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The impact of FDI on industry performance

by

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Abstract

This paper investigates the productivity effects of inward and outward foreign direct investment using industry and country level data for 17 OECD countries. The paper relates to a large recent literature on productivity spillovers from inward FDI, however, we also consider the relationship between productivity and outward FDI in the same estimation. Our results show that there are, on average, productivity benefits from inward FDI, although we can identify a number of countries which, on aggregate, do not appear to benefit in terms of productivity. On the other hand, a country's stock of outward FDI is, on average, negatively related to productivity. However, again there is substantial heterogeneity in the effect across OECD countries.

JEL classification: F23

Keywords: Foreign direct investment, inward FDI, outward FDI, productivity, spillovers

Outline

Non-Technical Summary

Whether or not inflows of foreign direct investment (FDI) improve productivity in the host country is a hotly debated issue. Policy makers tend to assume that they do, a belief that manifests itself in frequently quite generous investment incentives for FDI offered by governments in developed and developing countries alike.

In the literature, much of the work focuses on so-called horizontal productivity spillovers, i.e., effects of FDI on domestic firm within the same broadly defined industry. All in all, the evidence amassed thus far suggests that the jury is still out on whether or not inward FDI is conducive to domestic productivity growth.

Perhaps an even more controversial issue (at least in the public media) are the effects of outward FDI on the sending economy. Recent theory predicts that the most productive firms in the economy choose to invest abroad and, hence, opponents to outward investment may argue that the relocation of the most productive firms reduces productivity in the home country. On the other hand, supporters of outward FDI may argue that firms locating abroad are able to improve their performance as they become exposed to international competition and best practice. However, there has been little academic work on the link between a country's outward investment and productivity.

Given this somewhat unsatisfactory state of the literature, this paper provides some new evidence on the link between productivity in a host country and foreign direct investment. To do this, we relate industry level output in a country to inward and outward foreign direct investment stocks in a production function framework. By doing so we contribute to the literature in a number of ways.

The literature on productivity spillovers from inward FDI provides evidence for a number of particular countries. By contrast, we use data for 10 manufacturing sectors for 17 OECD countries, thereby providing more general evidence. Also, in the same estimation equation, we consider the effect of outward FDI on domestic production. Having a fairly large number of countries also allows us to investigate whether our results differ for different countries or groups of countries. Furthermore, many studies of productivity spillovers use cross section data or relatively short (in the time dimension) panels which only allows them to pick up short run effects. Our paper instead uses data covering the period 1973 to 2000. Hence, we are able to cover a long period of time during which we may expect medium to long term effects to manifest themselves in the data. Including the country wide stock of inward and outward FDI allows us to capture not only intra-industry spillovers, but also positive productivity effects through vertical input-output linkages. Furthermore, with our economy-wide definition of FDI stocks we are not confining ourselves to FDI in manufacturing industries, but capture the whole economy.

Our results show that, on average, inward FDI is positively associated with domestic productivity at the industry level, while this relationship is negative for outward FDI. However, we show also that this result hides considerable heterogeneity in the effects across countries. We find a number of examples where inward FDI is negatively associated with productivity (e.g., post-unification Germany, Spain, Italy and Norway), as well as countries where the relationship between outward FDI and productivity is positive (France, Poland, Sweden, UK, USA).

1 Introduction

Whether or not inflows of foreign direct investment (FDI) improve productivity in the host country is a hotly debated issue. Policy makers tend to assume that they do, a belief that manifests itself in frequently quite generous investment incentives for FDI offered by governments in developed and developing countries alike. For example, Head (1998) reports that the government of Alabama paid the equivalent of 150,000 USD per employee to Mercedes for locating its new plant in the state in 1994.

In the literature, much of the work focuses on so-called horizontal productivity spillovers, i.e., effects of FDI on domestic firm within the same broadly defined industry. Early studies using mainly industry level data generally affirm the assumption of positive effects (e.g., Caves 1974, Blomström 1986), however, their results have to be taken with caution as they use mostly cross-section data where issues of endogeneity and reverse causality are problematic (Görg and Strobl 2001).

