

The impact of FDI on the host economy

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Abstract. The foreign direct investment (FDI) and its impact on performance of domestic firms has been studied in many empirical papers, which, however, present rather ambiguous results. I argue that this is due to some limitations of prevalently used methodology, which does not separate the FDI spillover effects from the changes in competitive environment faced by domestic firms.

In my research, I propose a novel estimation strategy that allows me to disentangle FDI spillovers from the effects of competition changing in response to the entry of a foreign firm. I consider this issue on the industry level and I compare the effects of FDI to the impact of international trade on the domestic economy. My analysis covers the time period 2001 - 2007 and concerns both Western and Eastern European countries. My identification strategy leads me to confirm the presence of positive spillovers stemming from FDI.

Keywords: FDI, MNE, horizontal spillovers, international trade

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1 Introduction

Foreign direct investment (FDI) can be characterized as an operation by which a multinational enterprise (MNE) acquires a substantial control over a domestic firm in the host economy. The volume of foreign direct investment in Central and Eastern European (CEE) countries has been increasing in the past twenty years, and it has generally been welcomed by domestic governments because the presence of a foreign firm is considered to have a strong potential to improve domestic economic conditions. Instead of confirming this common expectation, however, empirical studies draw rather ambiguous conclusions as to whether the consequences of FDI are indeed as significant and as positive as it is believed.

My paper focuses on the impact of FDI on domestic firms within the same industry, and it complements the research that has been done in this field, which is very extensive but which still leaves many questions without clear and definitive answers¹. The major question I address here is how to disentangle the “competition effect” and the “spillover effect”, which, as Kosová [4] explains, both take place when domestic firms in an industry have to face a highly efficient MNE entering the market. At first, the MNE increases the competition within the industry, making some of the domestic firms leave the market (the competition effect). Only then there can be positive spillover effects stemming from the interaction between the MNE and the surviving domestic firms: these firms have a positive example which they can follow, they can copy the technologies, they can hire workers or managers that have had experience working for the MNE, and so on.

The problem of existing empirical literature is that authors usually measure the negative competition effect and the positive spillover effect simultaneously, without being able to distinguish exactly what is the role of each of them. As a result, the overall effect can be misinterpreted as being positive, negative or insignificant, depending on which effect is offsetting the other. The purpose of my paper is to propose an identification strategy that would allow me to separate the competition effect from the spillover effects within a reduced form model.

The motivation for my estimation strategy stems from a theoretical model proposed by Helpman et al. [3], who study under which conditions a firm decides to export or to invest abroad. This decision is known as a “proximity-concentration tradeoff”: when a firm wants to serve a foreign market, it can either undertake an investment in the country in question (by buying a local enterprise or by founding

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¹For a detailed survey, see [2].

a new one) or it can export. The existence of this tradeoff provides me with the argument that foreign competition in the domestic market can be of two sources. It can come from foreign firms that are located abroad through imports, or from foreign firms that are implanted in the country as MNEs through FDI.

On the other hand, if the foreign firm is located abroad, there is no scope for technological spillovers which should occur only if domestic firms are in close contact with the MNEs - this argument being supported by [1]. Therefore, the idea of my estimation strategy is to compare the impact of foreign presence given both by imports from abroad and by MNEs operating in the country. The difference between these two allows me to see if the physical presence of MNEs in a country has some advantages for the host economy compared to the situation when the country is just exposed to international trade, and hence to filter out a potential spillover effect of FDI.

2 Data description

My analysis covers the time period 2001 - 2007 and focuses on European countries, which are considered to be either *Western* or *Eastern* countries. The Western countries are the countries of EU15 (Luxembourg being joint with Belgium) plus Iceland, Norway and Switzerland. The Eastern countries are the countries that joined the EU in 2004 or 2007. The analysis is performed on both groups separately to see the differences between fully developed countries and those who had just undergo the transition period (CEE countries). Special focus is on the countries of the Visegrad group (Czech Republic, Slovakia, Poland and Hungary), for which the analysis is provided apart.

