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Sourcing Patterns of FDI Activity and Their Impact on the Domestic Economy*

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Abstract
In this paper, we describe sourcing patterns of FDI activity and test empirically whether their impact on the host economy is such as predicted by theoretical models. In the analysis, we focus on inter-industry interactions between a multinational enterprise (MNE) which enters the domestic market and other firms in the economy within the broader context of international trade flows. Our main purpose is to determine whether FDI inflow indeed boosts demand for intermediate goods, and whether the MNE uses domestic suppliers of intermediate goods or whether it purchases its supplies from abroad or from other MNEs entering the downstream sector. Our analysis covers the time period 2001––2007 and concerns both Western and Eastern European countries. Using an unbalanced panel of industries in these countries and the given time period, we come to the conclusion that even though FDI represents a positive shock to demand for intermediate goods, in countries of Eastern Europe this shock is better exploited by MNEs in the upstream sector and foreign importing firms than by domestic producers.

1. Introduction

The purpose of this paper is to shed more light on issues related to foreign direct investment (FDI) and its impact on the host country. FDI can be characterized as an operation by which a multinational enterprise (MNE) acquires substantial control over a domestic firm in the host economy, either by investing in an existing company or by founding a new subsidiary in the host country. Since the MNE is usually an entity with large economic and market power, FDI inflow significantly reshapes the industrial environment in the host country and affects its economy through several channels. In the paper, we study this issue by analyzing empirically one of the aspects of the presence of MNEs in the domestic market—their relationship with suppliers of intermediate goods.

We study whether the inflow of FDI increases the demand for intermediate goods and through what channels these goods are provided. We focus especially on the question whether MNEs purchase intermediate goods from domestic suppliers or from suppliers that have foreign owners, or whether they import these goods from abroad. We perform the analysis at the industry level (2-digit NACE) using a large panel of industries in European countries in the period 2001–2007. Our main goal is to describe sourcing patterns and the change in those patterns caused by FDI inflow in the context of Central and Eastern European (CEE) countries, but we complement our results by analyzing the same issue for countries of Western Europe. The comparison of the two regions allows us to draw some additional conclusions.

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In CEE countries, the volume of FDI has been increasing over the past 20 years, and it has been seen as one of the factors significantly reshaping the economies in transition from centrally planned to market systems. It has generally been welcomed and even promoted by domestic governments, and the debate among policy makers about how to attract foreign investors is still ongoing.

In the academic environment, there is also an ongoing debate about FDI, trying to understand the impact of the presence of MNEs in the domestic market and the different ways in which it can be beneficial to the host economy. As Meyer (2004) explains, this question is highly relevant for policymakers and for the MNEs themselves. Host country governments often try to attract foreign investors with substantial economic incentives, such as tax holidays, free acquisition of real estate, and enhanced infrastructure. Such means of attracting FDI can be very costly and it is therefore crucial to know if the entry of a foreign investor indeed has the desired impact and warrants the costs—both for governments, which decide whether to promote FDI or not, and for MNEs, which need to know their bargaining power in negotiations on the conditions of investment.

The purpose of our paper is thus to answer these questions and to assess whether FDI inflow indeed improves economic conditions in the host country. In our analysis, we address some drawbacks of the existing empirical literature in the context of vertical interactions between MNEs and domestic firms. This literature usually focuses too exclusively on the question of vertical spillovers, which, although extremely interesting, represent only one of the facets of the impact of FDI. Further, the authors very rarely take into account the close link between FDI and international trade and thus omit a factor that plays an important role here. In our analysis, we do not focus on vertical spillovers: rather than changes in individual firms' productivity, we study overall changes in market structure and we ask simply whether the sales of domestic suppliers increase as a result of FDI inflow, as compared to other potential sources of intermediate goods. Since intermediate goods can also be imported, we control for changes in international trade flows on a sectoral level. Hence, we use both the variation in industry production and the variation in international trade flows. This allows us to investigate the impact of FDI on the host economy along the vertical axis (between industries) in much greater detail than any of the existing empirical analyses.

In the paper, we ask the following questions: How does FDI shape inter-industry allocations on the national and international level? Do MNEs purchase intermediate goods from domestic suppliers, or do they prefer to import them from abroad? Alternatively, do MNEs attract further FDI in the domestic downstream sector? And finally, how much are these patterns changing due to the advances in the integration of the European market at the beginning of the 21st century?

