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NOT ALL THAT GLITTERS
THE DIRECT EFFECTS OF PRIVATIZATION
THROUGH FOREIGN INVESTMENT

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Not all that glitters
The direct effects of privatization through foreign investment

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Abstract

Although foreign subsidiaries usually perform better than the average of the hosting economies, empirical literature has also established that the selection effect is statistically significant. In this paper we attempt to evaluate its economic relevance, using a unique dataset of annual financial reports by all medium and large Polish enterprises over a period 1996-2007. We match firms privatized with the use of FDI to a control group of non-privatized state owned companies in order to disentangle the effect of self-selection and FDI entry.

Evidence suggests that although FDI enters more frequently into companies who already participate in the international trading networks, roughly half of the export intensity differential may be attributed to the entry of FDI. On the other hand, selection effects seem to dominate as far as efficiency is concerned, while only towards the end of the sample the positive effect of FDI on profitability may be confirmed.

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Keywords:

privatization, transition, propensity score matching, firm-level analysis, Poland

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1 Introduction

In a recent study, Denisova, Eller, Frye and Zhuravskaya (2009) view privatization as a form of a game between the market and the state. The extent to which the foreign ownership is allowed may depend, among other factors, on the concentration of political power in a given country. At the same time, foreign entry may be either complementary or substitute to improving market institutions. However, in most of the transition countries in Europe, the shift from centrally-planned to market economies is over and the transition process is largely irreversible, but little evidence exists on the effects of privatization involving foreign capital.

The post-privatization performance superiority of the foreign affiliates' can be in principle attributed to two effects: a true gain in efficiency (e.g. through internationalization) and non-random selection of privatized firms. These effects cannot be disentangled on aggregate or sectoral level. Evaluating the empirical evidence from the market economies, Girma, Greenaway and Wakelin (2001) and Greenaway, Sousa and Wakelin (2004) confirm, that the effect of selection is statistically significant. Subsequent research tried to control for the role the selection bias may play in the estimated effects of FDI entry. This bias may even be stronger in the context of privatization. Megginson and Netter (2001) point to the relevance of internal processes in the companies foreseeing privatization (e.g. pre-privatization restructuring). Indeed, DeWenter and Malatesta (2001) demonstrate that the boost in profitability of the state-owned enterprises precedes the event of privatization.

In this paper we attempt to go beyond the statistical significance in evaluating the contributions of the selection effect and the benefits of foreign entry in the context of privatization. We aim to disentangle the self-selection and the treatment effects of the FDI entry to state owned enterprises using firm-level data for a transition economy - Poland. We contribute to the literature in two ways. First, thanks to applying the propensity score matching technique, we may decompose the generally observed differential in performance into a part attributable to self-selection and a part attributable to the foreign ownership. Consequently, unlike studies that use Heckman (1979) correction, we are able to demonstrate the economic relevance of self-selection.

Second, contrary to a majority of previous studies for Central and Eastern European (CEE) countries, we use a large and representative data set. Instead of survey data - as customary in the literature - we use a panel of all medium and large enterprises over a decade of 1995-2007 in Poland. The data comes from the balance sheets and financial reports gathered consistently by the Central Statistical Office from all firms employing over 49 workers, which gives us a panel of over 20 000 different companies over the period of ten years. Thanks to the size of the data set we are able to control for both industry-specific and individual heterogeneity.

Findings suggest that indeed privatized foreign firms and state-owned firms differ. Foreign owned privatized companies have higher profits, invest more, are more efficient and more export-oriented. Moreover, our results show that in many cases, there is no convergence between the privatized firms with inward FDI and SOEs or firms privatized to domestic investor. However, when we decompose the FDI performance premia into effects of treatment (changes in performance induced by privatization through FDI) from selection (FDI entering into firms who already perform relatively better), the positive impact is no longer that evident. In fact, in majority of the cases the self-selection effect is dominant, while FDI contribution is decisive for export share and - over a few years - for the investment intensity. As far as the profitability and technical efficiency is concerned, self-selection seems to be a very strong factor - more efficient state owned firms are privatized to a foreign investor more easily than others.