I use the AMADEUS database to obtain information about firms operating in the chosen countries: their performance, their financial and organizational characteristics, their ownership structure (especially if they are domestic or foreign) and their industry classification given by the three-digits NACE code. I link this database with information from UN COMTRADE data about international trade, which covers international exports and imports between the selected countries and their trade partners in the studied time period, disaggregated to the four- and five-digits SITC level.

Unlike in other papers concerning the issue of FDI, my analysis is performed on industry level. The motivation for this approach is simple: first, I am not interested in the impact of the foreign presence on particular firms, but rather on the average efficiency of domestic firms in an industry, and second, both FDI and trade are sectoral variables and so there is no individual source of variation of these variables on firm level. The aggregation on industry level is performed by taking averages within industry, weighted by the share of domestic ownership in firms (as I am analyzing the performance of domestic firms only), and the level of aggregation is the four- and five-digits SITC level, leading to approximately 250 000 observations structured as an unbalanced panel of industries in the above mentioned countries.

3 Econometric specification

Following the seminal paper [5], I estimate an augmented production function: I choose sales (*Sales*) to proxy the output variable, and tangible fixed assets (*Assets*) and number of employees (*Employment*) to proxy the factor inputs of capital and labor, with all variables being in logarithms; moreover, I include in my specification the lagged values of output to account for the imperfect allocation of factor inputs. I augment this production function by variables indicating the foreign presence: I use the variable *Imports* to account for the foreign presence given by import flows and the variable *FDI* to account for the presence of MNEs.

I define imports as the volume of imported goods normalized by the size of the industry:

$$Imports_{it} = \frac{ImpVol_{it}}{\sum_{j=1}^{N_{it}} Sales_{ijt}} ,$$

where t is time, N_i is the number of firms in industry i , $Sales_{ij}$ are the sales of the j -th firm in industry i and $ImpVol$ is the volume of imported goods in industry i .

To define the variable *FDI*, I have to take into account the issue of timing. I do not really expect the spillover effect, if there is such, to take place instantaneously. In my opinion, even if domestic firms could benefit from the presence of FDI, they would need some time to accommodate and to incorporate

possible technological improvements into their production. Therefore, I define the foreign presence given by FDI as the ratio of the sales of foreign owned firms in a given industry over the sales of all firms operating in that industry, but I take into account only firms that were already foreign owned in the previous year:

$$FDI_{it} = \frac{\sum_{j=1}^{N_{it}} f_{ijt-1} Sales_{ijt}}{\sum_{j=1}^{N_{it}} Sales_{ijt}} ,$$

where f_{ij} is the share of foreign owners in the j -th firm in industry i and otherwise the notation is the same as for the definition of *Imports*.

From these definitions, we can see that whereas by construction, the variable *FDI* is from the interval $[0, 1]$, the variable *Imports* can have any positive value. The reasons are that first, there is nothing that prevents the imports to be larger than domestic production and second, whereas from the UN COMTRADE, I have the complete information about international trade, from the AMADEUS database, I have only a representative (even though very large) sample of firms and so I do not capture the whole domestic production. This implies that the two variables are measured in very different units. As it is usual in such cases, I decided to standardize both variables by dividing them by their standard deviations to get them on a comparable scale.

Using the above described variables, my econometric specification is

$$\ln(Sales_{it}) = \beta_0 + \beta_1 \ln(Sales_{it-1}) + \beta_2 \ln(Assets_{it}) + \beta_3 \ln(Employment_{it}) + \delta_{FDI} FDI_{it} + \delta_{Imports} Imports_{it} + \gamma_i + \gamma_t + u_{it} . \quad (1)$$

I include time and industry fixed effects (the industry being in fact an industry-state unit, because I aggregate over firms in industries only within countries, not across).

Every estimation is run twice: first on the whole sample of industries in the given geographical region, and second on industries that are not oriented to exporting. The estimation on the whole sample is presented basically for the sake of completeness of my analysis. My identification strategy, which is based on filtering out the competition effect, can work only when we talk about the competition in the domestic market, because I compare imported goods (which are obviously sold only in the domestic market) to sales of firms operating in the industry. If a significant part of the production of domestic firms goes for export, then my identification strategy cannot really work.