2. Literature Review

The inter-industry relationship (also called vertical linkage), which is what we are studying in this paper, is one of the two dimensions of the impact of FDI that the literature usually distinguishes. The second one is the intra-industry (or horizontal) level, which concerns the interaction between MNEs and their local competitors within the same industry. On both the vertical and horizontal level, there are

two main channels of interactions between the MNE and other firms in the economy: market structure and technological transfers. The entry of a highly efficient MNE significantly changes the competitive environment and market conditions for domestic firms; at the same time, domestic firms can potentially benefit from technological spillovers, which are externalities created by the presence of the MNE in the market. Researchers assume that a technologically more advanced MNE represents a positive example which domestic firms can follow by copying new technologies, by hiring workers or managers that have experience in the foreign company, and so on.

Both the market structure change and the technological spillovers caused by the entry of a highly efficient MNE in the domestic market are described in the theoretical model of Markusen and Venables (1999), who compare three different scenarios: i) the goods in the domestic market are produced by domestic firms, ii) the goods are produced by MNEs operating in the domestic market, and iii) the goods are imported from abroad. The authors conclude that whereas the second and third scenarios increase competition within industries and may thus threaten domestic firms, the second scenario also boosts the demand for intermediate goods across industries and may thus bring profit to domestic suppliers. In addition, the second scenario as opposed to the third one provides scope for technological spillovers, assuming that these need a face-to-face interaction between the two parties (domestic firms and MNEs), a hypothesis also supported by Ethier (1986).

The Markusen and Venables (1999) model brings forward the issue of international trade and its relation to FDI activities. The link between FDI and international trade is very close because from the point of view of the foreign firm, the two options (either to export or to invest abroad) are just two complementary ways of serving the targeted market. The choice between these two options, also known as a "proximity-concentration tradeoff," is described in the theoretical model of Helpman et al. (2004). Similarly, Bardhan (2000) describes the same tradeoff from the point of view of domestic consumers, for whom imports and production of MNEs implanted in the country are two complementary sources of the goods in question. In these models, trade is thus considered to be a complement of FDI within the same industry. This point of view is accompanied by works analyzing FDI and its relation to inter-sectoral trade, highlighting the vertical integration of MNEs and the possibility of intra-firm trade in intermediate goods, as, for example, in Helpman (1984).

The theoretical predictions thus lead to the conclusion that FDI inflow has the potential to increase the demand for intermediate goods. This demand is not always covered by domestic firms—MNEs may prefer to purchase the intermediate goods from abroad, and so the overall impact on domestic suppliers may ultimately be negative. On the other hand, if the MNEs have enough reasons to establish local supply linkages, these may lead to technological spillovers, further improving the efficiency of domestic firms. These predictions are in line with real life evidence often discussed in papers studying the issue of FDI and its vertical linkages (see Javorcik and Spatareanu, 2005).

Unfortunately, the empirical literature fails to reflect these theoretical predictions in their complexity. First, empirical analyses are usually focused solely on technological spillovers (on the horizontal or vertical level) and omit the issue of

changing market structure, and second, they take into account the interaction between FDI activities and international trade flows only very rarely.

Keller (2009) reviews the empirical evidence on the impact of FDI and clearly illustrates that the majority of studies published in this field concern technological transfers. A similar conclusion is derived in Hanousek et al. (2010). Both horizontal and vertical spillovers have been studied very intensely—for vertical spillovers, which concern the interaction between MNEs and their local suppliers, see, for example, Gorg and Strobl (2001), Meyer and Sinani (2009), Havranek and Irsova (2011), and Irsova and Havranek (2013). The problem is that spillovers represent only one part of the potential impact of FDI on the domestic economy: we know from the above-mentioned theoretical models that not only technology, but also demand shocks are present when FDI is shaping the domestic market, and this question is not sufficiently addressed in empirical studies.

A second important drawback of the existing empirical literature is that it usually ignores, or at least underestimates, the role of international trade and its interaction with FDI activities. Keller (2009) shows that although there are studies of the impact of international trade as well as of the impact of FDI, no study focuses on both aspects at the same time with the same intensity. For example, Stančík (2007) performs his analysis of horizontal and vertical FDI spillovers separately for import-oriented and export-oriented industries, and Lesher and Miroudot (2008) include trade variables on the country level in their sectoral regressions. However, these approaches, even if they confirm that international trade flows matter for the impact of FDI, still do not fully exploit their variation on the sectoral level. Hence, there is a large gap in the existing empirical literature, given probably by the fact that it is not very easy to link data on firms or industries with data on international trade, at least not at a sufficiently disaggregated level. Traded goods are classified under different a coding system than the one used for classification of industries, and no direct correspondence table is available.