Following on from this, a first wave of micro level panel data studies produced evidence that inflows of FDI can actually harm the productivity of domestic firms in the same industry (Aitken and Harrison 1999, Konings 2001), a result that was mainly attributed to increasing competitive pressure crowding out domestic firms. These studies, however, focus on developing and transition economies. A subsequent wave of panel studies, using newly available micro level data for developed countries, lead to another swing of the pendulum, by showing that FDI can indeed increase the productivity of domestic firms through horizontal spillovers (e.g., Keller and Yeaple 2003, Haskel, Pereira and Slaughter 2002 for the US and UK, respectively). Furthermore, recent studies of vertical spillovers (through, for example, customer-supplier relationships) also provide evidence that this is an important channel through which domestic firms can benefit from FDI (e.g., Javorcik, 2004). All in all, this evidence suggests that the jury is still out on whether or not inward FDI is conducive to domestic productivity growth.

Perhaps an even more controversial issue (at least in the public media) are the effects of outward FDI on the sending economy. Recent theory predicts that the most productive firms in the economy choose to invest abroad (Helpman, Melitz and Yeaple, 2004) and, hence, opponents to outward investment may argue that the relocation of the most productive firms reduces productivity in the home country. On the other hand, supporters of outward FDI may argue that firms locating abroad are able to improve their performance as they become exposed to international competition and best practice, similar to the "learning-by-exporting" idea discussed by, e.g., Clerides et al. (1998). Also, firms may source technology abroad (Fosfuri and Motta, 1999) which also has beneficial effects on productivity at home. However, there has been little academic work on the link between a country's outward investment and productivity. One exception is van Pottelsberghe and Lichtenberg (2001) who find from aggregate data that there are R&D spillovers through outward FDI that benefit domestic productivity.

Given this somewhat unsatisfactory state of the literature, this paper provides some new evidence on the link between productivity in a host country and foreign direct investment. To do this, we relate industry level output in country c to inward and outward foreign direct investment stocks in country c in a production function framework. By doing so we contribute to the literature in a number of ways.

The papers on productivity spillovers from inward FDI cited above provide in each case evidence for one particular country. By contrast, we use data for 10 manufacturing sectors for 17 OECD countries, thereby providing more general evidence. Also, in the same estimation equation, we consider the effect of outward FDI on domestic production. Having a fairly large number of countries also allows us to investigate whether our results differ for different countries or groups of countries. Furthermore, many studies of productivity spillovers use cross section data or relatively short (in the time dimension) panels which only allows them to pick up short run effects. Our paper instead uses data covering the period 1973 to 2000. Hence, we are able to cover a long period of time during which we may expect medium to long term effects to manifest themselves in the data.

Including the country wide stock of inward and outward FDI allows us to capture not only intra-industry spillovers, but also positive productivity effects through vertical input-output linkages. As pointed out above, this latter channel has been stressed in the recent literature on vertical spillovers from inward FDI (Javorcik, 2004). Furthermore, with our economy-wide definition of FDI stocks we are not confining ourselves to FDI in manufacturing industries, but capture the whole economy.

To some extent our paper is related to the study by van Pottelsberghe and Lichtenberg (2001), however, there are a number of important differences that distinguish our analysis from theirs. While they use OECD data at the country level to look at R&D spillovers through inward and outward FDI, our paper uses industry level data as well as a much longer time period. Furthermore, and perhaps most importantly, they are interested in R&D spillovers through FDI and hence use FDI only as a weighting matrix to measure R&D embodied in inward and outward FDI. We allow for a much more general effect of FDI by including FDI stocks directly in the estimating equation, while controlling for the stock of R&D in the country as well as abroad. Furthermore, even though they are interested in the effects of R&D spillovers through inward and outward FDI they do not include both types of investment simultaneously in one equation, as they use FDI only as a weighting matrix for the foreign R&D stock. We, however, include both inward and outward FDI stocks simultaneously in our empirical analysis.

