Determinants of Foreign Direct Investment of OECD Countries 1991-2001

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Abstract

Using a fixed-effects panel data approach, FDI flows of 22 OECD countries are explained by gravity equations over the period 1991-2001. It is distinguished between all available observations, Intra-EU25 observations only, and observations not belonging to the EU25 area in order to control for EU-specific effects. Regressions are repeated with exports as dependent variable in order to capture diverging influences for trade flows. Changes in total market size and relative market size are important factors that lead both FDI and exports in the same direction. However, relative market size is only significant in the FDI equation when variation between the EU25 area and other investment is taken into account, thus indicating a concentration of FDI within Western and Central Europe. Stock market booms boost FDI but not exports. Differences in significance levels/signs of coefficients of political indicators and exchange rate changes indicate that exports are demand-driven while FDI is supply-driven. Year dummies interacted with country distance show that, overall, FDI *and* exports tended to flow less to distant countries over the period under consideration. However, this trend is reversed for exports within the EU25 area.

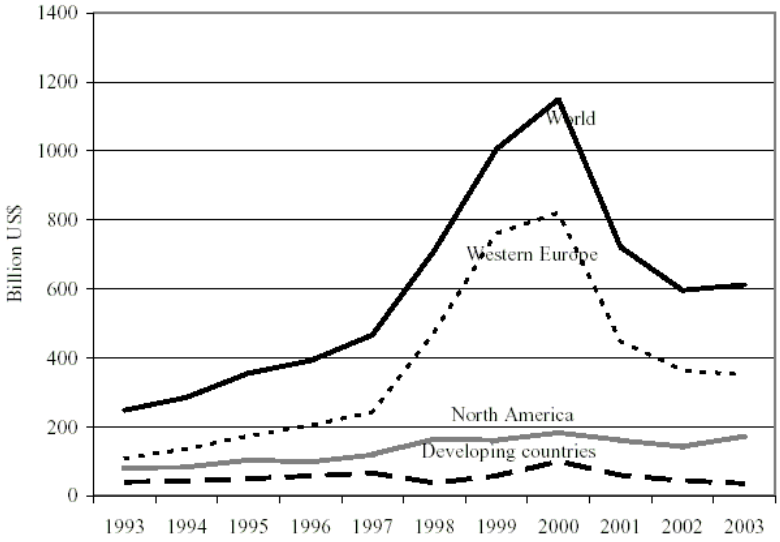
Keywords: foreign direct investment and international trade; multinational firms; models with panel data.
JEL classification: F21, F23, F14, C23.

1 Introduction

The 1980s and 1990s saw an unprecedented rise in worldwide foreign direct investment (FDI) that surpassed growth rates of world-wide GDP and trade flows. While today total FDI stocks are larger than ever, total FDI flows broke in after 2000 and have begun to recuperate only recently. The economic literature on the subject, however, has grown as quickly as FDI itself. Since FDI reflects in particular long-term investment activities of multinational enterprises, much research has been dedicated to identify motivations for a national enterprise to establish a lasting interest in foreign markets via foreign investment. Basically, foreign direct investment can take two forms: market-searching, horizontal FDI that establishes production facilities or distribution networks in order to serve the target market from within the partner country, or vertical FDI that shifts part of the production chain abroad in order to exploit differences in factor prices. It is therefore straightforward to assume a connection between FDI and trade. It is often argued that horizontal FDI substitutes for exports while vertical FDI leads to increased trade with intermediate products.

The Ownership-Location-Internalisation-Paradigm of DUNNING (1977) states that a firm faces three different possibilities to serve a foreign market: It might export, it might license its production to independent firms abroad or it might establish its own subsidiaries. The more OLI advantages there are to be exploited, the more the firm will favour market access by FDI. Ownership advantages encompass firm-specific advantages like patent rights, strong brands or superior management abilities which are not bound to a specific location and thus lead to scale economies. These render certain firms more competitive than potential (foreign) rivals and thus less willing to share internal knowledge for fear of plagiarism. Location advantages are pull factors that draw firms towards foreign shores because of lower wages, easier access to raw materials, a favourable tax environment or a necessary proximity to markets and consumers. Internalisation advantages relate to the reduction of possible transaction costs by overcoming principal-agent problems.

Figure 1: Development of worldwide FDI flows according to region of origin.



Source: collected according to UNCTAD (various).

