**Very preliminary draft**

# Distance and Foreign Direct Investment

# Evidence from OECD countries

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**Abstract**

*This paper analyses the determinants of Foreign Direct Investment (FDI) with a focus on the role played by geographical distance. In a proximity-concentration framework (Brainard (1993), the impact of distance on FDI, controlling for exports, should be positive. Indeed when distance is high, multinationals are better-off serving foreign markets by building foreign affiliates and saving on transport costs than by exporting.*

*However, estimation of a standard gravity equation on the 29 OECD countries between 1997 and 2001 yields a negative coefficient of distance, increasing over time in absolute value.*

*We provide an explanation of the distance puzzle for FDI by proposing a small extension to the proximity-concentration trade-off, allowing the fixed cost of building a foreign plant to depend on distance. This specification is motivated by anecdotal evidence of the existence of barriers to invest (such as cultural barriers, differences in legal systems, financial information asymmetries etc). Moreover, a refined specification for transport costs is introduced, based on the empirical findings of Hummels (1999). In this new setting, we find that the effect of distance on FDI can be negative if the fixed cost associated with a new plant outweighs the transport cost effect.*

*Nevertheless, if it seems realistic to suppose fixed costs associated to FDI dependant on distance, it is important to identify what factors (legal, financial, cultural etc) are at work behind this distance variable. A large strand of the literature puts the emphasis on financial systems low quality, legal system asymmetries and exchange rate uncertainty. We find a significant impact of legal similarities and exchange rate uncertainty on FDI. Nevertheless, the introduction of these variables does not decrease the coefficient of distance. Moreoever, no compelling evidence is found that financial system asymmetries does really matter in multinationals' investment choices.*

*Our main finding is that cultural variables (linguistic ties, tourism flows, tertiary education exchanges) are very significant and lead to a decrease in the coefficient of distance. This suggests that cultural differences are strong drivers of FDI in the OECD area.*

## Introduction

*Some reminders about long-term capital flows*

The definition of FDI can be found in UNCTAD (2003). FDI is defined as an investment by a parent enterprise in an affiliate enterprise resident in an economy other than that of the foreign direct investor. FDI implies that the investor exerts a significant degree of influence on the management of the affiliate enterprise. FDI has three components: equity capital (purchase of shares), reinvested earnings (earnings that are not distributed as dividends) and the intra-company loans (borrowing and lending of funds between direct investors and affiliate enterprise). FDI is a component of long-term capital flows, which can also take the form of portfolios and debt. Generally, the share of FDI versus portfolios is higher for developing countries versus developed countries. FDI can itself be decomposed in greenfield investment and mergers and acquisitions (M&A). According to UNCTAD (1998), M&A in total FDI was only 12.4% in 1997 for developing countries, whereas the worldwide share is 50%.

*Link between FDI and integration*

FDI, together with debt and portfolios allocation, are generally used to construct financial integration indexes. For instance, Lane and Milesi-Feretti (2003) consider a volume based measure of international financial integration (*IFIGDP*):

$$IFIGDP_{it} = \frac{FA_{it} + FL_{it}}{GDP_{it}}$$

where FA and FL represent the stocks of aggregate foreign assets and liabilities. These foreign assets and liabilities include debt, portfolio allocations and FDI.
Similarly, Edison and Warnock (2001) construct the following ratio:

*IFC[1] investable index/IFC global index*

The first index represents market capitalization taking into account foreign firms only whereas the second index represents the total market capitalization.
The main drawbacks of these measures are twofold. First, foreign investments can be affected by factors that do not really pertain to integration. For instance, a decrease in the political risk or an improvement in socio-economic indicators can bring about higher inflows of foreign investments. Secondly, these ratios are dependant on non-financial variables. Our view is that to use long-term capital flows, and more specifically FDI, as an index of integration, it is necessary to estimate an equation specifying all the potential determinants of FDI and to assess the contribution of integration variables in this equation, namely all the variables that are likely to hinder or facilitate integration (distance, quality of legal and financial institutions, cultural barriers etc).

