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## How Important is Export-Platform FDI? Evidence from Multinational Activities in Poland

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# **How Important is Export-Platform FDI? Evidence from Multinational Activities in Poland**

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## **Abstract**

This paper investigates the link between export performance and multinational enterprise presence utilizing trade and industry data for Polish manufacturing industries for the years 1994-2002. Decomposing trade into final and intermediate goods and assessing the impact of foreign-owned capital on the respective export performance of Polish industries, we suggest a significant role of export-platform FDI into Poland, while the importance of FDI for vertical integration is limited suggesting that the sourcing of intermediate goods from Poland primarily occurs through arm's-length contractual outsourcing instead of in-house sourcing of multinational enterprises. The paper also suggests that over the sample period, where Poland has evolved into a relatively stable economic environment, the role of export-platform FDI has increased significantly.

**JEL classifications:** F14, F23.

**Keywords:** Export-platform FDI; vertically integrated Multinational Enterprises; export performance; Poland; contractual outsourcing.

## I. Introduction

Until recently, theoretical models on Foreign Direct Investment (FDI) and Multinational Enterprises (MNEs) have operated in a two-good, two-factor and two-country model framework. The main distinction has been between horizontally and vertically integrated MNEs. While the first type of MNEs replicates identical production facilities across countries to avoid trade costs, the latter arises to exploit factor price differences by fragmenting production processes across countries.<sup>1</sup>

In Markusen's knowledge capital model (2002), the two types of MNEs are merged and endogenously arise due to country differences in relative factor endowments plus market size and trade barriers. However, even in Markusen (2002) the organizational form of MNEs is essentially dichotomous, being vertical or horizontal.

Recently, authors such as Motta and Norman (1996), Yeaple (2003) and Ekholm et al. (2007) have questioned whether this dichotomy adequately captures the range of strategies that MNEs follow and highlight the role of FDI for exporting to third countries. In Markusen (2002), host country exports are only consistent with vertical MNEs, i.e., foreign affiliates' exports of intermediate goods to their respective parent company. In contrast, models of the so-called export-platform FDI now allow for the possibility that affiliate production is located in a host country primarily to serve final demand in third country markets.

This may be of particular relevance for explaining MNEs' activities in Central and Eastern European transition economies, many of which not only have substantially lower wages, but also have enjoyed preferential trade agreements with the European Union before their membership making them an ideal export-platform for serving Western European markets.

In the present study, we assess the relevance of export-platform FDI in Poland. Poland is an interesting candidate for analyzing the nature of MNEs' activities for several reasons. First, with its 39 million inhabitants Poland is the largest country in Central and Eastern

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<sup>1</sup> For models of horizontal MNEs, see Markusen (1984) and Markusen and Venables (1998). Models of vertical MNEs include Helpman (1984) and Helpman and Krugman (1985).

Europe<sup>2</sup>, thereby raising the potential for horizontal, market seeking FDI (see Motta and Norman, 1996).<sup>3</sup> Second, its low production costs compared to its western neighbours and its fairly well educated labour force also make Poland attractive for vertical MNEs' input sourcing. At the same time, trade barriers to the markets in Western Europe are fairly low as Poland has had a free trade agreement with the EU (Europe agreement) from 1992 up to the full membership in 2004, which promoted vertical integration but also encouraged export-platform FDI. Accordingly, the different motives for MNEs' activities may all be at play here and what type of FDI dominates is essentially an empirical question.

Numerous empirical studies analyze the relevance of horizontal and vertical FDI (e.g., Carr et al., 2001; Blonigen et al., 2003). Although authors such as Hanson et al. (2001), Blonigen et al. (2004), Girma et al. (2005), Baltagi et al. (2005), and Ekholm et al. (2007) have made important contributions shedding light on export-platform FDI empirical evidence and its relevance remains limited particularly for FDI towards Central and Eastern Europe.

Our analysis contributes to the somewhat limited empirical evidence for export-platform FDI. Particularly, our focus on a transition economy adds a new perspective, as arguably motives for FDI depend on the institutional framework in the host country and therefore are likely to change over the observed transition period. Our empirical strategy to assess the dominant FDI strategy rests on decomposing trade into final and intermediate goods trade and subsequently analyzing the impact of MNE presence on the respective export performance.

The paper is organized as follows. Section II gives an overview of the specific legal and economic environment in which the MNEs operate in Poland and provides some descriptive statistics on the development of FDI and international trade. Section III discusses the applied theory of FDI and MNEs, and Section IV presents a brief survey of the existing empirical investigations of export-platform FDI. Section V presents the empirical model and discusses the empirical findings. Section VI concludes.

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<sup>2</sup> PPP gross national income in 2001 was USD 359 billion and per capita USD 9,280 US dollars.

<sup>3</sup> Hanson et al. (2001) did find that local sales (for foreign affiliates) are more attractive in larger markets, but in smaller markets affiliates are oriented towards exports more than local sales.

Our main finding is that over our sample period 1994-2002 the export performance of final goods is positively affected by MNE presence, while intermediate goods export performance is not. Our results therefore suggest a significant role of export-platform FDI, while the importance of FDI for vertical integration remains limited suggesting that the sourcing of intermediate goods from Poland primarily occurs through contractual outsourcing instead of in-house MNE sourcing.

## **II. Trade and foreign capital in Poland**

Before turning to the empirical questions at the heart of this study, it is important to understand the policy context and economic constraints that foreign affiliates in Poland have been dealing with since the beginning of the 1990s. This sub-section briefly describes the government policies affecting FDI inflow during the transition period.