However, while these arguments are intuitively appealing in order to explain why firms become multinational at all, Fig. 1 makes clear that there have to be strong macroeconomic forces driving the timing of investment. It is eye-catching that much of the rapid increase of worldwide FDI in the second half of the 1990s can be attributed to an increase in FDI-activity of European countries. While it is not unusual to relate the world-wide distribution of FDI stocks or the magnitude of trade flows empirically to various country differences, most of these studies are cross-sectional and do not account for changing influences over time; of those that do, many are multi-period cross-section studies that raise methodological problems of their own. The correct approach to combine cross-section and time-series elements is to use panel data. This has been done, but mostly for US data or other single countries as donor/recipient of FDI. In contrast, this study uses bilateral panel data for 22 OECD donor countries of FDI over the period 1991-2001 in order to answer the following questions: Which factors led to the tremendous rise (and subsequent fall) of FDI over the period 1991-2001? Was Europe "different" from the rest of the world? How were trade flows affected over the same period? This study does not explicitly address the question if there has been a direct trade-off between FDI and trade. However, it reverberates in the discussion, where it is asked if and in how far common factors influenced FDI and exports differently.

2 Possible motivations for national firms to go multinational

The 1980 saw the development of several approaches to integrate the existence of multinational companies into international trade theory, most importantly HELPMAN (1984), HELPMAN/KRUGMAN (1985), and MARKUSEN (1984). Whereas HELPMAN and HELPMAN/KRUGMAN focus on the development of vertical multinationals via factor-price differences between countries, MARKUSEN is more interested in the rise of horizontal multinationals due to trade costs. A key assumption in both models is that, in contrast to national firms, potential multinationals are allowed to possess "headquarter services" (roughly in the sense of DUNNING's ownership advantages) that are modelled as fixed costs and can be exploited through plants at home or abroad at no extra cost. This leads to economies of scale, and thus an incentive to become multinational arises. Through the 1990s, MARKUSEN adapted and enlarged his basic model with various co-authors. In particular, he tried to

integrate the vertical HELPMAN/KRUGMAN approach into his model of horizontal multinationals to create the "knowledge-capital" model. Its overall structure and key findings are nicely summarised in MCCORRISTON (1999). Very condensed, the model states that in a two-country world with a given level of trade costs (high enough to present a barrier to entry), there will be exclusively horizontal, "market-searching" FDI as long as the two countries are relatively similar in size (that is, GDP) and in relative endowments with skilled and unskilled labour. As differences in factor endowments emerge, there are growing incentives to undertake vertical FDI, culminating in a situation where headquarter services are concentrated in the skilled-labour-abundant country and production taking place with unskilled labour in the other. With equal factor endowments but a growing difference in country size, the other corner solution appears: One market becomes so small that (with economies of scale) production there becomes unattractive; instead, all headquarter services and production are carried out in the large country, the small one being provided through exports. Various mixed outcomes are possible.

It seems safe to say that the majority of observed FDI flows are caused not so much by green-field investment but by mergers and acquisitions (UNCTAD 1997). KLEINERT (2000) identifies three main factors for the merger waves of the 1980s and 1990s, that are interdependent: general "globalisation", deregulation and consolidation.

Deregulation of formerly state-controlled sectors in many western industrialised countries was surely an import trigger for mergers and sector consolidation. State protection and subsidies were reduced in obviously shrinking sectors like coal and steel in Europe or the US military industry after the end of the cold war. On the other hand, deregulation as cutting of entry-barriers lead to the appearance of new players and subsequent crowding out, for example in telecommunications, finance and the airline carrier industry (KLEINERT 2000, pp. 48). Together with technical progress in computer industry and telecommunications (think of mobile phones or the internet), deregulation in turn fostered globalisation, which in this context stands for a general reduction of "distance costs" that encompass trade costs as well as investment costs and costs for communication. Rather more vaguely, one could also argue that globalisation led to a more acute perception of investment possibilities. It has already been noted by KINDLEBERGER (1969) that firms tend to show a certain myopia with regard to their geographical horizon.

Along with deregulation one might also name integration, since its manifestations in the forming of the EU single market in 1993, its enlargement in 1994 and 2004 and the introduction of a single currency should have facilitated intra-European investment enormously. This is most likely an important explanation for the unprecedented rise of foreign direct investment by EU countries for the years 1997-2001. However, it is not clear how to integrate these effects into an empirical model apart from the use of dummy variables.