[1] International Finance Corporation

In a first section, we will estimate a standard gravity equation for FDI and show that distance does play a significant negative role in FDI determination, which stands in direct contrast to the conclusion of a standard "proximity-concentration tradeoff" model. Section 2 provides a conceptual framework that provides a rationale for this negative relationship under some assumptions about the expression of the entry cost of foreign investment. Section 3 analyses what variables are likely to be captured by the distance variable. We find a significant impact of legal similarities and exchange rate uncertainty on FDI. Nevertheless, the introduction of these variables does not decrease the sensitivity of FDI to distance in our estimations. Moreoever, no compelling evidence is found that financial system asymmetries does really matter in multinationals' choices. Introducing cultural variables suggests that cultural differences are strong drivers of FDI in the OECD area.

**Section 1 - Gravity model**

We will start with a "back-of-the-envelope" estimation to show that long-term capital flows appear to be driven by a large set of variables, among which financial variables do not have a clear-cut impact and distance is determinant and robust. To specify this equation, we build on the literature about gravity model. 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.

$$FDI_{ij} = \frac{\alpha GDP_i GDP_j}{\left(DIST_{ij}\right)^{\beta}}$$

An economic "translation" of this relation is 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 those models to study the impact of currency blocs on trade. 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).

*Distance appears as a strong determinant of FDI*

Our models build on this gravity equation. Our dependent variable is the outflows of FDI from a country A to a country B, provided by the International investment database (OECD). The dataset covers the period 1997-2001 and 29 OECD countries (2714 observations).

Our starting point is to measure the contribution of 'distance' in the determination of bilateral FDI by an 'ad hoc' equation, derived from a standard gravity equation. Our baseline equation is the following:

$$FDI(i \rightarrow j) = a_1 country\_size(i) + a_2 country\_size(j) + a_3 distance(i,j) + control\_variables + constant$$

*country_size* is defined as population or GDP. The distance is defined by the distance between capital cities, the main drawback being that it also captures the geographical size of each country. 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.

**Table 1**

| **Variable** | **Definition** | **Source** |
|---|---|---|
| FDI value | outflows of FDI national currency | 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 |
| phones | Fixed lines and mobile phones subscribers (per 1,000) people | World Bank (WDI dbase) |
| law | Legal system | Levine *et alii* |
| military | Military in politics | ICRG |
| Intconflict | Internal conflict | ICRG |
| extconflict | External conflict | ICRG |
| Cost | Bank overhead cost | Levine *et alii* |
| Itexppercap | 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 |

Our strategy is therefore to assume that we can control for the entire set of fixed exporter and importer effects and run pooled ordinary least squares (OLS). 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), World Development Indicators (phones), as well as country credit ratings.

**Table 2**

| | I_out | | I_out |
|---|---|---|---|
| Exports | 0.000 | Exports | 0.000 |
| | (4.07)** | | (6.06)** |
| Population in A | 7.365 | Gdp in A | 0.000 |
| | (2.75)** | | (1.31) |
| Population in B | 24.206 | Gdp in B | 0.000 |
| | (4.72)** | | (2.14)* |
| Growth in A | 44.518 | Growth in A | 48.851 |
| | (1.73) | | (1.92) |
| Growth in B | 88.639 | Growth in B | 15.731 |
| | (2.81)** | | (0.59) |
| Distance | -0.105 | Distance | -0.043 |
| | (4.62)** | | (2.39)* |
| Adjacency | 1,603.402 | adjacency | 1,441.126 |
| | (2.90)** | | (2.58)** |
| Control variables and constant | | Control variables and constant | |

z statistics in parentheses
* significant at 5%; ** significant at 1%

We build year dummies (*dist19XX*) that we interact with the distance variable to analyse whether the effect of distance has increased or decreased over time.

The main conclusion that we can draw from table 2 is that the coefficient of distance is negative, significant at 1% level. The baseline equation with growth domestic product gives a coefficient of distance of –0.04. The following table (table 3) shows that this coefficient is increasing over time, as if the world was getting bigger over time: the distance dummies are jointly significant.