The paper is organized as follows. In the next section we briefly review the literature on the effects of privatization and foreign entry, with the special emphasis on the transition countries. We then move to describing the data in Section 3. In Section 4 we discuss in detail the employed methodology. Section 5 presents the results of the analysis. In the concluding remarks we discuss the policy implications emerging from this study.

2 Literature review

Firms' responses to liberalization of markets are also likely to be heterogeneous. Technologically more advanced enterprises are potentially more apt in adapting by further increasing investment in new technologies and production processes. On the other hand, firms lagging behind may require public support (e.g. strategic investment). Girma, Greenaway and Wakelin (2001) were about the first to actually microeconometrically evaluate whether there indeed are direct positive effects of FDI entry into an economy. Controlling for foreign entry into sectors of economy at a very disaggregate level, they find that although the level and growth effects may be confirmed (foreign owned companies have higher productivity and productivity growth rates than the locals), there is no evidence supporting the increase in growth rates following FDI entry nor the performance spillovers from foreign to local companies. Therefore, Girma, Greenaway and Wakelin (2001) argue that the response to FDI presence may be heterogeneous, for some companies beneficial to the performance, for others - detrimental, and on average undetermined. Also Görg and Greenaway (2004) argue that the empirical firm-level evidence in support of the positive direct and indirect FDI effects is rather mixed and provide some policy context why such effects may not be confirmed, despite the strong theoretical underpinnings. Girma (2005) points to the threshold effects for example, while Sabirianova Peter, Svejnar and Terrell (2004) advocate in favor of the absorption capacity arguments. More recently, Wang and Yu (2007) demonstrated using the data for China, that in fact both these effects may combine, yielding a so-called curvilinear effect¹, while the absorptive capacity has been at the core of analyses concerning the transition and developing countries. The recent examples include Gorodnichenko, Svejnar and Terrell (2007) analyzing 17 transition economies. A large body of empirical studies analyzing Indian and Indonesian data may be found in Lipsey and Sjöholm (2004).

Privatization seems to raise substantially less controversies. Privatization is believed to improve the performance of firms, while in the case of privatization *via* FDI the effect is shown to be stronger. The privatized companies perform better after the change of ownership form, as demonstrated by Megginson, Nash and van Randenborgh (1994) for UK, Lopez-de Silanes, Shleifer and Vishny (1997) for US; Harper (2002) for Czech Republic. The earlier literature compared also the performance of privatized to the non-privatized firms - Anderson, Claessens, Djankov and Pohl (1997) and Vining and Boardman (1992) - finding superiority of the former.

However, the timing and the mode of privatization seems to matter indeed. Using firm-level evidence from CEECs and Russia, Sabirianova Peter, Svejnar and Terrell (2004) demonstrate that at the beginning of the transformation processes the productivity gap referenced to the global efficiency frontier actually increases despite foreign entry and privatization. They justify this finding by arguing that the effects of FDI entry and technology spillovers may indeed take some time to materialize. Also firm-level effects are likely to differ depending on the definition of the efficiency frontier - evidence seems to support catching up to the national frontier for the privatized firms, but the global frontier may indeed be "running away". This assertion is corroborated by Bartelsman, Haskel and Martin (2008) and Gorodnichenko, Svejnar and Terrell (2007). On the other hand, in a recent study, Gupta, Ham and Svejnar (2008) forcefully argue, that performance improves already *before* privatization, which lowers the statistical significance of the "privatization dummy" despite the actual relevance of the whole economic process.