The process of economic reforms in Poland has frequently been described as a kind of ‘shock therapy’ (Sachs, 1994). The main ingredients of this therapy were liberalization of foreign trade, inflow of FDI, currency convertibility, and privatization of state-owned enterprises. The term ‘shock therapy’ does not imply, however, that Poland was transformed from a planned into a market economy overnight, with all the concomitant changes in the regulatory and institutional environment. While trade and foreign capital liberalization, privatization and company restructuring did indeed take several years, the measures implemented to achieve these reforms were broad in scope and relatively rapid. For FDI, the most important change was the introduction of national (non-discriminatory) treatment of foreign affiliates in 1991. In addition, foreign entities were only allowed to do business in one of two legal forms: either as limited liability or as joint stock companies.<sup>4</sup> These rules apply to green-field investments as well as to acquisitions. For acquisitions of privatized state-owned enterprises, temporary restrictions were introduced with respect to the maximum stake held by the investor - domestic as well as foreign - in the equity of privatized enterprises. The Law on Commercialisation of State-Owned

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<sup>4</sup> There were a few exceptions—for example in some communications sectors—but these were all discontinued in 1999. Ministry of National Treasury (2005).

Enterprises limited the stake to 80% of the basic capital (equity).<sup>5</sup> The remaining 20% of the stake was to be held by employees of the privatized plant (15%) and the state treasury as a reserve for covering the expenditures potentially required for future restitution (re-privatization of nationalized property).<sup>6</sup>

One of the main methods of privatization was through sale to foreign investors, usually selected in a process of public tender or by public invitation to negotiations. In most cases, payments for the privatized enterprises were made in instalments, with the first instalment amounting to at least 20% of the price. The remainder was normally paid in instalments over a period of up to five years. Both aspects - equity limitations and instalment payments - show that the control over the privatized companies increased sequentially over a certain period of time. In any case, since the beginning of the transition process, privatization has attracted a substantial amount of FDI. The total amount of equities acquired by foreign investors accounted for 18.5% of total FDI in the years 1990-2002. Additional investments by foreign investors in the newly acquired firms made up another 30-40% (according to different estimations) of total FDI in the same period.<sup>7</sup> The remainder of FDI was in green-field investments and acquisitions of private, domestically owned companies.

#### *Geographical structure of FDI stock and exports*

The quantitative outcome for the FDI stock of the above institutional changes is shown in the second row of *Table 1*. We find an impressive increase in the FDI stock as a percentage of the Polish GDP from 3.2% in 1994 to 13.5% in 2002, but with modest changes in the beginning. As shown in the third row of *Table 1*, foreign-owned affiliates in Poland have become export-oriented to an increasing extent. The export to sales ratio has in MNE affiliates increased from 31% in 1994 to 39% in 2002. Behind these export-intensity figures we find either exports from vertically integrated affiliates to the parent company or exports from export-platform type of affiliates to both the parent country and third countries. The figures in *Table 1* furthermore illustrate that the general increasing

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<sup>5</sup> Ministry of National Treasury (2005).

<sup>6</sup> Polish Agency for Foreign Investments (2005).

<sup>7</sup> Ministry of National Treasury (2005) and Polish Agency for Foreign Investments (2005).

export orientation of Polish manufacturing industries (row 2) is dominated by foreign-owned companies (row 4).

**Table 1. FDI stock relative to GDP and export intensity of Polish manufacturing industries, 1994-2002 (%)**

%	1994	1995	1996	1997	1998	1999	2000	2001	2002
<b>FDI stock/GDP</b>	3.2	3.4	5.0	7.3	9.8	11.0	11.8	12.0	13.5
<b>Export intensity, total economy*</b>	18	21	18	17	19	21	24	26	29
<b>Export intensity, foreign-owned companies**</b>	31	32	25	26	28	30	38	35	39
<b>Foreign share of exports out of total exports</b>	50	57	61	64	62	64	68	66	71

Note: Export intensity and foreign share figures: Own calculations based on data from the Polish Statistical Office. A foreign-owned affiliate is defined as a company in Poland with a foreign stake of minimum 10% in total equity. \*: Total exports divided by total sales, Polish manufacturing. \*\*: Exports from foreign affiliates to sales from foreign affiliates.

Source: FDI figures: Own calculations based on PAIZ data that only includes medium and large investors (above USD 1 million). Converted from USD to Polish zloty by exchange rates conversions keys from the Polish National Bank.

To get a preliminary idea of the importance of vertically integrated affiliates versus export-platform FDI, *Table 2* divides Polish exports into intermediate and final goods. The idea is that vertically integrated affiliates export intermediate goods while exports from exports-platform affiliates to a high extent are final goods. Besides presenting export figures *Table 2* also displays figures for FDI, all figures divided by geographical origin.