3. Theoretical Predictions

In this paper, our aim is to analyze whether FDI inflow increases the sales of domestic producers of intermediate goods. We follow the theoretical model of Markusen and Venables (1999), who show that under certain circumstances, the increased activity of multinational firms in the downstream sector should increase the demand for intermediate goods. They assume that the MNEs are more efficient than domestic firms, thereby increasing production in the consumer goods sector, and moreover, that they use intermediate goods more intensively, which drives the demand for these goods up. Formally, this means that the authors assume sales of intermediate goods (SI) to be a function of FDI in the downstream sector: $SI=f(FD)$, with $\frac{dSI}{dFDI} > 0$.

To answer our research question, the prediction of the theoretical model of Markusen and Venables (1999) has to be modified in two ways. First, it should not be forgotten that the model is derived under the assumption that the total demand for the goods produced in the downstream sector is fixed and that there is no trade in intermediate goods. Neither of these has to be true. The demand for consumer goods

can vary over time, which would also affect the demand for intermediate goods as inputs. Also, part of the intermediate goods can be imported or exported. It is therefore more realistic to see the sales of intermediate goods (*SI*) as a function of FDI, sales of consumer goods (*SC*), imports of intermediate goods (*II*), and exports of intermediate goods (*EI*): $SI = f(FDI,\ SC,\ II,\ EI)$. Moreover, according to the models described in Section 2, it has to be expected that the production of consumer goods as well as imports of intermediate goods are also a function of FDI in the downstream sector, which leads to the following model:

$$SI = f\left(FDI, SC\left(FDI\right), II\left(FDI\right), EI\right)$$

Second, in the Markusen and Venables (1999) model, intermediate goods are produced by domestic firms only, whereas in reality, MNEs can also enter this sector. We want to estimate the impact of downstream FDI on sales of domestically produced intermediate goods, which is only a part of total sales. If we denote the domestically produced intermediate goods as SI^D and those produced by MNEs operating in the intermediate goods sector as SI^M, we can write

$$SI = SI^D + SI^M = SI^D\left(\frac{SI^D + SI^M}{SI^D}\right) = f(FDI, SC, II, EI)$$

$$SI^D = \frac{SI^D}{SI} f(FDI, SC, II, EI)$$

This implies that

$$\frac{dSI^D}{dFDI} = \frac{d\left(SI^D / SI\right)}{dFDI} \cdot f\left(FDI, SC, II, EI\right) + \frac{SI^D}{SI} \cdot \frac{df(FDI, SC, II, EI)}{dFDI} \tag{1}$$

where

$$\frac{df(FDI, SC, II, EI)}{dFDI} = \frac{\partial f(FDI, SC, II, EI)}{\partial FDI} + \frac{\partial f(FDI, SC, II, EI)}{\partial SC} \cdot \frac{dSC}{dFDI} + \\ + \frac{\partial f(FDI, SC, II, EI)}{\partial II} \cdot \frac{dII}{dFDI} \tag{2}$$

The derivative in (1) has a clear economic interpretation. There are two mechanisms that drive the impact of downstream FDI on the demand for domestically produced intermediate goods: the first changes the proportion of intermediate goods supplied by domestic producers (as compared to multinationals) in the quantity supplied, while the second changes the overall demand. These two mechanisms correspond to the first and second summands of expression (1), respectively.

The derivative in (2) shows that the overall demand for intermediate goods (the second summand in (1)) is further driven by three different factors: by the presence of multinationals directly, but also through their influence on sales in the downstream sector and on imports of intermediate goods.

The overall sign of the total derivative in (1) thus depends on the sign of four different factors and on their relative absolute values. These factors are the subject of our econometric analysis, which we will present after we specify the data we are using for the construction of the variables presented in this section.