The meta-analyses, using the abundant literature in the field, reach similar conclusions. Djankov and Murrell (2002) finds a generally positive effect of privatization in both CEECs and CIS and confirms that privatization is more "profound" if it takes place through FDI. However, he also points to the fact, that controlling for endogeneity is crucial for the reliability of the findings and demonstrates that over a half of studies did not adequately control for the self-selection effects. More recently, Estrin, Hanousek, Kocenda and Svejnar (2009) include recent studies and argue that privatization leads to a much better firm efficiency if performed through a foreign investor. However, they also find that with the domestic investors the results are even opposite. Majority shareholding - widely opposed to in transition countries - seems to improve the performance of privatized firms. Moreover, privatization is not associated with employment reductions: "private owners tend to keep employment at higher levels than state-owned firms, *ceteris paribus*" (p. 44).

¹ Empirical advances in the field have been carefully reviewed by Crespo and Fontoura (2007)

Summarizing, the literature has so far shown mostly beneficial effects of privatization, especially privatization through a foreign investor. However, the response of firms to the change of ownership as well as the foreign investor depends crucially on the inherent heterogeneity of firms. The role of the self-selection has been either overlooked or tackled with the use of Heckman (1979) correction, which does not permit the evaluation of its economic significance. Following the recommendation of Djankov and Murrell (2002), we develop a framework basing on the propensity score matching (PSM) technique in order to control for the non-random selection of privatized enterprises. Recently, also Chari, Chen and Dominguez (2009) applied this technique to evaluate the post-acquisition performance of publicly traded U.S. firms that have been acquired by owners from emerging markets over the period 1980-2007.

The non-parametric approach of PSM allows not only to control for the potential self-selection effects, but also to provide reliable estimates of their size. We address the direct effects of privatization through FDI, by analyzing the effect of foreign ownership on state owned enterprises that were privatized to a foreign investor. We compare their performance to the reference group of companies that were either privatized to a domestic investor or not privatized at all. If anywhere - benefits of FDI should be strongest in this context.

3 Data and empirical strategy

Typically, in this strand of literature dedicated survey based data sets are employed², which happens both for the sake of cross-country comparison and due to the fact that usually other data sets are not available. The data set used in this study comes from financial reports and balance sheets of all Polish enterprises employing 49 employees or more and covers the period of 1995-2007.

Data is collected on a quarterly basis by the Central Statistical Office of Poland. The firms covered by our sample constitute a significant part of the economy: they employ roughly 29% of the total working population of the national economy and 42% of all persons employed on a contract basis. The choice of the sampling period is determined by the data availability³. The data is a panel, as each company has a unique identifier. The total number of observations exceeds 260 000 over a period of 8 years (roughly 40 thousand companies each year). To the best of our knowledge, this is the first time these non-survey data are used for this type of analysis.

Since this is not a dedicated dataset, the event of privatization had to be identified from the raw data. Using the information on the form of ownership, the year of the change in ownership is treated as the moment of privatization. However, this operationalization may raise some doubts from the managerial perspective. Namely, although the companies are identifiable in the sample, their identity is not known, while the identification is based on a registration number⁴. However, economic understanding of a firm extends beyond the legal entity and entails the employees and the assets. In our data set if the same "operations" re-open activity under a new name, the registration number is new as well. Thus, a potential limitation of our data set emerges, i.e. it is impossible to identify as privatization such changes of ownership which involved either bankruptcy or liquidation of the legal entity and subsequent re-opening.

However, this last issue does not seem to be quantitatively important. Namely, neither exit rates (i.e. the share of companies that disappear from registry between years) nor entry rates (i.e. the share of companies that appear for the first time in a particular year) seem to be phenomena underlying the reliability of our approach, Figure (1). In fact, exit rates are proportionally much higher among the general population of medium and large enterprises in general than among SOEs and of much smaller magnitude, too. Entry rates are substantially higher than exits from state sector, on the other hand. This implies that the potential share of the actually privatised SOEs that cannot be identified in our database because they exited and returned to the sample under a different registration number - is very low and cannot drive the results.

² Konings (2001), Schoors and Van Der Tol (2002), Sabirianova Peter, Svejnar and Terrell (2004), Sabirianova, Svejnar and Terrell (2005), like the majority of other studies, use Amadeus data set, Gorodnichenko, Svejnar and Terrell (2007) use Business Environment and Enterprise Performance Survey, while Bartelsman, Haskel and Martin (2008) uses ICOP database.