The European Union represents 70-80% of the stock of FDI with an increasing trend. The dominant investor countries from the EU are Germany, the Netherlands and France, with the Netherlands at the top in 2000. The free trade agreements that Poland entered during this period (Europe agreements, CEFTA and agreements with EFTA) made Poland a lucrative investment country, both for EU companies and e.g. North American companies. EU companies aiming for low costs enjoy tariff-free imports from their affiliates in Poland and the proximity makes transport costs low. For companies in the US that are engaged in the EU market, the advantages (compared to EU companies serving the EU markets) are even higher, since they save the tariffs of prior exports from the US,

while exports from their affiliates from<sup>8</sup> Poland to the EU are tariff free, if rules of origin are fulfilled.<sup>9</sup>

**Table 2. Geographical origin of exports from Poland divided into final and intermediate goods and FDI stocks in Poland, selected years**

%	Exports divided into broad economic categories (selected years)								FDI stock	
	1992		1996		2000		2002		1996	2000
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)		
<b>European Union (15)</b>										
FG	36	63	48	65	45	67	46	66	72	79
	64	65	52	65	55	71	54	70		
<b>Other Western Europe</b>										
FG	42	3	60	3	62	2	70	4	5	3
	58	2	40	2	38	1	30	1		
<b>North America</b>										
FG	57	4	54	3	50	4	57	4	14	10
	43	2	56	2	50	4	43	3		
<b>Central and Eastern Europe</b>										
FG	21	3	34	5	43	10	45	11	1	5
	79	7	66	10	57	11	55	12		
<b>Rest of the World</b>										
FG	38	26	52	24	52	17	50	15	8	3
	62	24	48	21	48	13	50	14		
<b>World</b>										
FG	36	100	48	100	46	100	48	100	100	100
	64	100	52	100	54	100	52	100		

Note: FG: Final goods (i.e. consumer and capital goods); IG: Intermediate goods.

(1) Share of FG and IG respectively out of FG+IG. (2) Share of FG and IG respectively out of world FG and IG respectively.

Source: For trade figures: OECD Commodity Trade Statistics, UN BEC decomposition. For FDI figures: UNCTAD, based on National Bank of Poland.

Looking at Polish export patterns, not surprisingly, the European Union is the most important export partner accounting for around two thirds of total Polish exports, while in comparison North America is fairly insignificant accounting for only 3-4%. Central and Eastern European countries have regained some importance in Polish exports after the collapse of the Soviet block and in 2002 they account for slightly above 10% of total exports.

The share of final goods (FG) in total export has changed from one third in 1992 to 50% in 2002, which together with the increasing inflow of FDI indicates an increasing importance of Poland as an export-platform. In what follows we will assess the

<sup>8</sup> If they were exporting from the US to EU countries before.

<sup>9</sup> In case the production from an export-platform affiliate is not fully based on intermediate goods from the host country, the relative advantage of the American export-platform FDI to the EU export-platform FDI will be reduced.

importance of export-platform FDI empirically. However, first we take a closer look at the concept and theories of export-platform FDI.

### **III. Theoretical framework**

The fundamental characteristic of an export-platform FDI is that the affiliate of a MNE exports most of its output. Accordingly, local market conditions in the host country are of negligible importance for the location decision of MNEs. The export-platform FDI may – following Ekholm et al. (2007) – have three different orientations. Firstly, production from the affiliate may be solely oriented towards exports to third countries (that is, no sales in the host market and no export back to the parent country). Secondly, the affiliate may have a global orientation, where exports are balanced to both the parent and third countries. Finally, it may have a home country orientation, where exports are solely to the parent country.

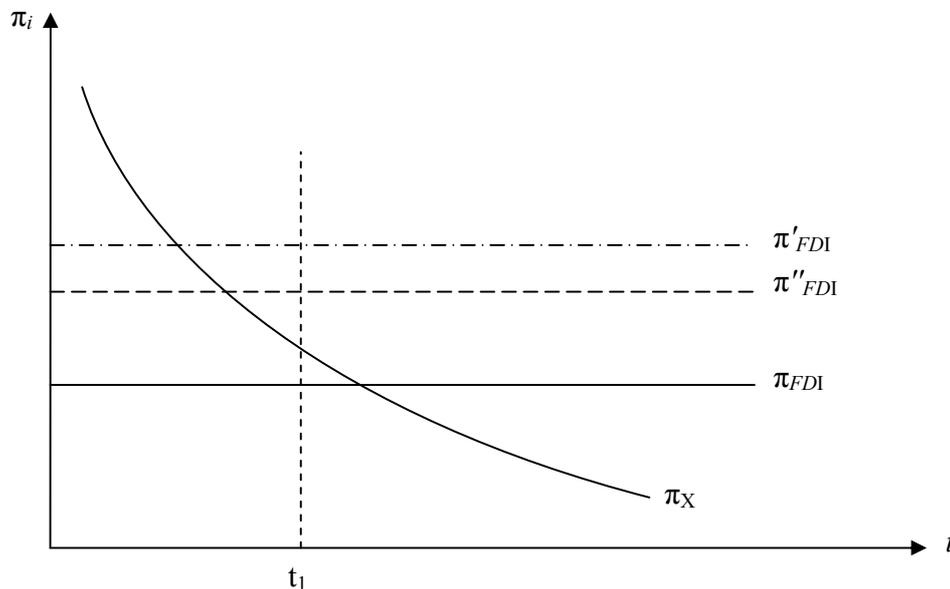
Besides different destinations for its sales, export-platform affiliates may differ with respect to sourcing, from companies in the host country or from the network of the MNE. In case of sourcing from the network of the MNE, export-platform FDI shows clear elements of vertical FDI, whatever the destination of the final product is.