Our results show that, on average, inward FDI is positively associated with domestic productivity at the industry level, while this relationship is negative for outward FDI. However, we show also that this result hides considerable heterogeneity in the effects across countries. We find a number of examples where inward FDI is negatively associated with productivity (e.g., post-unification Germany, Spain, Italy and Norway), as well as countries where the relationship between outward FDI and productivity is positive (France, Poland, Sweden, UK, USA).

The rest of the paper is structured as follows. Section 2 discusses the empirical approach and introduces the data used. Section 3 presents the empirical findings while section 4 concludes.

2 Empirical methodology and data

In order to evaluate the effect of inward and outward FDI stocks in country c at time t on the level of gross production Y in industry j we estimate the following transformed Cobb-Douglas production function

$$
\begin{aligned}
ln\ Y_{jct} &= \alpha + \beta \ln K_{jct} + \gamma \ln L_{jct} + \delta \ln M_{jct} \\
&+ \theta \ln RDD_{ct} + \lambda \ln RDF_{-ct} + \tau \ln IDI_{ct} + \sigma \ln ODI_{ct} \qquad (1) \\
&+ \nu_j + \mu_c + \iota_t + \epsilon_{jct}
\end{aligned}
$$

where K, L and M are the standard production factors capital, labour and materials, respectively. These data are constructed at the industry level from the OECD STAN database.[1] The capital stock is calculated using the perpetual inventory method and investment data, assuming a ten percent depreciation rate. L is the number of employees and M is measured as the difference between gross output and value added.

RDD and RDF are proxies for the R&D capital stock in country c and abroad (excluding country c), respectively. The variables are calulated using data from the OECD ANBERD database. Stocks are calculated using the same approach as for the physical capital stock K.[2] As proposed by Keller (1998) and Mohnen (1996) we do not place any restrictions in terms of weights on RDF, hence, allowing for a general effect of all R&D undertaken abroad on domestic production.[3]

The variables IDI and ODI are intended to capture the effects of inward and outward FDI respectively. Inward and outward FDI stocks are calculated using flow data from the IMF International Financial Statistics database and applying same

[1] A detailed description of all data used in the estimations is given in the appendix.

[2] The R&D capital stocks at time $t = 0$ were constructed using the standard procedure as described in Goto and Suzuki (1989) or Hall and Mairesse (1995). An alternative approach for the construction of R&D capital stocks is pointed out by Bitzer (2005).

[3] This is in contrast von Pottelsberghe and Lichtenberg (2001) and Coe and Helpman (1995) who weight their measures of RDF using FDI or trade data.

perpetual inventory method. The use of stocks is preferred to flows, as stocks allow us to capture medium to long term effects through accumulating FDI flows.

The data allow us to distinguish ten ISIC Rev. 3 manufacturing sectors, and are available for 17 OECD countries covering the period 1973 to 2000 (a list of countries can be found in the appendix). Tests for unit roots indicate no evidence of unit roots in any of our variables.[4] The panel is unbalanced since the length of the available time series differ across countries due to data constraints. All nominal variables were converted into 1995 USD using the OECD value added deflator for the manufacturing sector.

The production function estimation also includes full sets of sector, country and time dummies. The estimations have been carried out using a feasible GLS (FGLS) estimator with a correction for panel specific first order autocorrelation and panel heteroskedasticity.[5]

For firm or plant level productivity studies it is frequently argued that factor inputs should be considered endogenous. This is because firms/plants may observe total factor productivity (TFP) at least partly which, in turn, may influence the choice of factor input combinations in the same period. Hence, there would be a correlation between the error term and the contemporaneous levels of factor inputs, leading to biased estimates of the coefficients.[6] However, following Zellner et al.

[4]Test results are reported and described in the appendix.

[5]Tests based on residuals from equation (1) indicate that the error term follows an autoregressive process of order 1, hence we employ FGLS with AR(1) corrected standard errors. As a robustness check we also ran regressions using a standard fixed effects (within transformation) estimator. Results, which can be obtained upon request, are similar to the ones reported herein.