³ The data has been gathered by the Polish Central Statistical Office as of 1993, but the methodological changes prevent extending the analyzed period before 1995.

⁴ Any business operation located in Poland needs to have a unique registration number. When the firm is closed, its registration number cannot be allocated to another firm.

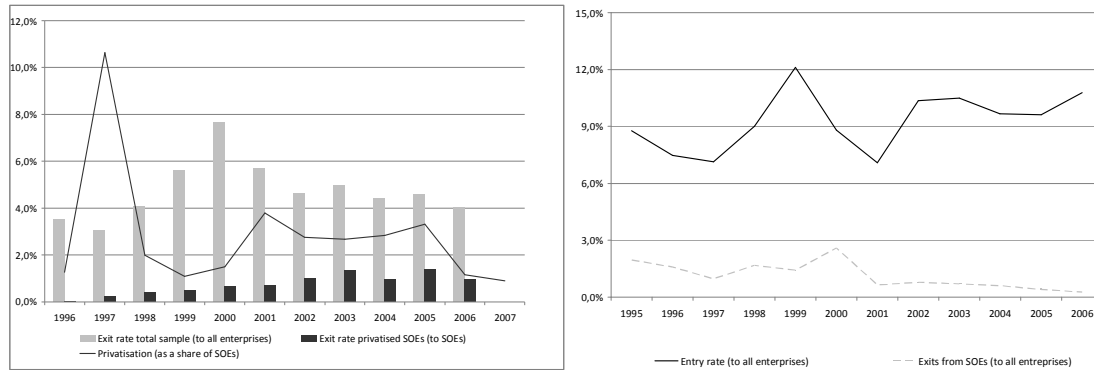


Figure 1: Entry and exit rates for the analysed sample (left panel); exits from SOEs and entry rates (right panel)

3.1 Data description

The database comprises all enterprises from the manufacturing sector (sections C, D and E) and from market services (sections G, H, I and K), employing at more than 49 persons, full-time equivalent. The data contains balance sheets and profit statement by the companies, as well as the stock of employed at the end of the year. All of the companies in the sample are subject to the same accounting regulations, thus making the data comparable across firms. However, the accounting regulations have changed over the analyzed period, while the companies also report nominal - not real - values on their balance sheets. Thus, comparing directly variables like profits, revenues, assets or investment across time would be methodologically doubtful.

Apart from the financial information, the data set allows to determine the form of ownership. In particular, the data set shows whether a firm is state owned, private or has a share of foreign ownership (alternatively, it may be completely owned by a foreign entity, which is also coded in the data set). Unfortunately, it is not possible to determine the share of foreign ownership (forms are categorized but detailed ownership data are not reported). We define a firm as foreign affiliate if majority of equity is owned by non-residents.

Using the categorical variables describing the form of ownership, we are able to identify cases of firms where foreign direct investment is present. We are also able to specify state ownership - either as state-owned or the so called “sole shareholder company of the State Treasury” - usually a transitory form of ownership post-commercialization and pre-privatization of many SOEs. Furthermore, observing the enterprises across time we are able to observe changes of the ownership form. For the purpose of this analysis we consider firm privatized whenever the ownership type changes from any of the two forms of state ownership to any private one. Intersecting these two dimensions - companies with foreign owner at each point in time with privatization in a particular year - we are able to diagnose the privatization to a foreign investor.

Finally, the data set contains the information about the total employment in every firm (full-time equivalent) and industry (two-digit NACE code).

3.2 Variables definition

The original data set contains: profits, assets, own capital, investment, revenues and revenues from exports, raw materials costs, and the energy costs. Based on these direct indicators variables, we specify a number of additional variables, (e.g. return on assets measured as profit over assets; or internationalization proxied by the share of revenues from exports in total revenues). We are also able to derive energy intensity (a share of energy costs in total costs) and scale many variables - e.g. profits and investment - by the headcount in each enterprise.