The theoretical literature on export-platform FDI to this date is scarce and contains Motta and Norman (1996), Neary (2002, 2006), Yeaple (2003), Grossman et al. (2004) and Ekholm et al. (2007). The Yeaple and the Grossman et al. models are general equilibrium models with monopolistic competition in the MNE sector, while the other models are oligopolistic partial equilibrium models. In all models there are more than two countries, and they have a clear focus on the importance of economic integration. The main difference is between Yeaple (2003), Grossman et al. (2004) and Ekholm et al. (2007) and the two others, since the latter disregard sourcing (intermediate goods) and only look at the destination of final goods production. Since this is the main characteristic of the export-platform concept, we will start with this more simple case of pure *horizontal export-platform FDI*.

To illustrate the main ideas in Motta and Norman (1996) and Neary (2002, 2006), let us assume that a firm (a monopolist) in a third party country (W) operates in two (potential) union countries, H and P, as well as in its own country.<sup>10</sup> To simplify, we assume that H and P are identical with respect to market size and production costs. We also assume that W supplies its domestic market, the market being large enough to keep average fixed costs moderate, while marginal costs are not substantially higher than in H and P. The barriers to trade ( $t$ ) between all three countries are initially equally high, that is trading costs between any random pair of countries are e.g.  $t_1$ . The strategic problem for W is now the choice between exporting to H and P, and establishing a subsidiary.

Since H and P are identical, the profit curve  $\pi_X$  for exports shown in *Figure 1* applies to both H and P. Increasing trade costs reduce the profits of exporting. If W chooses a horizontal subsidiary strategy and establishes plants in both H and P, trading costs are avoided, but there are two additional sets of fixed costs. Profits are in this case independent of trading costs, and the profit curve is the horizontal line  $\pi_{FDI}$ . If trading costs are  $t_1$ , exporting is the most profitable strategy.

**Figure 1. The choice between FDI and exporting for a third party country**



Source: Hansen and Nielsen (1997)

<sup>10</sup> This presentation is based on Hansen and Nielsen (1997).

If H and P integrate in a free trade agreement so that trade costs between H and P completely disappear, W needs only one plant within the union. This saves fixed costs, so the profit curve,  $\pi'_{FDI}$ , is higher, and with trade costs of  $t_I$  a subsidiary is the best strategy. If trade costs do not disappear completely, the establishment of a single plant is not so profitable, and the profit curve,  $\pi''_{FDI}$ , will lie between  $\pi_{FDI}$  and  $\pi'_{FDI}$ . Generally, we see that trade liberalization discriminating against third party countries increases the probability that third party countries supply the countries in the free trade agreement through subsidiaries rather than exporting.

Heterogeneous countries within the free trade area with respect to either cost of production (fixed or variable), market size or geographical location (and therefore transportation cost) may have influence on where the export-platform FDI will be established within the integrated area. Market size will of course only have importance if intra-union trade barriers are positive, in which case the larger country will be more attractive.<sup>11</sup> Cost differences, on the other hand, attract the export-platform to the low costs region, and the peripheral country will have difficulty attracting the FDI because of transportation costs to the center in the integrated area.

The above considerations illustrate why e.g. American companies establish export-platform FDI in Poland when Poland integrates with EU. The crucial factors are the low costs of production combined with low trade costs relative to the EU(15). For a European company<sup>12</sup> that operates as an export-platform from one of the EU(15) countries by exporting to the other 14 EU countries and to third countries, integration between Poland and the EU(15) may lead to relocation of the export-platform from the EU(15) countries to Poland because of production costs and market accessibility (low trade costs).

In contrast to the discussion above based on Motta and Norman (1996) and Neary (2002, 2006), Yeaple (2003), Grossman et al. (2004) and Ekholm et al. (2007) take production fragmentation (sourcing) into consideration and also assume heterogeneous countries with respect to size and production costs. In their models, there are two producers located with headquarters in each of two northern high income countries. Intermediate goods may be produced in their home country, in the other northern country or in a low-wage country in

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<sup>11</sup> The intra-union trade barriers will, on the other hand, reduce the incentive for establishing export-platform FDI in the first instance.

<sup>12</sup> Or non-EU(15) country that already has established an export-platform in one EU(15) country.

the south<sup>13</sup>, and assembling activities may be conducted in any of the three locations.<sup>14</sup> The crucial parameters for where location of production activities are done, and therefore the chosen strategy of MNEs, are dependent on cost differences between north and south, fixed costs of each plant, trade costs (for final and intermediate goods) and the share of consumers residing in the north and south. The main difference from the simpler assumptions in Motta and Norman (1996) and Neary (2002, 2006) is that the possibility for fragmentation of production may reduce variable costs, but increase fixed costs, and together with differences between trade costs for intermediate goods and final goods these factors may supplementary play a role for the advantage/disadvantage of an export-platform strategy compared to other MNE strategies or ordinary exports.

As stated by Grossman et al. (2004), one important limitation in these theoretical papers on export-platform FDI is that they take it for granted that firms produce their own intermediate goods and perform assembly in-house. In other words, outsourcing through contracts is not possible. In another paper, Grossman and Helpman (2002) show the choice between outsourcing and integration through FDI as a trade-off between incomplete contracts in arm's-lengths relationships versus less efficient integration within MNEs. And Antras and Helpman (2004) have shown which factors are crucial if final good producing companies in high-income countries choose to make relation-specific investments within an integrated company or in arm's-length relationship with sub-suppliers domestically or in foreign countries. Decisive variables include e.g. wage differences between final good producing countries and sourcing countries, trade costs, the size of ownership advantage, and the intensity of headquarter services. Companies with a low intensity in headquarter services (ownership advantages are not very important) are shown not to integrate, but to outsource through contracts. Since these results are company- and industry-specific, it is difficult to make generalizations or hypotheses if vertical integration or outsourcing is the dominant pattern for foreign companies' imports of intermediate goods from low wage countries.