**Table 3**

| Dependent variable | I_out | Dependent variable | I_out |
|---|---|---|---|
| Exports | 0.000 | exports | 0.000 |
| | (4.10)** | | (6.04)** |
| Population in A | 7.342 | Gdp in A | 0.000 |
| | (2.68)** | | (1.35) |
| Population in B | 24.152 | Gdp in B | 0.000 |
| | (4.72)** | | (2.15)* |
| Growth in A | 40.090 | Growth in A | 49.764 |
| | (1.48) | | (1.89) |
| Growth in B | 77.542 | Growth in B | 2.261 |
| | (2.44)* | | (0.08) |
| distance | -0.158 | Distance | -0.110 |
| | (4.37)** | | (3.49)** |
| dist1997 | 0.043 | dist1997 | 0.086 |
| | (1.27) | | (2.48)* |
| dist1998 | 0.091 | dist1998 | 0.117 |
| | (2.63)** | | (3.21)** |
| dist1999 | 0.072 | dist1999 | 0.075 |
| | (2.06)* | | (2.17)* |
| dist2000 | 0.053 | dist2000 | 0.050 |
| | (1.65) | | (1.57) |
| adjacency | 1,584.912 | adjacency | 1,427.434 |
| | (2.86)** | | (2.54)* |
| Control variables andconstant | | Control variables | |
| Test | | test | |
| ( 1) dist1997 = 0 | | ( 1) dist1997 = 0 | |
| ( 2) dist1998 = 0 | | ( 2) dist1998 = 0 | |
| ( 3) dist1999 = 0 | | ( 3) dist1999 = 0 | |
| ( 4) dist2000 = 0 | | ( 4) dist2000 = 0 | |
| chi2( 4) = 7.74 | | chi2( 4) = 11.92 | |
| Prob > chi2 = 0.1014 | | Prob > chi2 = 0.0180 | |

z statistics in parentheses
* significant at 5%; ** significant at 1%

*Spatial regression*

This strong dependence of FDI upon spatial factors is confirmed using spatial regressions. The main interest of spatial regression is that it takes the multidirectional nature of dependence into account. Econometrically, spatial dependence among FDI can take two forms (cf Anselin (1988) and Anselin and Hudak (1992) :

1. *Spatial error model*
   $FDI = X\beta + \varepsilon$
   $\varepsilon = \lambda W \varepsilon + \mu$

2. *Spatial lag model*

$$FDI = \rho WFDI + X\beta + \varepsilon$$

Where $X$ refers to the vector of non distance related explanatory variables.
The specification (1) posits that the error term for one country is correlated with the error term of all the other countries, whereas the specification (2) posits that FDI in one country is dependant on FDI in its neighbours.
Since *W has* ($N^2$-N) parameters, we have to posit a structure for spatial dependence . We take $w_{ij}=1/(d_{ij})^2$.
Using the Stata command *spatreg*, the p-values of the Lagrange multiplier tests of the nullity of the spatial coefficients are given by:

**Table 4**

| | **1997** | **2001** |
|---|---|---|
| **P value of** $LM_\lambda$ | 0% | 19% |
| **P value of** $LM_\rho$ | 0% | 0.2% |

These estimations lead to a rejection of the null hypothesis of no spatial dependence except for 2001, with the error model. Nevertheless, these results should be interpreted with caution since spatial dependence can reflect phenomena such as spatial interactions, diffusion processes but may also be due to non appropriate delineation of the spatial units of observation. These potential measurement errors can then generate a pattern which exhibits spatial dependence. If these spatial regressions should be taken with a pinch of salt, they don't invalidate the results of our gravity equation.

*'Distance puzzle'*

There seems to be two 'distance puzzles' in the determination of FDI. First, distance plays a negative role in multinational's choices of investment. This finding appears intriguing in a "FDI versus exports" framework, that should apply for OECD countries, where FDI is mainly "horizontal". Secondly, this effect of distance increases over time as if the world was not shrinking as it is generally asserted.

The role of distance in investment decisions has already been evidenced by Portes and Rey (1999). Working on portfolio investment data, 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.

In trade literature, the distance puzzle refers exclusively to the non-diminishing role of distance. Indeed distance plays a negative role on trade flows through the impact of shipping costs but this impact should decrease with the improvements of transportation technics. However empirical evidence points out ambivalent conclusions concerning the change in the impact of distance. The 'distance puzzle' is a standard result with exports and imports data. Leamer and Levinsohn (1995) find that 'the effect of distance on trade patterns is not diminishing over time'. In order to correct for omitted variable bias, Brun

*et alii* (2003) suggests an augmented cost function (introducing for example the price of oil) and find a decrease in the significance of distance. But Rose (1999) finds that the impact of distance on commerce had remained unchanged between 1970 and 1990, unaffected by communication and transportation improvements.

For FDI, the distance puzzle is intriguing in two different ways. First adopting a 'FDI vs exports' framework, the effect of distance on the ratio between FDI and exports should be positive. Secondly, with the Internet, the cost of moving goods remains high relatively to the cost of conveying information about the production of goods. Firms should find investment more and more efficient than trade for serving foreign markets.