[6]See, for example, Olley and Pakes (1996) and Levinsohn and Petrin (2003) for discussions of the problem and solutions for analyses using micro level data.

(1966) one could argue that output at the industry level is stochastic, as the data for individual plants/firms are aggregated up. For the case that output is stochastic Zellner et al. (1966) show that OLS regressions of a Cobb-Douglas production function yields consistent estimates of the output elasticities. However, to be sure, we perform a test for endogeneity of inputs using the approach outlined by Baum, Schaffer and Stillman (2003). The results, which are reported in the appendix, indicate that we cannot reject the hypothesis of exogeneity of the regressors.

3 Estimation results

Table 1 presents the results of estimating three variants of equation (1) using FGLS. While in Variant A the model is estimated without FDI, Variant B introduces inward FDI and Variant C finally estimates the fully specified model including inward and outward FDI. In terms of factor inputs, we find that K, L, M return positive and statistically significant coefficients in all variants, with magnitudes that appear reasonable and similar to what is generally found in the literature.

Turning to the knowledge stock, we find that the stock of domestic R&D capital is positively related to productivity, with an elasticity of about 0.04. Hence, a ten percent increase in the stock of R&D undertaken in the home country leads to an increase in TFP by 0.4 percent. This coefficient is well within the range of elasticities of domestic R&D estimated by van Pottelsberghe and Lichtenberg (2001) using country level data. They report estimates ranging from 0.02 to 0.14. One may argue that an elasticity of 0.04 is small in terms of economic significance, however, one should keep in mind that this variable captures R&D undertaken in all sectors in the entire economy. One would therefore arguably not expect strong spillover effects from all types of R&D undertaken in the economy on a given industry.

The stock of foreign R&D capital also returns a positive and statistically significant coefficient. However, as known from previous studies (cf. Mohnen, 1996 for an review) it is less robust to changes in the model specification. Recall that this variable is not weighted by trade or FDI, as done in some previous studies (e.g., Coe and Helpman, 1995, van Pottelsberghe and Lichtenberg, 2001) and hence would represent a general effect of outside R&D not particularly related to international flows of goods or factors. To capture more closely the latter, we now turn to the coefficients on inward and outward FDI in the economy.

As regards inward FDI, we find a positive and statistically significant coefficient in both specifications (Variants B and C), with elasticities of about 0.013.[7] This provides, thus, evidence that FDI inflows have, on average, positive effects on productivity in the host country in our sample of OECD countries. The findings are, thus, in line with the recent evidence from single country studies for the US and UK (as cited in the introduction) and also supports the general perception on the part of many policy makers that inward FDI can increase domestic productivity.

The coefficients reported in Table 1 are, of course, averages over a number of countries and may hence hide differences across countries. As pointed out in the introduction, for example, single country studies of productivity spillovers from inward FDI based on micro data tend to find different results for different countries. Even though in our sample all countries are members of the OECD there is still cross-country heterogeneity due to, for example, differences in country size, membership

[7] Recall that the FDI variables are also defined at the country level.

in preferential trading agreements, etc.

Why should such heterogeneities matter in our sample? They may be important because, for example, they may determine what type of FDI a country receives. The Markusen (2002) knowledge-capital model may be a useful tool in this respect. Assuming that all our countries are relatively skill abundant with respect to the rest of the world, the model predicts that countries that are similar in size will exchange horizontal FDI. Hence, countries that are 'large' relative to the main economies sending out FDI will send and attract horizontal types of FDI. On the other hand, the model predicts that small skill intensive countries may be particularly prone to be home countries of vertical outward investment. Skill intensive headquarter services locate in the small home country, while labour intensive production is located abroad.[8] The model is not clear on what type of FDI such small countries should attract, if any. However, it seems reasonable to assume that also skill intensive foreign multinationals locate in such countries in order to benefit from possible agglomeration economies, rather than horizontal FDI that is not attracted by the relatively small market.