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<sup>13</sup> Grossman et al. (2004) have this flexible assumption, while Ekholm et al. (2007) assume the intermediate good to be produced in the home country.

<sup>14</sup> A main difference between Ekholm et al. (2007) and Grossman et al. (2004) is that the latter assumes heterogeneity with respect to productivity among the firms in an industry.

In this paper, we aim to determine the extent to which multinational enterprises will be attracted to a low-costs country like Poland that is located near the EU market making it a potential export platform. More specifically, we will investigate, whether MNEs' influence on Polish exports is through vertically integrated affiliates (exports of intermediate goods), through export-platform FDI (exports of final goods) or both. We base our empirical investigation on the fact that trade in intermediate inputs in empirical investigations has been used as a proxy for outsourcing and intra-firm trade (see Hummels et al., 2001; and Yeats, 2001). A priori it is difficult to have clear expectations, which type of foreign influence dominates. The low production costs of Poland compared to its western neighbours may make Poland an ideal place for both vertically integrated MNEs and export-platform activities. But the size of the Polish market may reduce the importance of the export-platform type of foreign activity. Given export-platform FDIs are of importance, global export-platform FDI probably dominates for MNEs with headquarters in the EU, while third-country export-platform FDIs probably dominate for non-European MNEs.

If the foreign influence on Polish exports is mainly through exporting final goods to other countries and not exporting intermediate goods to the parent companies of the multinational enterprises, then exports of intermediate goods from Poland are primarily expected to be through 'outsourcing' that is finding a partner with which a firm can establish a bilateral relationship and having the partner undertake relationship-specific investments so that it becomes able to produce goods or services that fit the firm's specific needs. In some industries like the clothing industry the ownership control aspect may be of relative little importance, for which reason outsourcing may be chosen.<sup>15</sup> In other, more technology-intensive industries, the ownership protection aspect may dominate, for which reason vertical integration is chosen. The growth of institutional quality in Poland may reduce the importance of protection through integration.

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<sup>15</sup> This argument may also be related to the fact of a 'Global Shifting' phenomenon, where expectations of wage increases in Poland within a few years may make Poland a too costly place of production for simple products, like e.g. clothing.

#### **IV. Empirical literature**

In a very illustrative review article, Bloningen (2005) provides an overview of the quite substantial empirical literature on FDI determinants. Although most empirical papers only investigate the more traditional dichotomy of horizontal and vertical FDI, newer empirical findings point to the importance of export-platform FDI. For instance Ekholm et al. (2007) show that US affiliates located inside a free-trade area (e.g. NAFTA or EU) concentrate their exports to other countries in the free-trade area. Furthermore, the authors point out that the expansion of the European Union tends to shift export-platform production toward the lower-income new member states. Hanson et al. (2001, 2005) find strong evidence for vertical FDI and therefore challenge the prevailing academic view about the relative importance of horizontal and vertical FDI. Their findings based on US firm-level data also lend strong support to the relevance of export-platform FDI, which mainly takes place in less skill-intensive industries and is promoted by scale economies, low host-country trade barriers and discouraged by large host-country markets. Using firm-level data, Girma et al. (2005) focus on the importance of regional trade agreements (EU) for exports of foreign acquisitions in the UK. Their findings suggest that non-EU investors who acquire UK firms increase their exports to other EU countries which is consistent with an export-platform strategy.

A number of papers have applied spatial econometric techniques to allow for the interdependence of FDI across possible host countries. Bloningen et al. (2004) find evidence (for US outbound FDI data) consistent with export-platform FDI in Europe. The main idea is that MNEs' decisions are multilateral and not (as assumed in most empirical FDI literature) bilateral lacking dependence between host destinations (like in the paper of Hanson et al. (2001) and Ekholm et al. (2007)). Because of plant-level fixed costs there may be incentives to concentrate production in one host country with few incentives to have plants in nearby countries all balanced against trade costs that increase with distance. With a different sample of countries and industries, Baltagi et al. (2007) find support for third-country effects and therefore the existence of various modes of complex FDI like export-platform. The main difference with respect to data in the spatial econometrical models and the more traditional empirical work mentioned at the

beginning of this section is that the latter group uses firm-level data while the spatial group of models uses country/industry aggregates.

## V. Empirical model and estimation

We will assess the relevance of export-platform FDI in Poland by estimating variants of sectoral export functions for a panel of 20 manufacturing industries for the years 1994-2002 and by subsequently differentiating between export performance in intermediate and final goods. Differentiating between exports of different goods types is essential as increased aggregate export performance is consistent with different multinationals' strategies, namely export-platform and vertical FDI. However, when looking at different types of goods, export-platform FDI should only be positively related to final goods exports while low cost seeking vertical FDI should be positively related to intermediate goods exports. We will use this relationship to identify the relevance of the alternative multinational strategies and estimate the following export function for total, intermediate and final goods, respectively:

$$\ln EXP_{it}^{Type} = \alpha + \beta_{FP} \ln FP_{it} + \beta_{FPO} \ln FPO_{it} + \beta_{LAB} \ln LAB_{it} + \beta_{SCALE} \ln SCALE_{it} + TREND + \mu_i + \delta_t + \varepsilon_{it} \quad (1)$$

where  $EXP_{it}^{Type}$  denotes export performance calculated as the export to sales ratio of industry  $i$  at time  $t$  for total ( $Type=Total$ ), intermediate ( $Type=Intermediate$ ) and final ( $Type=Final$ ) goods exports, respectively.