**Section 2 - A theoretical model**

A theoretical model seems necessary to shed light on this puzzle. The framework we adopt builds on the proximity-concentration trade-off literature, in which Brainard (1993) is one of the seminal papers. Brainard (1993) describes firm's choice between exports and "horizontal" FDI. "Horizontal" FDI are defined as foreign investments that are designed to serve foreign customers. 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. The main motive of "horizontal" FDI 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.

The model considers a setting with two countries (A and B), two sectors (agriculture and manufacturing) and two factors (land and labour). 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 labour 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, $C^e$, 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:

$$C^q(q_i) = F + Vq_i$$

Lastly, transport costs are modeled as a fraction of output that is lost in transit: only a fraction $S_{aj}^{-1}$ of a given quantity survives shipment between countries a and j. Brainard posits $S_{aj}^{-}1 = exp(-Td_{aj})$, $T$ being the transport cost coefficient and $d_{aj}$ the distance between $a$ and $j$. We will just suppose that $S$ is a general function of distance and time. This transport cost $S$ is to be multiplied to the variable cost $V$. Market equilibrium conditions give prices and quantities. The price of a good produced in $a$ and sold in $j$ is given by:

$$p_{aj} = markup.V.S_{aj}$$

The corresponding quantities, $q_{aj}$, are a decreasing function of these prices.

The variable profit is given by: $\pi_{aj} = p_{aj} q_{aj}$

Algebra shows that the variable profit is a decreasing function of distance.

These elements give the appropriate framework to analyse the formation of a multinational. Let us consider a firm in A which have 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 variable profit (due to lower transport cost) that follows will exceed the additional fixed cost of opening a new plant.

With algebra, Brainard shows that the condition for FDI to occur has the following form:

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

Where $\psi$ is an increasing function of transport costs *S*, and therefore of distance. In Brainard's model *F* is only a function of *w*, which is fixed. Therefore FDI is a positive function of transport cost. However, in our theoretical framework, we consider more realistic to assume that *F* increases with distance.

$$F(\overset{+}{D})$$

This can be explained by different barriers-to-invest: difficulty to get information about buying/building new production facilities, low quality of financial/accounting information, big differences in the legal systems, language barrier.
All in all, the effect of distance is twofold and ambiguous. Distance, via transports costs has a positive impact on FDI and a positive impact through the sunk cost effect. For simplicity we assume that

$$FDI(\overset{+}{S},\overset{-}{F}) = \gamma_1 \ln(S) - \gamma_2 \ln(F) \text{ with } 0 \le \gamma_i$$

First, distance increases transport cost and encourage market proximity. But at the same time, the sunk cost of FDI is higher the higher the distance.

*Transport cost specification*

Hummels (1999) provides a detailed accounting of the time-series pattern of shipping costs and identifies the main determinants of freight costs. We draw on his study to specify the following expression for transport costs:

$$\ln(S) = \alpha_1 \ln(D) - \alpha_2 time \ln(D) + cst \text{ with } 0 \le \alpha_i$$

And we suppose that *F(D)* has the following expression:

$$\ln(F) = \alpha_3 \ln(D) + cst \text{ with } 0 \leq \alpha_3$$

We therefore get the following expression for FDI:

$$\ln(FDI) = (\beta_3 - \beta_1)\ln(D) + \beta_2 time \ln(D) \text{ where } \beta_i > 0, \ \forall i$$

This model debunks the distance puzzle to a large extent. Our estimations show that $\beta_3 - \beta_1 < 0$, which means that the fixed cost effect of building a new plant outweighs the transport cost effect. Our estimation are also consistent with a positive sign for the coefficient of *time*ln(*D*).

Our endeavour is now to disentangle this different types of barriers to invest that are likely to be captured by the distance variable. Indeed a large set of integration variables is likely to facilitate or hinder integration and therefore influence FDI determination. Distance is one of those variables but so are legal systems similarity, efficiency in the transmission of financial information and the stability in the currencies.

**Section 3 - What factors are at work behind the distance variable?**

First, we test if geographical proximity is not only a proxy for other types of asymmetries/differences: proximity in legal systems; better transmission of financial information between neighboring countries than countries that are far apart; currency blocs. Estimation results are given in table 5.