4. Data Description

4.1 Geographic and Time Coverage

The 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 the EU15 (Luxembourg being combined with Belgium) plus Iceland, Norway, and Switzerland. The Eastern countries are the countries that joined the EU in 2004. The main focus is on the Eastern countries, but the analysis is performed for both groups separately to see the differences between fully developed countries and those who had just undergone a transition period. The comparison of these two groups allows us to draw further conclusions about the issue studied.

4.2 Data Sources

We use the Amadeus database to obtain the level of sales and FDI presence in given industries. This database contains information about firms operating in the chosen countries: their performance, their financial and organizational characteristics, their ownership structure (especially whether they are domestic or foreign), and their industry classification expressed by the three-digit NACE code (Rev. 1.1). We link this database with UN Comtrade data on international trade, which covers international exports and imports between the selected countries and their trade partners in the time period studied, disaggregated to the four- and five-digit SITC level (Rev. 3).[1] Further, we use the Eurostat database as an additional source of information about input-output tables of industries and FDI positions in European countries (both at two-digit NACE, Rev. 1.1).

4.3 Data Harmonization

Since our main research question concerns the interaction between upstream and downstream industries in terms of both production and trade, we first need to establish the links between these industries, i.e., we need to determine to what industries the producers of intermediate goods supply. For this purpose, we use input-output tables downloaded from the Eurostat database[2] for the period 2001––2007 (we use aggregated I-O tables for the EU27 countries, since they are available for the whole period, and we assume that the I-O structure of European industries does not vary too much across countries). These tables allow us to construct a matrix with coefficients representing the share of output supplied to different downstream industries, which will be used to define the variables used in our analysis in a way that we will describe later.[3]

Data from all sources are transformed to be measured in millions of euros.

4.4 Definition of Variables

In Section 3, we explained the mechanisms through which FDI in the consumer goods sector (downstream sector) influences sales in the intermediate goods sector (upstream sector). This division between consumer and intermediate goods is

[1] We use the same dataset as Frensch and Gaucaite-Wittich (2009).

[2] http://epp.eurostat.ec.europa.eu/portal/page/portal/esa95_supply_use_input_tables/data/database

[3] The tables are available at the two-digit NACE level, which we chose as the level of aggregation in our model. To link the data coded under the NACE system with the trade data (which is coded in the SITC system), we use correspondence tables available at http://unstats.un.org/unsd/cr/registry/regot.asp?Lg=1.

handy for the presentation of the theoretical model, but in reality, the industry structure is much more complex and each sector can produce goods that are used as intermediaries for another sector as well as final goods. Therefore, in our analysis we consider all sectors to be potential producers of intermediate goods and we link them to their corresponding downstream sectors to which they supply. For the sake of simplicity, we continue to use the same notation as in Section 3. We limit our analysis to the industries of agriculture, mining, and manufacturing—a complete list is provided in the *Appendix*.

For each sector i at the NACE two-digit level, we define total sales (SI) and sales by domestic firms (SI^D) in the following way:

$$SI_{it} = \sum_{j=1}^{N_{it}} Sales_{ijt}$$

$$SI_{it}^{D} = \sum_{j=1}^{N_{it}} d_{ijt} Sales_{ijt}$$

where N_i is the number of firms in industry i, $Sales_{ij}$ represent the sales (turnover) of the j-th firm in industry i, and d_{ij} is the share of domestic owners in the j-th firm in industry i (all in year t).

Further, we define total sales in the corresponding downstream sectors as the sum over these sectors weighted by coefficients derived from the input-output tables:

$$SC_{it} = \sum_{k=1,\, j\neq 1}^{n} \alpha_{ikt} SI_{kt}$$

where $n = 32$ is the total number of sectors that we include in our analysis and αikt denotes the share of the output of the i-th sector that is sold to the k-th sector in year t according the I-O table.

Then, we define the share of FDI in each sector as the ratio of the sales of foreign-owned firms in a given industry to the sales of all firms operating in that industry (in a given country), and to obtain the overall FDI level in the corresponding downstream sectors for each sector i, we weight the FDI levels in these sectors again by coefficients derived from the I-O tables. The variable is thus computed as

$$FDI_{it} = \sum_{k=1,\, j\neq 1}^{n} \alpha_{ikt} \frac{f_{kjt} Sales_{kjt}}{Sales_{kjt}}$$

where f_{kjt} is the share of foreign owners in the j-th firm in industry k in year t. Note that this definition is the same as used by Javorcik (2004).