$FP$  denotes foreign presence, i.e. the extent to which MNEs dominate the given industry measured by the share of foreign capital (equity) in total capital (equity) in the given industry. We also control for the foreign presence in all other industries ( $FPO$ ) to account for possible inter-industry linkages and spillovers measured for each industry as the ratio of foreign equity capital over sales in respectively all other industries. Our additional control variables include industries' labour intensity ( $LAB$ ) capturing costs of labour relative to other factors of production and the industries average company size (real sales divided by number of companies) capturing scale economies ( $SCALE$ ).

Furthermore, we allow for a linear time trend (*TREND*) and include a set of time dummies  $\delta_t$  capturing common developments across industries. In addition, we allow for industry unobserved time constant characteristics  $\mu_i$ . The remaining error term  $\varepsilon_{it}$  is assumed to be independently distributed and allowed to be heteroscedastic.<sup>16</sup>

In terms of expected coefficients, a positive significant coefficient  $\beta_{FP}$  in the total export regression would be consistent with an important role of either export-platform FDI, vertical FDI or both. However, if export-platform FDI is indeed a relevant strategy of multinationals in Poland, we expect  $\beta_{FP}$  to be significant and to take on a positive sign in the final goods export performance regression. A positive and significant  $\beta_{FP}$  in the intermediate goods export regression, on the other hand, would indicate the relevance of vertical FDI.

With regard to  $\beta_{FPO}$ , we expect a positive and significant coefficient if there are indeed important direct inter-industry linkages or unspecified spillovers that increase an industry's export performance. Our expectations concerning  $\beta_{LAB}$  and  $\beta_{SCALE}$  are ambiguous. It is essentially an empirical question to what extent changes in an industry's relative labour costs or scale economies affect export performance.

A potential problem that could bias our coefficient estimates is simultaneity between export performance and some of our industry-level regressors. However, using one- to three-year lagged values as instruments we cannot reject the exogeneity assumptions at reasonable confidence bounds as the C-tests reported in *Table 3* indicate.<sup>17</sup>

The analysis is based on aggregated manufacturing industry data for Poland for the period 1994-2002 based on a database created in cooperation with the Central Statistical Office of Poland. From this database with industry aggregates of all Polish companies with more than nine employees, we use NACE 2-digit information on real sales, number of companies, employment, and foreign capital share, where a foreign company is

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<sup>16</sup> We reject the identical distribution assumption due to group-wise heteroscedasticity. Furthermore, we adjusted our standard errors for contemporaneous correlation following Beck and Katz (1995). However, adjusted standard errors were actually smaller than the unadjusted ones. We therefore report the more conservative estimates.

<sup>17</sup> Specifically, we test for the exogeneity of foreign presence, relative labour costs and industries' scale. Without testing, foreign presence in other industries is considered clearly exogenous. In all specifications, we cannot reject exogeneity at least at the five per cent level.

defined as a company with a foreign capital share equal to or greater than 10% of total equity. For trade figures, we use OECD Commodity Trade Statistics divided into trade in final and intermediate goods based on the UN Broad Economic Categories (BEC) decomposition. Descriptive statistics on all variables are presented in Table A1.

The parameter estimates for Equation 1 with heteroscedasticity robust standard errors are presented in *Table 3*. When looking at total export performance (Column I), industry-level MNE presence ( $\ln FP$ ) is rendered insignificant. However, we find a positive weakly statistically significant coefficient on the foreign presence indicator in other industries ( $\ln FPO$ ).

**Table 3. Regressions results (Dummy OLS)**

	<i>ln(Export to sales ratio)</i>		
	<b>Total Trade</b>	<b>Intermediate Goods</b>	<b>Final Goods</b>
	(I)	(II)	(III)
<i>ln FP</i>	0.099 [0.1209]	0.0294 [0.1395]	0.1642 [0.1203]
<i>ln FPO</i>	4.3316 [2.4223]*	4.0877 [3.5815]	5.7102 [3.0279]*
<i>ln LAB</i>	-0.0749 [0.4098]	0.296 [0.3805]	-0.4559 [0.4895]
<i>ln Scale</i>	-1.172 [0.1808]***	-1.2181 [0.2103]***	-1.1539 [0.1638]***
<i>TREND</i>	-0.197 [0.1320]	-0.1374 [0.1857]	-0.2834 [0.1643]*
<i>Constant</i>	25.1808 [3.8549]***	29.7983 [4.8339]***	20.4895 [4.5044]***
Year-dummies	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes
Observations	179	179	179
R <sup>2</sup>	0.91	0.93	0.93
Exogeneity tests			
C statistic for $\ln FP$	1.997	0.127	0.099
p-val	0.158	0.721	0.752
C statistic for $\ln LAB$	0.631	0.673	0.937
p-val	0.427	0.412	0.333
C statistic for $\ln Scale$	1.690	1.046	1.779
p-val	0.194	0.307	0.182

Notes: Standard errors in brackets, heteroskedasticity robust.  
\*\*\* significant at the 1%, \*\* at the 5%, \* at the 10% level .