We have also decided to define additional variable measuring the efficiency of a particular enterprise. With the use of the stochastic frontier in a panel version we have estimated time dependent technical

efficiency scores for each company in the sample. Revenues were the output variable, while employment, energy, raw materials constituted inputs. Estimations were performed controlling for industry (frontier estimated separately for two-digit NACE industries) using time-varying decay model with the parameterization of time-effects following Battese and Coelli (1995). The assumption of constant returns to scale was strongly rejected for each industry and each year. The technical efficiency scores are naturally relative, but have been benchmarked to the industry-specific average to avoid confusion. Thus, negative values signify industry-relative underperformance and the opposite is true for the positive values.

The available variables are used in the subsequent analysis in two ways: for matching and for evaluating performance.

- First, firm specific characteristics that investor may know *ex ante* are used for matching. These include company size *i.e.* assets, capital and employment. The variables are taken for the face value while the nominal effects are no longer relevant because matching is performed for each year separately. However, to make sure that matching procedure weights similarly all three aspects of company size, we have additionally created categorical variables for each of the three original size measures. Basing on their distributions deciles were generated, these categories were subsequently transformed into dummies and interacted. Consequently, we are matching on all of these characteristics with the same weight. We also control for the capital intensity, energy intensity and turnover. We also include an exporter dummy (but not the share of export revenues in sales), following the rationale, that actual foreign revenues are a measure of outcome while *per se* presence in the foreign markets is company characteristic.
- The second group of the variables are our performance measures - they are known to an econometrician *ex post*, but could not have been known to the investor at the moment of privatization. Consequently, they measure the performance of companies - both privatized and control group - but they could have not affected the decision of the foreign investor to acquire a particular SOE. These variables include: technical efficiency (estimated through the stochastic frontier), return on assets, internationalization (share of export revenues in sales), investment (scaled by assets and by employment) as well as profits over employment.

3.3 Data properties

The initial sample contained over 260 000 observations for over 40 000 enterprises present in the panel for - on average - 6.8 years. Unfortunately, this data set is not flawless and contains some erroneous observations (*e.g.* companies with under 49 employees, occasionally negative values of revenues, material costs or employment), which had to be eliminated. Subsequently, we have inspected each of the key variables to observe if the data set contained outliers. Since profits (expressed both in relation to the assets and to overall employment) exhibited few considerable outliers, we have cut 0.5% from both tails of the distributions. The resulting data set contains 188 691 observations for 40 152 enterprises over 6.8 years on average. All subsequent econometric procedures (including the technical efficiency estimation) were conducted on a reduced data set. Data properties are presented in Table 1.

Table 1: Data properties

Variable	Full Sample	Foreign owned firms	Privatized firms
Revenues	53 121.68 (344 804.5)	145 273.6 (468 378.6)	174 726.6 (1 171 342)
Energy costs	1 231.14 (9 719.079)	1 898.97 (11 210.05)	4 598.81 (25 393.46)
Raw materials	16 380.69 (140 037.1)	45 064.28 (252 065.5)	22 613.24 (232 392.8)
Employment	197.72 (1 282.76)	304.10 (796.83)	451.47 (1 477.35)
Assets/Employment	194.04 (1 102.35)	330.90 (1 337.53)	267.07 (1 127.48)
Own capital	22 516.04 (204 890.7)	44 031.44 (235 929.9)	82 610.53 (619 074.7)
% of exporting SOE	.0926 (.29)	.0426 (.20)	.7232 (.45)
Technical efficiency	.2003 (.29)	.2075 (.30)	.0736 (.16)
% of exporters	.4486 (.49)	.7996 (.40)	.7232 (.44)
% of formerly SOE	.2034 (.40)	.0567 (.23)	
Share of exports in revenues	.1105 (.29)	.3362 (.37)	.1651 (.22)
% of foreign owned	.1092 (.31)		.1753 (.38)
% of privatized	.0339 (.18)	.0545 (.23)	
Observations	188 691	20 606	6 406

Note: SOE denotes state-owned enterprises. All monetary values expressed in current Polish zloty. Own calculations based on F-01 data sets. Standard deviations in the parentheses.