As for the trade data, we simply sum the imports (II) and exports (EI) at the corresponding level over all importers and over all export destinations, respectively.

4.5 Resulting Dataset

By aggregating and combining the two data sources, we obtain a unique dataset of approximately 5,000 observations. It has the structure of a panel of industries in the above-mentioned countries over the period 2001–2007. Descriptive statistics of all variables are provided in the *Appendix*.

5. Econometric Specification, Hypotheses, and Results

5.1 FDI and Sales in Upstream Sector

The purpose of our analysis is to describe how FDI in the downstream sector influences the sales of domestic suppliers, and whether it is in line with the theoretical predictions presented in Section 3. Since we do not have a model that will predict the functional form of $f(.)$ from that section, we propose a semi-logarithmic specification as a first approximation. This allows us to interpret most of the coefficients as elasticities. We structure it as a panel data model with industry and time fixed effects in all specifications.

In our first specification, we study the impact of downstream FDI on total sales in the intermediate goods sector:

$$\ln\left(SI_{it}\right) = \beta_0 + \beta_1 FDI_{it} + \beta_2 \ln\left(SC_{it}\right) + \beta_3 \ln\left(II_{it}\right) + \\ + \beta_4 \ln\left(EI_{it}\right) + \alpha_i + \eta_t + \varepsilon_{it} \tag{3}$$

where all the variables are denoted in the same way as in Section 3, α_i is the industry-specific fixed effect, η_t is the time-specific fixed effect, and ε_{it} is the idiosyncratic error term. The main variable of interest is *FDI*, the presence of multinational firms in the downstream industry, measured as the weighted share of foreign owners in the sector (with values from 0 to 1). The control variables are chosen in line with the theoretical reasoning presented above, the industry-specific fixed effects allow me to control for time-invariant industry characteristics, and the time-specific fixed effects control for aggregate shocks to the economy.

In this specification, sales of consumer goods and imports of intermediate goods are controlled for, and so the impact of *FDI* measured by the coefficient $\beta 1$ represents only the direct influence of downstream *FDI* on sales of intermediate goods. However, it turns out that the coefficient is insignificant. To refine the analysis, we alter the specification by taking sales by domestic firms in the intermediate goods sector (denoted as SI^D) as our dependent variable:

$$\ln\left(SI_{it}^D\right) = \beta_0^D + \beta_1^D \mathrm{FDI}_{it} + \beta_2^D \ln\left(SC_{it}\right) + \beta_3^D \ln\left(II_{it}\right) + \\ + \beta_4^D \ln\left(EI_{it}\right) + \alpha_i^D + \eta_t^D + \varepsilon_{it}^D \tag{4}$$

In this specification, the coefficient β_1^D encompasses both the effect described in the first specification and the impact of FDI on the share of intermediate goods supplied by domestic producers (compared to multinationals) in the quantity supplied, as described in Section 3. We know that the first effect is insignificant, and we suppose the second effect to be negative, therefore, we expect the overall impact of FDI on downstream providers of intermediate goods to be negative.

The results of this estimation are presented below in *Table 1*, and they show that for the countries of Eastern Europe we can indeed confirm that the effect of downstream FDI on the sales of domestic firms is negative. More precisely, an increase of downstream FDI of 1 percentage point leads to a decrease of sales of domestic producers of 1.8%. Moreover, given the insignificant result from the first specification, we expect that this is driven by the negative impact of FDI on the share of intermediate goods supplied by domestic producers (as compared to multinationals) in the quantity supplied.

Table 1 Impact of Downstream FDI on Domestic Sales

Dep. var.: Domestic sales (log)		
	Western countries	**Eastern countries**
Downstream FDI	-0.618 (0.414)	-1.762*** (0.388)
Downstream sales	0.931*** (0.049)	1.013*** (0.054)
Imports	-0.087 (0.088)	0.112 (0.088)
Exports	0.084 (0.079)	-0.043 (0.103)
Year and industry/country effects	Yes	Yes
R^2	0.581	0.478
No. of observations	2218	984

Notes: The table presents the results from a FE estimation for the two regions. Downstream sales, Imports and Exports are in logarithms. Clustered standard errors (at industry level) are in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 2 Impact of Downstream FDI on Share of Domestic and MNE Sales

