(3.33)***	(2.43)**	(4.74)***	(2.67)***
Dummy for 1997	1.294e-02	-2.022e-01	-4.409e-01	-2.312e-01	3.848e-02	-2.088e-01
	(0.06)	(2.56)**	(1.68)*	(2.93)***	(0.17)	(2.64)***
Dummy for 1998	2.067e-01	-1.771e-01	-1.504e-01	-2.014e-01	2.316e-01	-1.825e-01
	(0.94)	(2.37)**	(0.62)	(2.70)***	(1.10)	(2.44)**
Dummy for 1999	3.831e-01	-2.013e-02	1.189e-01	-3.819e-02	4.051e-01	-2.371e-02
	(2.13)**	(0.32)	(0.60)	(0.60)	(2.37)**	(0.37)
Dummy for 2000	6.760e-01	1.261e-02	5.609e-01	3.122e-03	6.760e-01	1.103e-02
	(5.52)***	(0.25)	(4.40)***	(0.06)	(5.72)***	(0.22)
Dummy study A in B			3.075e+00	1.715e+00		
			(5.99)***	(4.09)***		
Dummy study B in A			3.809e+00	1.519e+00		
			(6.64)***	(3.88)***		
Dummy tourism					1.400e+00	8.489e-01
					(7.93)***	(4.10)***
Constant	6.614e+00	-2.245e+01	1.776e+01	-2.140e+01	5.321e+00	-2.152e+01
	(1.28)	(15.98)***	(2.68)***	(15.13)***	(1.15)	(15.15)***
1st stage regression (Wald test)	150 (0.00)		202 (0.00)		173 (0.00)	

Absolute value of z statistics in parentheses   * significant at 10%; ** significant at 5%; *** significant at 1%
Excluded instrumentents for Log(exports from A to B): transport costs between A to B (cif/fob ratios), RTA dummies (ANZCERTA, CEFTA, EEA, EU)

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[14] Some of the investment flows to the four less skilled abundant countries in our sample (Mexico, Korea and New Zealand and Portugal) are excluded since we suspect that they correspond to vertical FDI.

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