In addition, there is a possible connection between exchange rate fluctuations and FDI. This argument was presented by FROOT/STEIN (1991), who observed that Japanese FDI into the United States followed surprisingly close movements of the yen-dollar exchange rate in the 1980s. They explained this with imperfect capital markets in which lenders with imperfect information tend to charge premiums on credits. However, holders of the appreciating currency experience wealth gains which allow them to finance more of an investment internally instead of relying heavily on expensive credit markets.

BLONIGEN (1997) follows a different argumentation, proposing that foreign investors who calculate in the appreciating currency are prepared to pose higher bids than national

competitors for a possible acquisition target, since the possible gains in form of new intangible assets (ownership advantages) are independent of the exchange rate. As such, the exchange rate might be a determinant not for the decision to invest itself but for the timing of an acquisition (and thus contribute to a wavelike or cyclical pattern). BLONIGEN also mentions a possible wealth effect along the lines of FROOT/STEIN in regard to stock market developments where booms enrich participating companies as well. This is in line with Tobin's Q theory (based on TOBIN 1969) that suggests a firm should increase its capital stock when its market value exceeds its book value. DE SANTIS et al. (2004) used this approach in a recent paper to explain FDI for eight to nine European countries into the United States, with Tobin's Q proxied by fluctuations of European stock markets. They find a significantly positive relationship between stock market developments and FDI into the United States.

3 Methodology

As is well known, gravity equations are a very successful empirical tool to model trade flows and, more recently, also activities of multinational companies, measured by flows or stocks of FDI (e.g. EATON/TAMURA 1994, GRAHAM 1997, BRENTON *et al.* 1999, EGGER/PAFFERMAYR 2004) or affiliate sales (BRAINARD 1997, CARR *et al.* 2001). The gravity equation relates bilateral flows of goods or factors to country income (Y), population (P) and country distance (D):

$$X_{ij} = \alpha_0 Y_i^{\alpha_1} Y_j^{\alpha_2} P_i^{\alpha_3} P_j^{\alpha_4} D_{ij}^{\alpha_5} .$$

Originating in the work of TINBERGEN (1962) and PÖYHÖNEN (1963), its somewhat intuitive econometric specification has been put on a solid foundation on economic theory especially by LINNEMANN (1966), ANDERSON (1979) and BERGSTRAND (1985,1989). A useful outcome of these derivations is that the gravity equation can be thought of as a reduced form equation incorporating supply and demand factors of two countries. HELPMAN (1987) and CARR *et al.* (2001) use gravity equations to test implications derived from general-equilibrium models concerning the volume of trade or affiliate sales, respectively. Common results of the new trade literature are that, on the one hand, bilateral trade volume between countries rises when total income rises and when country incomes converge (this effect is due to monopolistic competition and consumer preferences). On the other hand, the trade volume also rises when factor endowments diverge because of Heckscher-Ohlin-type specialisation in production. Rising trade or distance costs should dampen trade.

In the presence of multinational companies, the Knowledge-Capital-approach expects analogous results for FDI activity and affiliate sales. The exception is distance costs, since these are expected to influence multinational activity in more than one way: some part of high distance costs might be attributed to high investment costs that should negatively influence FDI. Pure trade costs are supposed to positively influence horizontal direct investment, substituting for trade. Vertical direct investment, however, is related to increased trade with intermediate products. Thus, rising trade costs are expected to lower vertical FDI. In practice, of course, it is hard to disentangle horizontal from vertical FDI. The significance of variables controlling for relative factor endowments is often taken as an indicator for the presence of vertical FDI.

Here, gravity equations are specified for bilateral exports and bilateral FDI flows. In order to remain close to the knowledge-capital-framework, I follow CARR *et al.* (2001) by taking

gravity variables that account for the total market size of two countries, for differences in country size and for differences in skilled labour abundance, indices for trade and investment costs and country distance. In contrast to CARR *et al* (2001), however, I include a stock market indicator, exchange rates and price indices in order to account for possible relative wealth effects in line with FROOT/STEIN (1991), BLONIGEN (1997) and DE SANTIS *et al.* (2004). Note that the stock market indicator is the only variable that has not yet been derived formally out of a general-equilibrium framework: BERGSTRAND (1985, 1989) includes exchange rates and price indices into an empirical specification of the gravity equation in order to control for relative price effects. Thus, the specifications are as follows:

$$\begin{aligned} FDI_{ijt} = {} & \beta_1 GDPSUM_{ijt} + \beta_2 GDPDIFF_{ijt} + \beta_3 AGRPOPDIFF_{ijt} + \beta_4 STOCK_{it} + \beta_5 EXCH_{\$it} \\ & \beta_6 EXCH_{\$jt} + \beta_7 CPI_{it} + \beta_8 CPI_{jt} + \beta_9 RISK_{it} + \beta_{10} RISK_{jt} + \beta_{11} TREATY_{it} + \beta_{12} TREATY_{jt} \\ & + \beta_{13} FREE_{it} + \beta_{14} FREE_{jt} + \beta_{15}^{t} DIST_{ij} \cdot YD_t + a_{ij} + u_{ijt} \end{aligned}$$

$$\begin{aligned} EX_{ijt} = {} & \beta_1 GDPSUM_{ijt} + \beta_2 GDPDIFF_{ijt} + \beta_3 AGRPOPDIFF_{ijt} + \beta_4 STOCK_{it} + \beta_5 EXCH_{\$it} \\ & \beta_6 EXCH_{\$jt} + \beta_7 CPI_{it} + \beta_8 CPI_{jt} + \beta_9 RISK_{it} + \beta_{10} RISK_{jt} + \beta_{11} TREATY_{it} + \beta_{12} TREATY_{jt} \\ & + \beta_{13} FREE_{it} + \beta_{14} FREE_{jt} + \beta_{15}^{t} DIST_{ij} \cdot YD_t + a_{ij} + u_{ijt} \end{aligned}$$

Both, yearly bilateral FDI flows from country *i* to country *j*, FDI_{ijt} and yearly bilateral exports, EX_{ijt}, are in 1995 US$ and are explained by the same set of variables. (In the following, indices are omitted for convenience.) *GDPSUM* is the sum of both countries' GDP, controlling for total market size. The expected sign is positive for both, *FDI* and *EX*. *GDPDIFF* is an indicator of relative country size in terms of GDP, measured as $1-\left(GDP_i/GDPSUM_{ij}\right)^2-\left(GDP_j/GDPSUM_{ij}\right)^2$. It ranges from nearly 0 (high difference in country size) to 0.5 (both countries are of the same size). The expected sign of *GDPDIFF* is positive since convergence in country size is supposed to raise horizontal FDI and intra-industry trade. *AGRPOPDIFF* is supposed to control for endowment differences in skilled labour; I take the difference in the agricultural population's share of total population as a proxy. The difference is expressed in absolute terms in order to keep observations strictly nonnegative (see BLONIGEN *et al.* 2002). I expect its sign to be positive in respect to *FDI*, since high endowment differences in skilled labour should encourage vertical FDI. The expected sign in respect to *EX* is positive, too, because differences in factor endowments should foster inter-industry trade. Since a rising stock market indicator is supposed to raise the relative wealth of country *i, STOCK* is supposed to influence *FDI* positively. There are no predictions for its influence on exports.

An appreciation of the reporting country's currency relative to the partner country's currency is supposed to raise bilateral FDI because there is a relative wealth effect in favour of the reporting country. The opposite is true for exports: An appreciation of the home country's currency makes traded products in the partner country more expensive, thereby lowering import demand. However, many multinational enterprises can be supposed to calculate their overseas transactions in US-Dollars. Positive wealth effects thus are arguably connected not so much to appreciations of the reporting countries own currency but to appreciations of the US-Dollar. Therefore, it is not the bilateral exchange rate that is used here but the exchange rates of the reporting and partner country's currency in respect to the US-Dollar, $EXCH_{\$}$. An appreciation of a countries currency in respect to the US-Dollar is reflected in a decrease of $EXCH_{\$}$. It is expected that an increase in either $EXCH_{\$i}$ or $EXCH_{\$j}$ raises FDI outflows from

country *i* to country *j*, while it lowers corresponding exports. $EXCH_{\$}$ enters the equation in nominal terms. Instead of calculating the real exchange rate, consumer price indices for the reporting and partner country are included as separate terms, *CPI*. This is done in order to distinguish between external and internal price effects.