To investigate this issue we divide the countries in our sample in 'small' and 'large', the former being all countries with a population size of no more than 15 million.[9] We create a dummy equal to one for such 'small' countries and interact this dummy with the FDI variable to allow for different effects depending on country size.

Variant D in Table 2 presents the results of this exercise for inward FDI stocks.

[8]Markusen (1998) cites Sweden and the Netherlands as examples for such location patterns.

[9]This includes Czech Republic, Denmark, Finland, Netherlands, Norway and Sweden.

From the FGLS results we can see that small countries in fact benefit more from inward FDI than large countries, with an elasticity of 0.018 for the former compared with 0.011 for the latter group of countries. This may indicate that the size distinction reflects different types of FDI in the two country groups. Unfortunately, we cannot distinguish FDI into different types with our data, but our results are in line with the hypothesis that small countries attract on average more technology intensive inward FDI than large countries.

Another possible grouping of countries that we can perform with our sample is by broad geographic region. We have in our sample a large number of European countries, all of which are part of the European Economic Area.[10] We also have two transition economies, the two North American countries as well as two Asian economies. We calculated dummies for each of these region groupings and interacted the dummy with the FDI variables.

The results of the estimations with inward FDI are reported in Variant E of Table 2. The baseline group is the European countries, as this represents the largest number of countries in our sample. The interaction terms indicate that relative to the European economies North American and Transition countries are able to reap higher productivity benefits from inward FDI. This is not true for Asian countries, which appear to benefit relatively less than European countries.

In order to take this issue even further we allow the coefficient on FDI to differ across all countries. The results for inward FDI are reported in Variant F of Table 2. It is now apparent that even within the broadly defined country groupings not all countries gain equally from inward FDI. Specifically, we do not find any positive

[10] In fact, all but Norway are part of the European Union.

coefficients for post-unification Germany, Spain, Italy and Norway. In fact, for the latter country, we find a statistically significantly negative impact of inward FDI on domestic productivity at the industry level.

In contrast to the impact of inward FDI our estimation results suggest that outward FDI has, on average, a negative effect on home country productivity, with an average elasticity substantially less than the positive inward FDI effect (Table 1, Variant C). This may, perhaps, reflect the decision by multinational companies to locate highly productive parts of the production process abroad, which would reduce overall industry level productivity in the home country at least in the short run through a compositional effect.

As in the case of inward FDI we test the hypothesis that the impact of outward FDI might differ between 'large' and 'small' countries. Variant G in Table 3 also shows that small countries experience smaller negative effects from outward FDI on domestic productivity than large countries. This is again in line with a view of differences in location patterns. Small countries may concentrate skill intensive headquarter services in their economies, thereby being able to compensate better than larger firms the reductions in production carried out in such countries.

Carrying out a differentiated analysis of the impact of outward FDI by geographic regions, we find strong evidence that European countries are the 'losers' from such forms of investment (Variant H). Relative to this category, for which we find a negative link between productivity and outward FDI, all three other country groups show a positive relationship. This illustrates particularly strongly that there is substantial heterogeneity in our sample, and that conclusions based on the average coefficient may be misleading.

Finally, similar to the analysis of inward FDI we allow also the coefficients on the ODI variable to differ by country, the results being reported in Variant I of Table 3. In line with our previous results this shows that some countries benefit, while some lose in terms of industry level productivity from outward investment. Specifically, France, Poland, Sweden, the UK and USA show positive and statistically significant coefficients on ODI, indicating that increased outward FDI is associated with higher total factor productivity at the industry level. While our data do, unfortunately, not allow us to look in more detail at the sectoral and destination composition of the outward stocks, our results show that the benefits from ODI, which to some extent reflect decisions by firms to relocate part of the production process abroad, are not clear-cut.