Dep. var.: Domestic sales / MNE sales (log)		
	Western countries	**Eastern countries**
Downstream FDI	-1.048 (0.735)	-1.329** (0.634)
Country FDI position	-0.001 (0.210)	1.402** (0.650)
Year and industry/country effects	Yes	Yes
R^2	0.011	0.025
No. of observations	1691	651

Notes: The table presents the results from a FE estimation for the two regions. Country FDI position is in logarithm. Clustered standard errors (at industry level) are in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

To confirm this expectation, we propose one complementary regression that shows this effect immediately:

$$\ln\left(\frac{SI^D}{SI^M}\right)_{it} = \gamma_0^M + \gamma_1^M FDI_{it} + \gamma_2^M FDI^C + \alpha_i^M + \eta_t^M + \varepsilon_{it}^M \quad (5)$$

where SI^D stands for the volume of goods produced by domestic firms and SI^M stands for the volume of goods produced by multinational firms in the upstream sector. We control in this regression for the overall level of FDI in the country (FDI^C) to capture the possible trend in the general attractiveness of the country to foreign investors.

We expect the presence of multinational firms in the downstream sector to reduce the ratio of sales of domestic firms to sales of multinational firms that produce intermediate goods. This expectation is confirmed by the results presented above in *Table 2* for the countries of Eastern Europe. More precisely, an increase in downstream FDI of 1 percentage point in these countries leads to a change in this ratio of 1.3%.

For the countries of Western Europe we do not observe the same effect—there, MNEs do not seem to crowd out domestic suppliers as a consequence of downstream FDI inflow. This can be explained using insights from other papers dealing with this issue, e.g. Javorcik and Spatareanu (2005). MNEs operating in CEE countries often report that they do not use domestic suppliers because their products are not of a satisfactory quality. This is due to the fact that even several years after the transition, domestic firms in CEE countries are not as efficient as their counterparts from more developed economies. Logically, we should not observe this problem for countries from Western Europe, which is completely in line with the insignificant effect of FDI for this group.

5.2 Other Issues Related to FDI

So far, we can thus say that even though FDI in the downstream sector does not seem to have a direct impact on the intensity with which intermediate goods are supplied, for the countries of Eastern Europe, it changes the proportion in which these goods are supplied by domestic firms and by MNEs. In Section 3, we explained that these are only two out of four basic mechanisms that could drive the impact of downstream FDI on sales of intermediate goods. The two remaining questions that have to be considered are whether FDI in the downstream sector raises the production of consumer goods and thus the overall demand for intermediate goods, and whether it raises the level of imports of these goods. To complement our analysis and take into account these two issues, we propose the following two regressions:

$$\ln\left(\frac{II}{SI^{D}}\right)_{it} = \gamma_0^I + \gamma_1^I FDI_{it} + \alpha_i^I + \eta_t^I + \varepsilon_{it}^I \tag{6}$$

and

$$\ln (SC)_{it} = \gamma_0^S + \gamma_1^S FDI_{it} + \alpha_i^S + \eta_t^S + \varepsilon_{it}^S \tag{7}$$

The first regression allows us to discover whether FDI in the downstream sector attracts more imports of intermediate goods (as compared to the sales of domestic firms in the upstream industry): we expect the presence of multinational firms to increase the ratio of imported volumes of intermediate goods to domestic production.

The second regression serves to verify whether increasing FDI in the downstream sector goes hand in hand with increasing production. Obviously, it is not clear in this regression whether the causality goes in only one direction, because MNEs are more likely to enter a sector that is booming.[4] In any case, however, increasing production in the upstream sector is obviously a decisive positive factor that boosts the demand for intermediate goods,[5] and if it is related to an increase of FDI, it clearly represents one of the channels through which FDI influences sales in upstream sectors.

The results of these two regressions are presented below in *Tables 3* and *4*.

[4] This issue is addressed in detail by Jurajda and Stančík (2009).

[5] This is proved by the significant coefficient β_1 in regression (3), which is not statistically different from 1.