Variables controlling for the political environment, and thus, transport and investment costs, follow. *RISK* is a country risk indicator for each country, ranging from 0-100. High values indicate a low country risk. Therefore, its sign is expected to be positive. *TREATY* is the number of bilateral investment treaties each country has signed in total with other countries. It controls for investment liberalisation; its expected sign is positive for *FDI* and unspecified for *EX*. *FREE* is an index of economic freedom. It ranges from 1.0 to 5.0; higher values indicate less economic freedom. Thus, its expected sign is definitely negative for *EX*. As this index comprises trade and investment costs, its influence on *FDI* is ambiguous.

At last, *DIST* is the great circle distance of country capitals. The significantly negative influence of distance on trade (and more recently also FDI) has been reported in many cross-section studies. However, a fixed-effects regression does not allow for estimation of parameter coefficients. Parameters are absorbed into the fixed group effects. A random-effects specification would allow for estimation of parameter coefficients but necessitates the assumption that the group effects are not correlated with the explaining variables. A Hausman-test indicates that random effects are not appropriate in our case. Thus, *DIST* is interacted with *t* year dummy variables. This approach renders observable the changing influence of *DIST* on the dependent variable over time (WOOLDRIDGE 2003, p. 428).

4 Data and Results

In contrast to much prior research, which relied heavily on data for inward and/or outward FDI of the United States and occasionally other single countries, data of 22 reporting OECD countries is used in order to come to more universally applicable results. This is justified with regard to the relative importance that FDI by EU-countries has gained in recent years. Countries included in the dataset are listed in Table 1. It remains as a drawback that the already vast bilateral OECD data base is for total bilateral FDI only. Industrial Sector specification on a country-to-country basis cannot be accounted for - the very reason that makes comparable US data so attractive. Nevertheless, although it would be appreciable to account for sectoral differences between FDI flows, it is the general tendencies we are most interested in here. These can also be accounted for in a strict macroeconomic approach.

For the empirical analysis, an unbalanced panel data set is created for the period 1991-2001. FDI data for yearly bilateral outward FDI flows from OECD countries are obtained from the OECD Foreign Direct Investment Statistics Yearbook (OECD 2003a) and trade data come from the OECD Bilateral Trade Database (OECD 2003b). Exchange rates are from the IMF Financial Statistics Yearbook (IMF 2003). GDP based on purchasing power parity is from the IMF World Economic Outlook Database (IMF 2004). The number of total bilateral investment treaties is taken from UNCTAD (2005). As an indicator for economic freedom the Heritage Index of Economic Freedom is employed (HERITAGE FOUNDATION 2004). Since this index starts only in 1995, the 1995 values are inserted for the years 1991-1994. This is clearly a second-best solution but the alternatives would have been either to lose these observations or to omit the index. The ICRG country risk indicator is part of the World Development Indicators Series published by the World Bank (WORLD BANK 2004).

Consumer price indices with base year 1995 are also from this source. Variables appearing in levels, as well as the stock market indicator, are transformed into logs for estimation.

Table 1: Countries included in the dataset

OECD countries reporting bilateral FDI outflows

Australia	Austria	Belgium-Luxembourg	Canada	Denmark
Finland	France	Germany	Iceland	Italy
Japan	Korea	Netherlands	New Zealand	Norway
Poland	Portugal	Spain	Sweden	Switzerland
United Kingdom	United States			

Destination countries
All of the countries listed above, plus

Algeria	Argentina	Baltic Countries	Brazil	Bulgaria
Chile	China	Colombia	Costa Rica	Czech Republic
Egypt	Greece	Hong Kong	Hungary	India
Indonesia	Iran	Ireland	Israel	Malaysia
Mexico	Morocco	Panama	Philippines	Romania
Russia	Saudi Arabia	Singapore	Slovak Republic	Slovenia
South Africa	Thailand	Turkey	Ukraine	United Arab Emirates
Venezuela				

Source: OECD (2003).

Results were obtained by fixed-effects estimation, as already mentioned above. This means that the group effects are constructed as dummy variables. Fixed-effects estimates are less efficient than random-effects estimates, where the group effects are treated as a random disturbance. However, fixed group effects yield consistent estimates even when they are correlated with explaining variables. This approach seems better suited for country data and was also supported by a Hausman-test.

First, regressions are run over all available observations. The results appear in the columns "All country pairs" of Table 2. Then, regressions are run separately for FDI/exports within the EU-25 area of 2005 (columns "Intra-EU25 investment/trade") and for all remaining observations ("Other investment/trade"). Results are reported with fully robust standard errors that correct for heteroskedasticity and additionally for possible autocorrelation within panel groups.