**Table 5**

| | I_out |
|---|---|
| Exports | 0.000 |
| | (5.82)** |
| Dummy anzcerta | -213.185 |
| | (0.58) |
| Dummy cefta | 64.589 |
| | (0.45) |
| Dummy eea | -283.299 |
| | (1.46) |
| Dummy eu | -144.361 |
| | (0.86) |
| Bank concentration A | -2,656.515 |
| | (2.12)* |
| Bank concentration B | -3,293.670 |
| | (3.54)** |
| Dummy legal system | 544.166 |
| | (2.28)* |
| Bank overhead cost in A | -4,616.928 |
| | (0.87) |
| Bank overhead cost in B | 24,200.087 |
| | (3.68)** |
| Bilateral exchange rate. level | 6.939 |
| | (1.97)* |
| Bilateral exchange rate. variance | -89.423 |
| | (3.01)** |
| Gdp in A | 0.000 |
| | (1.23) |
| Gdp in B | 0.000 |
| | (2.30)* |
| GDP growth in A | 46.734 |
| | (1.66) |
| GDP growth in B | 67.987 |
| | (2.44)* |
| Distance | -0.126 |
| | (3.05)** |
| Adjacency | 1,460.146 |
| | (2.62)** |
| Control variables and constant | |

z statistics in parentheses
* significant at 5%; ** significant at 1%

*Does Distance capture differences in legal systems ?*

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. We find that the legal system proximity is significant at 5%.

*Does Distance capture financial information asymmetries?*

We implement two methods to address this question. As a direct method, we use of measures of bank overhead cost and of bank concentration to reflect the quality of the financial system. The conclusion of these regressions is not clear. Whereas bank concentration seems to have a negative impact on the outflows of FDI both in the capital exporting and receiving countries, the bank overhead cost of the capital receiving country has the wrong sign.

A more indirect method is provided by Froot and Stein (1991)'s model. Froot and Stein (1991) using an imperfect information framework develop a model where wealth, and consequently exchange rates, are explanatory variables of FDI. Indeed, as they write, in a world with perfectly mobile capital and perfect information, general equilibrium should lead to an equalization of risk-adjusted expected returns on all international assets. Consequently, there should be no connection between exchange rates and investment in assets. For instance, assuming that the dollar falls, the return of assets that are issued in dollars should fall and the price of these assets should therefore rise. All in all, the price in dollars of these dollar assets should remain constant. Nevertheless, since foreigners hold their wealth in foreign currencies, when the dollar is weak, assets in dollarized countries seem cheaper for them and thus inflows of FDI in these countries should increase. The authors use this model to justify the simultaneity of the depreciation of the dollar and the rise of US FDI around 1990.

But this possible effect hinges upon the hypothesis that incomplete information and imperfections in capital mobility play a very important role in firms' choices. Therefore, the effect will be stronger in countries with poor financial systems leading to high informational costs and capital misallocation. 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.

This result provides a way to test for financial integration. As countries become more integrated, the link between FDI and exchange rate should get looser. Table 5 shows that effect of exchange rate on FDI for our set of countries is significant, but this result is not fully robust to other types of specification. Clearly the effect of financial information asymmetries on FDI flows is not very clear-cut in the OECD countries.

*Does distance capture currency blocs or regional trade agreements?*

Perceptions grow that gradually the world is geographically segmenting into regional currency blocs. The delineation of currency blocs seems mainly driven by geographical proximity. The euro bloc represents an almost connex geographical area and is likely to continuously expand to its natural neighbours of Central and Eastern Europe. A merger of the Australian and New-Zealand dollars is a recurrent topic in Oceania. Outside OECD, a currency union is emerging among Mercosur members in Latin America and a geographical currency zone already exists around the South Africa rand.

We capture membership to a common currency bloc by the variance of bilateral exchange rate. 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. However this estimation are affected by a problem of reversed causality, since a government may make deliberate efforts to promote exchange rate stability with major economic partners. For FDI, Calderon-Rossell (1985) finds that an increase in the exchange rate variance has a positive effect on FDI if productions costs are relatively high in the host country. In this case exports dominate FDI in the flows between the domestic and the host country. An increase in exchange rate variance is harmful for exports but tends to increase the level of FDI. Conversely, if the host country has low production costs, it will most likely exhibit a high level of FDI inflows. A higher variance of exchange rate will spur these FDI inflows. Similarly Cushman (1985) studies the effect of real exchange rate risk on FDI. Introducing uncertainty both around exchange rate and external demand, Goldberg and Kolstad (1995) show that, FDI increases for a given amount of productive capacity when the volatility in exchange rate increases.