In reality, most of the industries have both import and export flows, because they are industries with differentiated products. Hence, I cannot really find an industry that would be purely import oriented and as a consequence, my identification strategy is not flawless. However, I can at least focus on industries that are less export oriented than others, which is why I run for each geographical region a second estimation only on a subsample of industries where the exports (normalized by total sales) are below the median of the whole sample. This is the estimation that I focus on when evaluating my research hypotheses, presented in the following section.

4 Hypotheses

The literature on spillover effects claims that if these are present, the coefficient δ_{FDI} in (1) should be positive; however, it is often found insignificant or negative. I argued throughout this paper that this might be because the variable *FDI* influences the output in two opposite ways: by inducing the negative competition effect and the positive spillover effect at the same time.

To account for the foreign competition, I introduce in the model the variable *Imports*, which should also represent the negative competition effect but no positive spillover effect. To verify this, I test if the coefficient $\delta_{Imports}$ in (1) is negative:

Hypothesis 1:

$$H_0 : \delta_{Imports} \geq 0 \quad \text{vs} \quad H_A : \delta_{Imports} < 0 .$$

Further, I compare the coefficients δ_{FDI} and $\delta_{Imports}$ in (1), and if their difference is positive, I can conclude that there is a positive spillover effect present, which outweighs, at least partially, the negative competition effect:

Hypothesis 2:

$$H_0 : \delta_{FDI} - \delta_{Imports} \leq 0 \quad \text{vs} \quad H_A : \delta_{FDI} - \delta_{Imports} > 0 .$$

Hence, the rejection of H_0 of the first hypothesis justifies my identification strategy and the rejection of H_0 of the second hypothesis proves the presence of positive spillover effects of FDI.

5 Results

The results of regression (1) are presented in Table 1. The results for the estimation over the whole sample can be found in the first three columns (for Western, Eastern and Visegrad group countries), the results for the subsample of non export oriented industries are in the the last three columns. Several observations can be made based on these.

	All industries			Non export oriented		
	West	East	Visegrad	West	East	Visegrad
FDI	-0.138*** (0.004)	-0.066*** (0.003)	-0.062*** (0.004)	-0.103*** (0.005)	-0.058*** (0.004)	-0.058*** (0.007)
Imports	-0.100*** (0.004)	-0.051*** (0.005)	-0.038*** (0.006)	-0.148*** (0.032)	-0.126*** (0.031)	-0.246*** (0.088)
Lagged Sales	-0.015*** (0.003)	-0.014*** (0.003)	-0.008** (0.004)	0.012*** (0.004)	0.008* (0.004)	0.009* (0.005)
Tangible fixed assets	0.377*** (0.007)	0.498*** (0.005)	0.565*** (0.007)	0.433*** (0.010)	0.520*** (0.007)	0.694*** (0.010)
Employment	0.330*** (0.006)	0.299*** (0.007)	0.209*** (0.007)	0.285*** (0.010)	0.311*** (0.010)	0.133*** (0.010)
Year effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry-country effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.489	0.712	0.737	0.517	0.744	0.797
Observations	173480	81392	36803	86737	38691	18331

Clustered (on industry level) standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 1: Estimation results

First, it has to be said that in all subsamples, the effect of FDI (when measured solely by the coefficient on this variable) is estimated as negative. This is in line with the results of many other papers concerning this topic and also with the metaanalysis proposed in [2]. Hence, if my conclusions differ from those already published, it is not because of the construction of my dataset nor my variables, but just because of my identification strategy.

Second, in all subsamples, the effect of $Imports$ is negative and significant. I can thus reject the null of *Hypothesis 1* and conclude that imports really induce a negative competition effect on domestic firms, supporting thus the assumption on which my estimation is based.

Third, the results differ in the estimation performed over the whole dataset as compared to the estimation over the subsample of non export oriented firms. In line with my expectations, in the latter one, the negative effect of imports is more pronounced: in this subsample, domestic firms serve the domestic market and compete with imported goods. This proves that to answer my research question about the presence of positive spillovers, I should focus only on the subgroup of non export oriented firms, because it is relevant to my identification strategy.