Results for the FDI equations show that total market size is the dominating force driving FDI for all groups of observations with coefficients well over 1 (implying in this case an elastic relationship). Relative country size is significant but only when regressed over all country pairs. It is not significant when EU25 observations or observations with Non-EU countries involved are dropped. This implies that the variation between the EU25 area and the rest of the world is crucial for establishing a relationship between relative country size and FDI. Differences in human capital endowments as measured by differences in the share of the agricultural population do not influence FDI flows significantly over time. This result supports the notion that horizontal FDI is more common than vertical FDI; it is consistent with BLONIGEN *et al.* (2002) who could not establish a relationship between skill differences and FDI either. On the other hand, stock market developments are highly significant for all country pairs and for investment that did not take place between EU25 countries.

Table 2: Fixed-effects panel estimation for bilateral FDI flows and exports 1991-2001

Regression with fully robust standard errors

	Dependent variable: **bilateral FDI outflows**						Dependent variable: **bilateral exports**					
	All country pairs		Intra-EU25 investment		Other investment		All country pairs		Intra-EU25 trade		Other trade	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
GDPSUM	3.360 ***	0.595	5.174 ***	1.563	2.476 ***	0.705	1.802 ***	0.228	0.598 *	0.334	1.724 ***	0.286
GDPDIFF	5.941 ***	2.192	9.764	6.639	3.354	2.493	3.589 ***	0.823	2.808 **	1.164	3.468 ***	0.985
AGRDIFF	3.398	3.668	5.081	10.952	2.862	3.981	0.529	0.988	5.711 **	2.258	-0.115	1.094
$STOCK_i$	0.424 ***	0.082	0.215	0.181	0.480 ***	0.090	0.007	0.021	-0.021	0.031	-0.001	0.028
$EXCH_{\$i}$	0.837 ***	0.266	0.869	0.573	0.910 ***	0.299	0.073	0.059	0.202 **	0.094	0.064	0.074
$EXCH_{\$j}$	-0.011	0.084	-0.962 *	0.532	0.005	0.085	-0.070 ***	0.026	-0.436 ***	0.113	-0.069 ***	0.026
CPI_i	-2.157 ***	0.682	-0.355	0.851	-3.549 ***	0.771	-0.535 ***	0.138	-0.543 ***	0.140	-0.517 **	0.213
CPI_j	0.190 ***	0.050	1.085 **	0.513	0.163 ***	0.051	0.130 ***	0.018	0.896 ***	0.109	0.123 ***	0.019
$RISK_i$	-0.009	0.009	-0.009	0.019	-0.004	0.010	0.003	0.002	0.003	0.002	0.003	0.002
$RISK_j$	0.004	0.006	0.011	0.013	0.010	0.007	0.011 ***	0.002	0.001	0.002	0.012 ***	0.002
$FREEDOM_i$	0.062	0.269	0.410	0.399	0.075	0.352	-0.045	0.053	0.064	0.063	-0.069	0.077
$FREEDOM_j$	-0.127	0.175	0.312	0.296	-0.303	0.211	-0.219 ***	0.047	0.004	0.058	-0.249 ***	0.064
$TREATIES_i$	0.010 ***	0.004	-0.006	0.008	0.016 ***	0.004	0.001	0.001	-0.003 **	0.001	0.001	0.001
$TREATIES_j$	0.001	0.003	0.011	0.008	0.000	0.004	0.000	0.001	-0.005 ***	0.001	0.000	0.001
DIST*1992	0.000	0.010	-0.018	0.022	0.005	0.011	-0.004 *	0.002	0.002	0.003	-0.004	0.003
DIST*1993	-0.037 ***	0.012	-0.059 **	0.029	-0.018	0.014	-0.016 ***	0.003	-0.010 *	0.005	-0.012 ***	0.003
DIST*1994	-0.028 *	0.014	-0.096 **	0.043	0.000	0.016	-0.020 ***	0.004	0.004	0.008	-0.016 ***	0.005
DIST*1995	-0.033 *	0.019	-0.116 **	0.057	0.000	0.021	-0.012 **	0.005	0.030 ***	0.011	-0.010	0.007
DIST*1996	-0.046 **	0.022	-0.162 **	0.068	-0.006	0.026	-0.023 ***	0.006	0.034 **	0.014	-0.021 ***	0.008
DIST*1997	-0.074 ***	0.025	-0.178 **	0.082	-0.025	0.028	-0.029 ***	0.008	0.041 **	0.018	-0.024 **	0.010
DIST*1998	-0.065 **	0.027	-0.162 *	0.095	-0.017	0.031	-0.039 ***	0.009	0.049 **	0.021	-0.036 ***	0.010
DIST*1999	-0.091 ***	0.030	-0.165	0.108	-0.046	0.034	-0.052 ***	0.010	0.052 **	0.024	-0.050 ***	0.012
DIST*2000	-0.101 ***	0.034	-0.149	0.121	-0.057	0.038	-0.061 ***	0.011	0.050 *	0.026	-0.056 ***	0.013
DIST*2001	-0.142 ***	0.036	-0.208	0.131	-0.089 **	0.041	-0.073 ***	0.012	0.054 *	0.029	-0.068 ***	0.015
CONS	- ***	5.122	-39.445 ***	9.380	-4.761	6.148	-7.620 ***	2.162	-1.463	2.181	-7.298 **	2.851
N	6219		1833		4386		6219		1833		4386	
Groups	1002		265		737		1002		265		737	
F-Test	F(23, 5193)	24.60	F(23, 1544)	11.51	F(23, 3625)	18.35	F(23, 5193)	40.63	F(23, 1544)	29.61	F(23, 3625)	26.78
R^2 (within)		0.17		0.22		0.18		0.33		0.68		0.28
R^2 (incl.FE,adj.)		0.80		0.80		0.80		0.98		0.99		0.98
Root MSE		1.12		1.10		1.11		0.23		0.13		0.26