4 Conclusions

This paper investigates the productivity effects of inward and outward foreign direct investment using industry and country level data for 17 OECD countries. The paper relates to a large recent literature on productivity spillovers from inward FDI, which mainly uses micro level data for a particular country as case study evidence. However, we also consider the relationship between productivity and outward FDI in the same estimation equation. Our results show that there are, on average, productivity benefits from inward FDI, although we can identify a number of countries which, on aggregate, do not appear to benefit in terms of productivity. On the other hand, a country's stock of outward FDI is, on average, negatively related to productivity. However, again there is substantial heterogeneity in the effect across countries, with a number of countries, namely, France, Poland, Sweden, the UK and the US, showing positive associations between total outward FDI and domestic productivity.

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Appendix

Data description

The estimations have been carried out on the basis of data for ten manufacturing industries in the 17 countries Canada (CAN), Czech Republic (CZE), pre-unification (till 1990) West Germany (DEW), post-unification (1990 onwards) Germany (DEU), Denmark (DNK), Finland (FIN), France (FRA), Italy (ITA), Japan (JPN), South Korea (KOR), Netherlands (NLD), Norway (NOR), Polen (POL), Spain (ESP), Sweden (SWE), the United Kingdom (GBR) and the United States (USA). The data were taken from the OECD databases ANBERD and STAN and the IMF database IFS.

The time series are available for the years 1973 to 2001 in ISIC Rev. 3 calssification. Due to data constraints the length of the available time series differ across countries. The panel is therefore unbalanced.

The data was deflated to constant prices of 1995 using the OECD value-added deflator for the manufacturing sector and was then converted into USD using the exchange rates from 1995. To this end, Euro-data was converted back into national currency. From this data, output Q is measured as gross production. All stocks, i. e. the physical capital stock, the R&D capital stock and the FDI stocks, are calculated using the perpetual inventory method where a depreciation rate of ten percent is assumed. Labor L is measured as the number of employees, and material/intermediate inputs M are calculated as the difference between gross output and value added.

Unit root test

The panel is unbalanced since data are missing for a few sectors in some years.

Thus, the Fisher method, which was proposed by Maddala and Wu (1999), appears suitable. Another benefit of it is its flexibility regarding the specification of individual effects, individual time trends and individual lengths of time lags in the ADF regressions (Baltagi, 2001, p. 240). The P_λ-statistic is distributed chi-square with $2 \cdot N$ degrees of freedom, where N is the number of panel groups. As Table A1 shows, the tests do not indicate evidence of unit roots, either in the output series $\ln Y$ or in the factor input series $\ln K$, $\ln L$, $\ln M$, $\ln W$, $\ln IDI$, or $\ln ODI$.[11]

Table A1: Results for the Fisher-type Unit Root Test for Panel Data

Variable	**P_λ-statistic**	**p-value**
$\ln Y$	592.4	0.0000
$\ln K$	443.6	0.0000
$\ln L$	385.8	0.0068
$\ln M$	496.3	0.0000
$\ln W$	659.1	0.0000
$\ln IDI$	1259.9	0.0000
$\ln ODI$	421.8	0.0001

[11] Note that since RDF is constructed as linear combinations from W, this also automatically leads to a rejection of the unit roots hypotheses for RDF.

Exogeneity tests

With exception of labour and intermediate/material inputs all other production factors are stock variables. The latter have been constructed by using the perpetual inventory method with a constant depreciation rate of ten percent. This implies that depreciation of investments takes longer than 20 years and thus investments remain in the stock variable for that time. Thus, endogeneity is unlikely to be an issue for the used stock variables.

Therefore, the only suspicious variables are labour and intermediate/material inputs. To test for exogeneity of these two variables we apply a General Method of Moments (GMM) regression using lagged values of labour and intermediate/material inputs as instruments. We prefer the use of GMM over instrumental variable (IV) estimation because the latter is not consistent in the presence of heteroskedasticity. As pointed out in the main text the latter is an issue in our data. The results of the exogeneity tests are reported in Table A2. In all cases the hypothesis of exogeneity of the suspicious regressors cannot be rejected.