Fourth, if we focus only on this subgroup, we can see that the coefficient on *FDI* is consistently less negative than the coefficient on *Imports*, which indicates that the null of *Hypothesis 2* is likely to be rejected. I test this hypothesis formally using a one-sided *t*-test of the difference of the two coefficients. The results of this test are presented in Table 2 separately for the three regions, and they confirm that I can reject H_0 at 95% confidence level for Eastern countries and countries of the Visegrad group, whereas for Western countries, the statistical significance is a little bit less strong (but still valid at 90% confidence level).

	Western countries	Eastern countries	Visegrad group
<i>t</i> -statistic	1.407	2.152	2.121
<i>p</i> -value	0.080	0.016	0.017

Note: *p*-values of asymptotic one-sided test (standard normal distribution)

Table 2: Hypothesis testing

To sum up, I can reject the null hypothesis that the effect of FDI is more negative than the effect of imports: I find the difference of these two effects to be positive. This result supports the theory that there might be positive spillover effects stemming from FDI, and thus answers my main research question, but it merits to be commented a little further.

It is interesting to compare the estimation results for the three geographical regions. If we define the spillover effect as the difference between the coefficients on *FDI* and on *Imports*, we see it is the largest for countries of the Visegrad group and relatively smaller for Eastern countries as a whole and for Western countries. This result can be interpreted in line with other papers analyzing the effect of FDI: it is hypothesized that to internalize the spillover effect, domestic companies should not be too inferior in terms of efficiency to MNEs, because when the efficiency gap is too wide, domestic companies are not able to “catch up”. Hence, the spillover effect is a U-shaped function of domestic firms’ efficiency: if domestic firms’ efficiency is very small compared to MNEs, the spillover effect is weak because of the inability to internalize; if domestic firms’ efficiency is similar to the efficiency of MNEs, the spillover effect is also weak because there is not too much scope for improvement; if the gap between domestic firms and MNEs is significant but moderate, the spillover effect is the strongest².

If we assume that domestic firms in Western countries are the closest to MNEs in terms of efficiency, we should not be surprised that there is not a very significant spillover effect present - there is not too much to learn from the point of view of domestic firms. Further, a closer look on the data tells us that firms of the Visegrad group are closer in their characteristics to Western firms than the mean of Eastern firms is, which signals that within the group of Eastern countries, the countries of the Visegrad group are rather above the average, and domestic firms there are then also closer to MNEs in terms of efficiency, even though the gap is still significant. This observation together with the above presented theory of the U-shaped effect could explain the differences I found among regions.

6 Robustness check

It has to be admitted that the validity of the presented results depends on how well the chosen variables proxy the control variables of the theoretical model of production function, especially labor and capital. In my estimation, I choose total fixed assets and number of employees, because these are often used in the stream of literature to which I am relating my analysis. However, as a robustness check, I also repeated the estimation using working capital as a measure of capital used for production and staff costs as a measure of labor. The results, which are available upon request, were not significantly different from those presented here.

7 Conclusion

In this paper, I contributed to the literature concerning the impact of FDI on the host economy by presenting a new identification strategy for the horizontal spillover effect. I explained why this effect is

²For more details, see [6].

not correctly identified in papers that take into account only the presence of firms with foreign owners in the domestic market. I pointed out that the positive spillovers might be outweighed by a negative competition effect if the competition environment is not controlled for. My strategy for identification of spillovers is to compare the effect induced by foreign firms that import in the domestic market with the effect induced by foreign firms that actually operate in the domestic economy: the difference between these two effects should be attributed to potential spillovers. I performed the analysis on a large panel of industries in European countries in the period 2001-2007.

The key contribution of my paper lies in the comparison of the two sources of foreign presence which enables me to properly isolate the spillover effect and to confirm its positive impact on the performance of domestic firms. This finding is especially pertinent for the countries of the Visegrad group.

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