Table 3 Impact of Downstream FDI on Share of Imports and Domestic Sales

Dep. var.: Imports / Domestic sales (log)		
	Western countries	**Eastern countries**
Downstream FDI	-4.028*** (0.859)	-0.863 (0.653)
Year & industry/country effects	Yes	Yes
R^2	0.158	0.149
No. of observations	2225	989

Notes: The table presents the results from a FE estimation for the two regions. Clustered standard errors (at industry level) are in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4 Impact of Downstream FDI on Downstream Sales

Dep. var.: Downstream sales (log)		
	Western countries	**Eastern countries**
Downstream FDI	6.706*** (0.934)	5.968*** (0.486)
Year and industry/country effects	Yes	Yes
R^2	0.343	0.528
No. of observations	2551	1310

Notes: The table presents the results from a FE estimation for the two regions. Clustered standard errors (at industry level) are in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

They show that the correlation between FDI and sales is clearly positive in all European countries, whereas the ratio of imported volumes of intermediate goods to domestic production does not increase as a consequence of FDI inflow in the downstream sector (and for Western Europe it even decreases). This is an interesting observation and merits further attention with a special focus on the process of European integration.

5.3 European Integration

In our analysis, we compare the countries of Western and Eastern Europe mainly to see the difference between fully developed and less developed economies. However, the difference between Western and Eastern countries lies not only in their economic development, but also in their different degree of integration in the common EU market. In our sample, most of the countries that we denote as Western are members of the European Union. Countries that we denote as Eastern were not members during the first half of the period studied, but all of them became members in 2004.

We cannot really claim that Eastern countries fully opened their markets to international trade exactly on the day when they became EU members—the liberalization process certainly preceded this date and it was progressive and different for each country in the sample. However, it can be generally said that as far as openness to trade is concerned, Eastern countries become comparable to Western countries in the second half of the period studied.

Since the issue that we study in this paper—the impact of FDI on domestic suppliers—is closely related to the problem of international trade flows, it is inter-

Table 5 Impact of Downstream FDI on Domestic Sales (with Interaction)

Dep. var.: Domestic sales (log)		
	Western countries	**Eastern countries**
Downstream FDI	-0.536 (0.445)	-1.371*** (0.392)
Downstream FDI * D2004	-0.187 (0.279)	-0.835* (0.457)
Downstream sales	0.934*** (0.050)	1.002*** (0.053)
Imports	-0.088 (0.089)	0.111 (0.180)
Exports	0.082 (0.079)	-0.036 (0.095)
Year and industry/country effects	Yes	Yes
R^2	0.581	0.481
No. of observations	2218	984

Notes: The table presents the results from a FE estimation for the two regions. Downstream sales, imports and exports are in logarithm. Clustered standard errors (at industry level) are in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6 Impact of Downstream FDI on Relative Domestic Sales (with Interaction)

Dep. var:	**Domestic sales / MNE sales (log)**		**Imports / Domestic sales (log)**	
	Western	**Eastern**	**Western**	**Eastern**
Downstream FDI	-0.756 (0.703)	-1.420** (0.592)	-2.637*** (0.823)	-1.613** (0.681)
Downstream FDI * D2004	-0.678 (0.576)	0.359 (0.666)	-2.749*** (0.650)	1.704*** (0.542)
Country FDI position	0.025 (0.214)	1.545* (0.767)		
Year and industry/country effects	Yes	Yes	Yes	Yes
R^2	0.012	0.026	0.177	0.162
No. of observations	1691	651	2225	989

Notes: The table presents the results from a FE estimation for the two regions. Country FDI position is in logarithm. Clustered standard errors (at industry level) are in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

esting to see whether the increasing openness to trade caused by progressing European integration somehow influences the results of our analysis. For this purpose, we repeat some of the regressions presented in the previous section, but we let the impact of FDI vary over two sub-periods: 2001–2003 and 2004–2007. Technically, we simply add to our regressions a dummy *D*2004, equal to 1 for 2004–2007 and 0 otherwise, and we interact it with the variable *FDI*.

The regressions that we repeat with the added interaction term are (4), (5), and (6). We study the impact of FDI in the downstream sector on sales of domestic suppliers of intermediate goods, on the proportion of these goods supplied by domestic suppliers and MNEs, and on the proportion of imported intermediate goods and those provided by domestic suppliers, respectively. The results are provided above in *Tables 5* and 6.

These results allow us to make several statements about the impact of FDI inflow into the downstream sector on the intermediate goods sector and the changes therein during the process of European integration.

First, it should be noted that the impact of FDI is not significantly different for the two periods in the countries of Western Europe as regards the direct influence on sales of domestic producers and their ratio to the sales of MNEs in the upstream sector. FDI seems to lower imports (as compared to sales of domestic producers) more in the second period than in the first one. Of course, any difference between the two periods cannot be attributed to the integration process (the countries in this group did not change their membership status between 2001 and 2007), so this part of our analysis serves only for comparison with Eastern European countries.