Table A2: Exogeneity tests for *ln L* und *ln M*

Test statistic	**Variant A**	**Variant B**	**Variant C**	**Variant D**	**Variant E**	**Variant F**	**Variant G**	**Variant H**	**Variant I**
					Test of predictive power of instruments				
Instruments *ln L*									
F-Test	67.04	70.10	67.43	47.62	55.59	57.45	41.01	36.19	26.70
P-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Instruments *ln M*									
F-Test	66.71	70.16	68.02	47.95	55.45	58.28	40.92	34.12	25.11
P-value	0.000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
					Test of orthogonality of instruments				
Hansen J-Statistic	4.594	4.132	3.936	3.732	3.764	4.511	3.752	3.675	3.694
P-value	0.3316	0.3884	0.4148	0.4435	0.4388	0.3413	0.4406	0.4517	0.4490
					Test of orthogonality of unrestriced model				
Hansen J-Statistic	1.430	1.553	1.519	1.524	1.706	0.512	1.624	1.948	0.371
P-value	0.4829	0.4600	0.4680	0.4667	0.4260	0.7740	0.4440	0.3775	0.8308
					Test for exogeneity				
C-statistic	3.164	2.579	2.417	2.208	2.058	3.999	2.128	1.727	3.323
P-value	0.2055	0.2754	0.2987	0.3315	0.3573	0.1354	0.3450	0.4217	0.1899
Exogeneity rejected	no	no	no	no	no	no	no	no	no

Table 1: FGLS Estimation Results for Levels

Indep. var.	**Variant A**	**Variant B**	**Variant C**
	dependent variable is $\ln Q$		
$\ln RDD$	.0417***	.0294***	0.0362***
	(.0053)	(.0054)	(0.0058)
$\ln RDF$	.0550***	.0741***	0.0739***
	(.0282)	(.0284)	(.0284)
$\ln IDI$		.0125***	.0128***
		(.0013)	(.0013)
$\ln ODI$			-.0052**
			(.0023)
$\ln K$	.0318***	.0300***	0.0292***
	(.0032)	(.0030)	(0.0030)
$\ln L$	.1623***	.1715***	0.1715***
	(.0046)	(.0044)	(0.0044)
$\ln M$	.7958***	.7896***	0.7903***
	(.0037)	(.0038)	(0.0038)
Wald χ^2 (df)	9.95e+07 (59)	1.25e+08 (60)	1.24e+08 (61)
p-value Wald χ^2	0.0000	0.0000	0.0000
Obs.	3220	3220	3220

Remarks: Country-, industry- and time-specific effects are included and groupwise significant at the one-percent level. Consistent standard errors between parentheses. ***, **, * indicate a significance at the 1%, 5% and 10% levels, respectively.

Table 2: FGLS Estimation Results on Inward FDI

Indep. var.	Variant D	Variant E	Variant F
	dependent variable is $\ln Q$		
$\ln RDD$	.0309*** (.0060)	.0328*** (.0059)	.0304*** (.0083)
$\ln RDF$	.0757*** (.0283)	.0393 (.0304)	.0518* (.0306)
$\ln IDI$	.0111*** (.0014)	.0157*** (.0018)	
$\ln IDI * D^{small}$	.0071*** (.0019)		
$\ln IDI * D^{NA}$		.0063* (.0034)	
$\ln IDI * D^{AS}$		-.0069*** (.0024)	
$\ln IDI * D^{CEEC}$		.0243*** (.0074)	
$\ln IDI * D^{CAN}$			.0369*** (.0137)
$\ln IDI * D^{CZE}$			.0224** (.0109)
$\ln IDI * D^{DEU}$			-.0040 (.0030)
$\ln IDI * D^{DEW}$			.0295*** (.0087)
$\ln IDI * D^{DNK}$			.0111* (.0064)
$\ln IDI * D^{ESP}$			-.0038 (.0052)
$\ln IDI * D^{FIN}$			.0139*** (.0040)
$\ln IDI * D^{FRA}$			.0311*** (.0043)
$\ln IDI * D^{GBR}$			.0531*** (.0079)
$\ln IDI * D^{ITA}$			-.0015 (.0054)
$\ln IDI * D^{JPN}$			.0094*** (.0018)
$\ln IDI * D^{KOR}$			.1052*** (.0191)
$\ln IDI * D^{NLD}$			.0216*** (.0050)
$\ln IDI * D^{NOR}$			-.0108** (.0053)
$\ln IDI * D^{POL}$			.0627*** (.0085)
$\ln IDI * D^{SWE}$			.0304*** (.0028)
$\ln IDI * D^{USA}$			.0215*** (.0036)
$\ln ODI$	-.0057** (.0023)	-.0044* (.0023)	-.0024 (.0028)
$\ln K$	.0297*** (.0030)	.0280*** (.0030)	.0218*** (.0031)
$\ln L$	.1724*** (.0044)	.1715*** (.0045)	.1777*** (.0045)
$\ln M$	.7900*** (.0038)	.7897*** (.0038)	.7926*** (.0037)
Wald χ^2 (df)	1.24e+08 (62)	1.24e+08 (64)	1.50e+08 (77)
p-value Wald χ^2	0.0000	0.0000	0.0000
Obs.	3220	3220	3220