***, **, * = significant at 1%-, 5%-, 10%-level.

US-dollar exchange rate fluctuations are highly significant in respect to the reporting country's currency as long as we do not focus exclusively on Intra-EU25 investment. An appreciation of the US-Dollar in respect to the reporting countries currency raises FDI in the partner country while changes of the exchange rate of the partner country have no effect. This does not directly support a relative wealth hypothesis along the lines of FROOT and STEIN but suggests that (US-Dollar based) foreign direct investment becomes more attractive the more there is to lose by doing business in one's domestic currency. Within the EU25 area, the US-dollar exchange rate of the reporting country's currency has no significant effect on direct investment. The partner country's exchange rate, however, does have a significant effect if only at the 10% level. Here, a negative sign implies that a depreciation of the dollar in respect to the partner country's currency raises FDI.

Inflation in the reporting country has a significantly negative influence on FDI if investment within the EU25 area is left out. On the other hand, inflation in the partner country has a significantly positive influence on FDI flows for all country groups.

Rather disappointingly, most of the variables controlling for political influences are not significant. These variables show relatively little variation over time; differences of these variables between countries rather likely *do* influence FDI but in this case they are accounted for by the fixed country effects. However, an increase in the number of bilateral investment treaties of the reporting country raises significantly FDI that does not take place between EU25 countries. Within the EU25 area, changes in the number of investment treaties do not influence FDI, which might be due to the irrelevance of third-country treaties in regard to Intra-EU investment. (However, if standard errors need not account for possible autocorrelation, the coefficient of $TREATIES_j$ becomes significantly positive; this result is not reported in Table 2. A possible explanation is that bilateral investment treaties CEEC countries established before their EU-accession raised EU-FDI into the future member states.) Thus, overall, investment liberalisation has influenced FDI positively over the nineties.

The influence of distance tended to become more negative over the same period. The interaction terms are highly significant for all country pairs and moderately to highly significant for Intra-EU25 investment; for other investment, however, they are only significant for 2001. Therefore, as in the case of relative country size, variation between the EU25 area and the rest of the world is important in order to measure a significant influence. BUCH *et al.* (2004) stress that the coefficient of the distance variable does not measure distance costs per se. A negative sign should rather be interpreted as a tendency to keep closer economic relations to neighbouring countries than to countries far away. Thus, our results state a tendency over the nineties to conduct relatively less FDI in distant countries. This effect is highly significant when Intra-EU25 investment is included in the sample. Therefore, there has taken place a concentration of FDI-activity in the EU25 area in contrast to the rest of the world. On the other hand, significantly negative distance coefficients *within* the EU25 area for the year 1993-1998 indicate a concentration of investment flows in the EU15 area. After accession talks with potential new member states became relevant, EU investment began to flow east, rendering the negative distance terms within the EU25 area insignificant.