For countries in Eastern Europe, the impact of FDI changes significantly between the two periods and its negative impact is stronger after 2004. When we look at the results of the two complementary regressions (the impact of FDI on the shares of domestic sales, sales of MNEs, and imports), we see that in this second period, domestic sales are replaced by imports rather than by sales of MNEs. In other words, we observe more imports relative to sales by domestic producers and MNEs after 2004. This is completely the opposite of what we observe in the case of Western countries.

We conclude from this comparison that whereas in the first half of the period studied, domestic suppliers of intermediate goods were replaced more by MNEs, and in the second period, they were replaced by importers. This is in line with our expectations: before 2004, the barriers to trade were higher, and it was easier for foreign producers to serve a given market by establishing their own subsidiaries. After 2004 and with the continuing abolition of trade barriers, it was easier to import the goods.

6. Conclusion

In this paper, we analyze sourcing patterns of FDI activity and we discuss their impact on the domestic economy. We show that an increase in FDI in a sector is associated with increased production and therefore also with increased demand for intermediate goods. This has a clearly positive impact on producers of these intermediate goods, but it does not affect all of them in the same way.

The detailed results of our econometric analysis can be summarized in several statements. First, we do not find any evidence for a direct effect of downstream FDI on the demand for intermediate goods, once the sizes of the production of consumer goods and imports are controlled for. Second, the overall demand for intermediate goods increases with increased activity of MNEs in the consumer goods sector, but this is driven rather by increased production in this sector. Third, downstream FDI affects the proportions in which intermediate goods are supplied by domestic producers, upstream MNEs, and importers. This is true especially for the countries of Eastern Europe, where MNEs and importers are preferred as suppliers. It may signal that domestic producers are not able to provide intermediate goods of sufficient quality. Fourth, in Eastern European countries, domestic suppliers are being replaced by MNEs and imports, and imports are preferred when barriers to trade are lower.

In conclusion, when we focus on CEE countries, we see that increased FDI activity in the downstream sector leads to a change in the proportion of intermediate

goods supplied by domestic producers and by MNEs operating in the upstream sector—MNEs cover a larger share of the increasing demand. This is true especially in the first half of the period studied. In the second half, domestic producers are further replaced by importers. This shows that FDI has the potential to positively influence the economy of the host country through backward inter-industry linkages, but this potential is not fully exploited yet in CEE countries, possibly due to a persisting technology gap.

APPENDIX

Table 7 Descriptive Statistics of Dependent and Explanatory Variables

	Western countries	Eastern countries
Sales	5380 (16129)	806 (7397)
Downstream FDI	0.22 (0.18)	0.49 (0.24)
Imports	4607 (8276)	1027 (1686)
Exports	4261 (10400)	835 (1545)
No. of observations	3413	1393

Notes: Means of the variables are presented. Standard errors are in parentheses. Sales, imports and exports are in millions of current EUR. FDI is a share between 0 and 1.

Table 8 List of Industries—NACE Rev. 1.1

Code	Name
01	Products of agriculture, hunting and related services
02	Products of forestry, logging and related services
05	Fish and other fishing products; services incidental of fishing
10	Coal and lignite; peat
11	Crude petroleum and natural gas
12	Uranium and thorium ores
13	Metal ores
14	Other mining and quarrying products
15	Food products and beverages
16	Tobacco products
17	Textiles
18	Wearing apparel; furs
19	Leather and leather products
20	Wood and products of wood and cork (except furniture)
21	Pulp, paper and paper products
22	Printed matter and recorded media
23	Coke, refined petroleum products and nuclear fuels
24	Chemicals, chemical products and man-made fibres
25	Rubber and plastic products
26	Other non-metallic mineral products
27	Basic metals
28	Fabricated metal products, except machinery and equipment

29	Machinery and equipment n.e.c.
30	Office machinery and computers
31	Electrical machinery and apparatus n.e.c.
32	Radio, television and communication equipment and apparatus
33	Medical, precision and optical instruments, watches and clocks
34	Motor vehicles, trailers and semi-trailers
35	Other transport equipment
36	Furniture; other manufactured goods n.e.c.
37	Secondary raw materials
40	Electrical energy, gas, steam and hot water

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