Thus, there is some evidence that FDI through unspecified spillover effects indirectly raises aggregate export performance. However, when focusing on intermediate goods export performance (Column II), all MNE presence related coefficients are rendered insignificant. Hence, we find no evidence in support of vertical FDI. If Poland indeed serves as a low cost production site for intermediate goods, as one might expect, then this takes place via arm's-length trade rather than through increased FDI.

Furthermore, when looking at isolated final goods exports (Column III), the coefficient on MNE presence in the same industries ( $\ln FP$ ) is sizable but not identified with enough precision while we find MNE presence in other industries ( $\ln FPO$ ) to have a positive and weakly statistical significant effect on final goods export performance. Thus, the export performance raising spillover effect we have identified in Column I for aggregate exports mainly arises through increases in final goods export performance.

Arguably, strategies of multinationals in Poland and the associated export performance might have undergone significant changes since the early 1990s as economic transition proceeded. In order to identify potential strategy changes of multinationals, we interact our foreign presence measures with a linear time trend and estimate the following equation:

$$\begin{aligned} \ln EXP^{Type}_{it} = & \alpha + \beta_{FP} \ln FP_{it} + \beta_{FPT} \ln FP_{it} \times TREND \\ & + \beta_{FPO} \ln FPO_{it} + \beta_{FPO} \ln FPO_{it} \times TREND \\ & + \beta_{LAB} \ln LAB_{it} + \beta_{SCALE} \ln SCALE_{it} + TREND + \mu_i + \delta_t + \varepsilon_{it} \end{aligned} \quad (2)$$

The corresponding parameter estimates are reported in *Table 4*. Contrary to the previous regression documented in Column I of *Table 3* we find significant coefficients on our industry-level foreign presence measure when looking at aggregated total export performance (Column I, *Table 4*). This positive effect, however, is concentrated towards the end of our sample period as the statistically significant coefficients on  $\ln FP$  and the interaction term  $\ln FP \times TREND$  indicate. While, initially at the beginning of the 1990s, MNE presence actually lowered an industry's overall export performance, a one per cent increase in the industry-level foreign capital share raises overall export performance by about 0.5 per cent in 2002. Furthermore, differing from our findings in *Table 3* there is no evidence of any indirect export performance raising effects of MNE presence in other industries.

**Table 4. Regression results interacted (Dummy OLS)**

	<i>ln(Export to sales ratio)</i>		
	<b>Total Trade (I)</b>	<b>Intermediate Goods (II)</b>	<b>Final Goods (III)</b>
<i>ln FP</i>	-0.3033 [0.1412]**	-0.1585 [0.1811]	-0.5448 [0.1612]***
<i>ln (FP*TREND)</i>	0.0977 [0.0254]***	0.0455 [0.0303]	0.1723 [0.0324]***
<i>ln FPO</i>	-0.806 [2.2139]	3.5727 [4.1120]	-5.0861 [2.2724]**
<i>ln (FPO*TREND)</i>	0.7353 [0.4903]	-0.9553 [0.7173]	2.4954 [0.5307]***
<i>ln LAB</i>	-0.2171 [0.4037]	0.3906 [0.3674]	-0.8551 [0.4560]*
<i>ln Scale</i>	-1.2644 [0.1701]***	-1.2183 [0.1954]***	-1.3564 [0.1518]***
<i>TREND</i>	0.5515 [0.3476]	-0.5878 [0.5558]	1.7749 [0.3655]***
<i>Constant</i>	19.6344 [4.2616]***	29.9511 [5.4494]***	8.1796 [4.7724]*
Year-dummies	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes
Observations	179	179	179
R <sup>2</sup>	0.93	0.93	0.94

Notes: Standard errors in brackets, heteroskedasticity robust.

\*\*\* significant at the 1%, \*\* at the 5%, \* at the 10% level .

Focusing on export performance with respect to intermediate goods, we again find no evidence for a significant role of MNE presence. Thus, our findings from Table 3 are confirmed, over the whole sample period input sourcing appears to take place mainly through arm's-length trade and not through FDI.

When looking at isolated final goods export performance (Table 4, Column III), we now find a significant negative coefficient on our industry-level foreign presence measure *lnFP* and a statistically significant positive coefficient on the interaction term (*lnFP* × *TREND*). This indicates that over the sample period the role of export-platform FDI has increased significantly. Differentiating with respect to *lnFP* shows that while initially in 1994 a one per cent increase in the foreign presence measure hypothetically would actually have lowered the industry export to sales ratio, four years later a one per cent increase in the foreign presence measure would already have raised export

performance by around 0.14 per cent while in 2002 a one per cent increase in our foreign presence measure would have raised industries' export performance by around 0.83 per cent. A similar story holds for multinationals' presence in other industries. While at the beginning of our sample period an increase in our external foreign presence measure (*ln FPO*) hypothetically would have lowered the industry's final goods export performance, towards the end of our sample period a one per cent increase in our external foreign presence measure would have raised export performance by 15%. Thus, we find strong evidence for a growing role of export-platform FDI.