Comparing these results with those for the export equations (the right side of Table 2), we can see that market size is also highly significant for explaining exports for all country groups, as is relative country size. The difference in the share of agricultural population is significant only for trade flows within the EU25 area. This is most likely due to increased exports to Central and Eastern Europe.

Stock market developments do not influence exports. This indicates one important diversion from the results for FDI. However, also the influence of exchange rates differs: As expected, appreciations of the US-Dollar in respect to the partner country's currency reduce exports to the partner country. However, exchange rate changes of the reporting country's currency are only significant for observations within the EU25 area. Here, a depreciation of the reporting country's currency in respect to the Dollar significantly raises exports, while such changes do not influence overall observations and observations for "other trade". Overall, these results imply that in respect to exchange rate fluctuations, exports are influenced more heavily by demand factors of the partner country while FDI is driven by supply factors of the reporting country.

As in the case of FDI, an increase in the price level of the partner country raises exports. Price increases in the reporting country lower exports significantly in all country groups.

Low country risk of the partner country is significant except for Intra-EU25 trade. Bilateral investment treaties have no effect on exports for trade not between EU25-countries and for all country pairs. Interestingly, however, *TREATIES* is significantly negative for Intra-EU25 trade with respect to the reporting and the partner country. This might be an indication for a substitution effect between investment and trade between certain countries of the EU25 area. Rising economic freedom in the partner country is significantly associated with rising exports to that country except for Intra-EU25 trade.

The yearly distance variables are negative and highly significant for all years when estimated for all country pairs or without EU25 observations. However, for Intra-Eu25 trade they are significantly positive for the period 1995-2000. Thus, while there has been a worldwide tendency to trade more with less distant countries, within the EU25 area, this trend seems to be reversed and more trade has been directed to the periphery.

5 Conclusion

This paper tried to illuminate the factors that led to the dramatic increase in worldwide foreign direct investment from 1991-2001 and the question if these factors influenced exports differently over the same period. Gravity equations for bilateral FDI and exports were estimated for a panel data set of OECD countries as reporting countries, with explaining variables adopted from the new trade theory and the knowledge-capital approach of multinational enterprises. The results show that an increase in total market size and convergence in relative country size are main factors that promote both, FDI and exports. Changing differences in skilled labour-endowments as measured by absolute differences in shares of agricultural population, on the other hand, have no significant effect on either FDI or exports.

There could be distinguished, however, factors that do not affect FDI and exports in the same manner. Stock market booms seem to increase outward FDI if it does not take place between countries of the EU25 group while exports are generally not influenced by stock market variations. On the other hand, assessment changes in political risk or economic freedom of a country have marked effects on exports while they leave outward FDI more or less unchanged. This result may be due to the fact that import demand is reduced in countries that are relatively unstable politically or equipped with high trade barriers, while FDI might be more affected by push factors regarding ownership advantages of multinational firms. For the latter could not explicitly be controlled for with the applied dataset. However, investment liberalisation very

significantly encouraged FDI while some evidence suggests that it might have reduced exports within the EU25 area.

Exchange rate fluctuations of reporting and partner countries currencies in respect to the US-dollar do influence FDI and exports, but differently. In the case of FDI, appreciations of the dollar in respect to the reporting country's currency raise outward FDI while exports are raised by a dollar depreciation in respect to the partner country's currency. This is further evidence that FDI is directed more by supply factors of the reporting country while exports respond to demand in the partner country.

Price increases in the partner country raise FDI and exports in all country groups while price increases in the reporting country lower exports significantly. They lower FDI that does not take place between EU-countries, too.

The effect of distance over time was negative for both, FDI and exports, when all available country groups were taken into account. Thus, there has been a tendency of OECD countries to boost economic integration with neighbouring economies rather than with countries far away. Within the EU25 area, this trend was reversed for exports, indicating growing trade with peripheral countries. This evidence can be brought forward in respect to the opinion that the globalisation phenomenon is rather an ongoing regionalisation.

In sum, the results support general theories of horizontal foreign direct investment and should encourage further research in the area, especially with regard to sector-specific effects which could not be controlled for here. Better proxy variables for factor endowment differences than differences in agricultural population might be employed in order to reveal vertical FDI.

6 References

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