Remarks: Country-, industry- and time-specific effects are included and groupwise significant at the one-percent level. Consistent standard errors between parentheses. ***, **, * indicate a significance at the 1%, 5% and 10% levels, respectively.

Table 3: FGLS Estimation Results on Outward FDI

Indep. var.	Variant G	Variant H	Variant I
	dependent variable is $\ln Q$		
$\ln RDD$	.0341*** (.0059)	.0346*** (.0059)	.0389*** (.0085)
$\ln RDF$	.0742*** (.0285)	.0727** (.0304)	.0515 (.0315)
$\ln IDI$	.0125*** (.0013)	.0122*** (.0013)	.0058*** (.0015)
$\ln ODI$	-.0073*** (.0025)	-.0053** (.0023)	
$\ln ODI * D^{small}$	.0042** (.0021)		
$\ln ODI * D^{NA}$		.0101*** (.0038)	
$\ln ODI * D^{AS}$		.0158*** (.0046)	
$\ln ODI * D^{CEEC}$		.0290*** (0104)	
$\ln ODI * D^{CAN}$			-.0102 (.0076)
$\ln ODI * D^{CZE}$			-.0055 (.0684)
$\ln ODI * D^{DEU}$			-.0217*** (.0063)
$\ln ODI * D^{DEW}$			-.0286*** (.0077)
$\ln ODI * D^{DNK}$			-.0050 (.0086)
$\ln ODI * D^{ESP}$			-.0193*** (.0032)
$\ln ODI * D^{FIN}$			.0009 (.0030)
$\ln ODI * D^{FRA}$			.0117*** (.0040)
$\ln ODI * D^{GBR}$			.0473*** (.0093)
$\ln ODI * D^{ITA}$			-.0170*** (.0039)
$\ln ODI * D^{JPN}$			.0166*** (.0053)
$\ln ODI * D^{KOR}$			-.0917*** (.0194)
$\ln ODI * D^{NLD}$			.0073 (.0079)
$\ln ODI * D^{NOR}$			-.0207*** (.0043)
$\ln ODI * D^{POL}$			.0260** (.0105)
$\ln ODI * D^{SWE}$			.0231*** (.0054)
$\ln ODI * D^{USA}$			.0140** (.0060)
$\ln K$	.0302*** (.0031)	.0270*** (.0031)	.0247*** (.0032)
$\ln L$	.1719*** (.0044)	.1690*** (.0045)	.1784*** (.0045)
$\ln M$	.7898*** (.0038)	.7920*** (.0038)	.7903*** (.0038)
Wald χ^2 (df)	1.23e+08 (62)	1.29e+08 (64)	1.35e+08 (77)
p-value Wald χ^2	0.0000	0.0000	0.0000
Obs.	3220	3220	3220

Remarks: Country-, industry- and time-specific effects are included and groupwise significant at the one-percent level. Consistent standard errors between parentheses. ***, **, * indicate a significance at the 1%, 5% and 10% levels, respectively.