As table 5 shows, the variance of the exchange rate is significant at 1% level. On the contrary, membership to a common regional trade agreement (which is captured by dummy_ZONE) does not seem to have any effect of the flows of cross-bordier investment.

Both legal system similarities and exchange rate uncertainty have a significant impact on FDI. Nevetheless their introduction in our estimation does not decrease the coefficient of distance. In the baseline equation with GDP (table 1), the coefficient of distance is –0.04, whereas in the law and finance data augmented equation, this coefficient is –0.126. Besides, no compelling argument is found that this negative effect of distance on FDI is the byproduct of financial information asymmetries.

*The limited and ambivalent role of IT*

As evidenced in tables 7, the impact of development in IT is limited and ambivalent. This result is in line with Leamer and Storper (2001), who claims that progress in IT goes hand-in-hand with new innovative activities for which there is a concentration advantage for the firm. These innovative activities require that transfer of complex and uncodifiable messages that may imply high shipping costs. Indeed the shipping of intellectual product is costly, as evidenced by the high clustering of intellectual and immaterial activities (accounting, strategy, marketing, finance, legal work) and the existence of big financial districts. Moreoever, with the advent of the Internet, production process is more sophisticated and complex and face-to-face contract become more important. We can also presume that the cost of the Internet is so low that it prevents from investing in a close bound.

**Table 6 – Role of IT**

| | I_out |
|---|---|
| Exports | 0.000 |
| | (5.23)** |
| Gdp in A | 0.000 |
| | (1.20) |
| Gdp in B | 0.000 |
| | (1.57) |
| GDP growth in A | 57.367 |
| | (2.14)* |
| GDP growth in B | 72.866 |
| | (2.63)** |
| Distance | -0.073 |
| | (4.10)** |
| Adjacency | 1,550.083 |
| | (2.82)** |
| Internet in A | 0.000 |
| | (0.34) |
| Internet in B | 0.000 |
| | (3.88)** |
| IT expenditure (per capita) in A | 0.226 |
| | (1.78) |
| IT expenditure (per capita) in B | 0.006 |
| | (0.03) |
| Control variables and constant | |

z statistics in parentheses
* significant at 5%; ** significant at 1%

*A strong effect of cultural variables*

Table 7 provides strong evidence that cultural links are one of the main drivers of investment flows. Linguistic ties, tourism flows, study exchanges appear strongly significant. Interestingly, introducing tourism flows and study exchanges reduce the coefficient of distance substantially compared to the baseline equation given in table 2 (-0.04 in table 1 versus –0.03 in columns 2 and 3 of table 7).

**Table 7 – Cultural variables**

| Dependent variable | I_out | I_out | I_out |
|---|---|---|---|
| Exports | 0.000 | 0.000 | 0.000 |
| | (5.55)** | (5.30)** | (5.07)** |
| GDP in A | 0.000 | 0.000 | 0.000 |
| | (1.16) | (0.51) | (0.84) |
| GDP in B | 0.000 | 0.000 | 0.000 |
| | (2.10)* | (1.83) | (2.11)* |
| GDP growth in A | 46.962 | 42.235 | 41.869 |
| | (1.85) | (1.64) | (1.64) |
| GDP growth in B | 8.871 | 43.667 | 21.873 |
| | (0.33) | (1.75) | (0.83) |
| Language | 2,166.024 | | |
| | (2.36)* | | |
| d_tourism | | | 800.218 |
| | | | (3.29)** |
| d_study A in B | | 3,802.972 | |
| | | (4.58)** | |
| d_study B in A | | 2,776.078 | |
| | | (3.75)** | |
| Distance | -0.057 | -0.031 | -0.028 |
| | (3.03)** | (1.87) | (1.72) |
| Adjacency | 676.922 | 303.997 | 752.981 |
| | (0.95) | (0.46) | (1.17) |
| Control variables and constant | | | |

Z statistics in parentheses
* significant at 5%; ** significant at 1%

## Conclusion

In this paper, we identify two distance puzzles for FDI and propose an explanation for them drawing on Brainard (1993). We then show that institutional similarities do play a big role in FDI determination but that cultural links promote investment flows considerably.

However the culture database we built would need to be extended and some robustness checks are still to be implemented. Also, the theoretical framework underpinning our estimations could be improved to yield a more tractable solution.

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