**Table 5. Regression results interacted (Dummy OLS) - reduced sample**

	<i>ln(Export to sales ratio)</i>		
	<b>Total Trade (I)</b>	<b>Intermediate Goods (II)</b>	<b>Final Goods (III)</b>
<i>ln FP</i>	-0.0882 [0.0986]	0.0903 [0.1699]	-0.4121 [0.1507]***
<i>ln (FP*TREND)</i>	0.061 [0.0204]***	0.0033 [0.0268]	0.1495 [0.0341]***
<i>ln FPO</i>	-0.1951 [2.2409]	4.4127 [4.3561]	-4.6498 [2.4098]*
<i>ln (FPO*TREND)</i>	0.4473 [0.4048]	-1.3164 [0.6957]*	2.4145 [0.5047]***
<i>ln LAB</i>	-0.1308 [0.2836]	0.4567 [0.2417]*	-0.914 [0.3870]**
<i>ln Scale</i>	-0.6056 [0.1706]***	-0.5065 [0.1965]**	-0.9547 [0.2485]***
<i>TREND</i>	0.32 [0.3030]	-0.8837 [0.5477]	1.6791 [0.3606]***
<i>Constant</i>	8.3039 [4.0742]**	16.1409 [6.0768]***	1.0229 [5.0151]
Year-dummies	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes
Observations	162	162	162
R <sup>2</sup>	0.91	0.94	0.93

Notes: Standard errors in brackets, heteroskedasticity robust.

\*\*\* significant at the 1%, \*\* at the 5%, \* at te 10% level .

As a final exercise, we check for the robustness of our findings when excluding industries with extraordinary export shares in total sales and remove the industries manufacturing wearing apparel as well as coke and petroleum from our sample (see summary statistics in Table A1). The respective parameter estimates for the reduced sample are reported in

*Table 5.* Although coefficients change slightly, our general findings are not altered. MNE presence only raises export performance with respect to final goods trade and the effect is concentrated towards the end of our sample period suggesting an increasing role of export-platform FDI.

## **VI. Conclusions**

This paper adds to the sparse empirical literature on export-platform FDI by investigating the link between export performance and foreign control utilizing trade and industry data for Polish manufacturing industries for the years 1994-2002. By splitting the Polish trade into final and intermediate goods, we assess the impact of foreign-owned capital on the respective export performance of Polish industries

Our results show a significant role of export-platform FDI into Poland, while the importance of FDI for vertical integration is limited suggesting that the sourcing of intermediate goods from Poland primarily occurs through arm's-length contractual outsourcing instead of in-house sourcing of multinational enterprises. The paper also suggests that over the sample period, during which Poland has evolved into a relatively stable economic environment, the role of export-platform FDI has increased significantly. These results are robust to a number of different specifications of the regression model.

In the course of the transition period (1994-2002), Poland has attracted MNEs increasingly using Poland as an export platform instead of a location for producing intermediates for further processing outside the country. This process could be advantageous for Poland because export-platform-oriented MNEs are more locally grounded than vertically integrated MNEs searching for low production costs and therefore orienting themselves eastwardly when the wage level in Poland converges to EU average level.

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## VIII. Appendix

**Table A1: Descriptive Statistics**

<b>NACE - Manufacturing Industries</b>	<b>Average export intensity total</b>	<b>Average export intensity for intermediate goods</b>	<b>Average export intensity for final goods</b>	<b>Average foreign presence</b>	<b>Average foreign presence in other industries</b>	<b>Average labour intensity</b>	<b>Average scale economies</b>
Total Manufacturing	0.38	0.17	0.22	0.53		0.00001	12200000
15 Food products and beverages	0.17	0.03	0.14	0.53	0.46	0.00001	15079735
16 Tobacco products	0.02	0.00	0.00	0.59	0.47	0.00000	354700000
17 Textiles	0.52	0.21	0.31	0.24	0.48	0.00003	8670110
18 Wearing apparel, dressing a and dyeing of fur	2.04	0.04	2.00	0.49	0.47	0.00004	3234012
19 Tanning and dressing of leather, luggage, handbags, etc.	0.97	0.18	0.78	0.18	0.48	0.00003	5264949
20 Wood and products of wood, except furniture	0.66	0.62	0.04	0.35	0.48	0.00002	5826421
21 Pulp, paper and paper products	0.39	0.30	0.09	0.74	0.47	0.00001	17640774
22 Publishing, printing and reproduction of recorded media	0.09	0.02	0.07	0.56	0.47	0.00001	6616282

23 Coke, refined petroleum products and nuclear fuel	7.72	5.47	2.25	0.53	0.49	0.00000	544000000
24 Chemicals and chemicals products	0.32	0.24	0.08	0.47	0.48	0.00001	31284809
25 Rubber and plastic products	0.31	0.21	0.10	0.56	0.47	0.00001	7832935
26 Other non-metallic products	0.25	0.17	0.08	0.68	0.46	0.00002	8800154
27 Basic metals	0.58	0.58	0.00	0.11	0.52	0.00001	42792411
28 Fabricated metal products, except machinery and equipment	0.53	0.44	0.08	0.43	0.48	0.00002	5520276
29 Machinery and equipment	0.43	0.19	0.24	0.18	0.50	0.00002	7832683
30 Office machinery and computers	0.21	0.06	0.14	0.64	0.47	0.00000	16100674
31 Electrical machinery and apparatus	0.57	0.44	0.13	0.47	0.48	0.00001	14124681
32 Radio, television and communication equipment	0.50	0.23	0.26	0.68	0.47	0.00001	20003078
33 Medical , precision and optical instruments, watches and clocks	0.26	0.05	0.21	0.46	0.47	0.00002	6117750
34 Motor vehicles, trailers and semi-trailers	0.44	0.18	0.27	0.83	0.44	0.00001	50283196
35 Other equipment	0.79	0.06	0.72	0.18	0.48	0.00002	19409052
36 Furniture, manufacturing n.e.c	0.99	0.09	0.90	0.60	0.47	0.00002	8162901

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