Visibly, foreign owned enterprises have on average lower employment, higher revenues, capital, exports share as well as share of exporters. On the other hand, former state-owned enterprises still exhibit employment overhang and high dependence on energy. Although due to the large size of the sample most of these averages could be proven to be in a statistically significant way different one from another - standard errors of these averages are considerable, pointing to large heterogeneity of the firms in the sample. Detailed characteristics taking into account the industrial composition of the sample are provided in the Data Appendix.

4 Empirical strategy

Propensity score matching is typically applied to estimate causal treatment effects (e.g. the effectiveness of labor market policies, pharmaceutical research or profitability of particular marketing solutions or the effect of institutions on economic development). Caliendo and Kopeinig (2008) discuss in detail the recent development in the area, as well as guide through the process of adequate construct of this approach. The critical element in propensity score matching lies in the conditional independence assumption. In other words, for the reliability of the results it is important that the selection is solely based on observed characteristics and that all variables that influence belonging to the shadow economy and potential earnings are simultaneously observed. In practice it implies that there should be no other sources of systematic (i) selection and (ii) outcome.

With propensity score matching, the quality of estimation depends much on the data availability. In the case of this study, the pool for matching (the size of the control sample in the relation to the size of the analyzed sample) is relatively large, so there is no need for sampling with replacement. We apply kernel estimates of propensity scores with the kernel density nearest neighbor matching, following Heckman, Ichimura, Smith and Todd (1998).

Although the set of variables is limited in this study, we believe relying on the cost structure as well as revenues, size of own capital, size of employment and individual characteristics (industry dummy interacted with the above variables) may be sufficient for the stability of propensity score matching approach and conformity with the conditional independence assumption. We verify this approach empirically by the use of *t*-tests, as suggested by Rosenbaum and Rubin (1983).

In particular, we perform a matching procedure based on the following variables: size (measured by assets), employment, costs structure (the share of the costs of energy and raw materials), capital intensity (measured by own capital over labor) and industry. In principle, for all continuous variables, decimal group categorical variables have been generated. Subsequently, all of the above listed variables were interacted for the purposes of higher efficiency in the matching procedure. After completing the matching procedure we estimate two first moments for the control group the treated group and the matched untreated group with respect to the following variables: (i) profits over assets, profits over employment, investment over assets, share of exports in revenues as well as technical efficiency parameter. These moments are estimated separately for each year. Finally, we decompose the initial differentials into self-selection and treatment components by comparing the moments for the matched untreated and treated to the size of the gap between the unmatched untreated and treated.

For the graphical representation of the results we chose the following way. First, for each of the analysis, we have separated the treated group, the control group and the reference group: these are privatized companies, matched “state ever companies” and all “state ever” companies, respectively. By computing the moments for each of the groups and each of the “output” measures we were able to define (i) the levels for unmatched untreated as opposed to the levels of treated at each point in time and (ii) decompose the differential to disentangle the effect of self-selection and the effect of treatment. This was obtained through computing the following decomposition:

$$\text{Outcome}_{\text{Treated}} - \text{Outcome}_{\text{Unmatched}} = (\text{Outcome}_{\text{Treated}} - \text{Outcome}_{\text{Matched}}) + (\text{Outcome}_{\text{Matched}} - \text{Outcome}_{\text{Unmatched}})$$

We call the former term in the brackets the “privatization effect” and the later “self-selection effect”. Since the size of differentials differ across variables and across time, at each point in time we have scaled it by the combined effect of “self-selection” and “privatization” (i.e. $O_T - O_{UM}$). Naturally, these differentials do not need to be positive - negative contributions signify that either of the effects was detrimental to the performance. Contributions are expressed as a share in pre-matching differential (i.e. $(O_M - O_{UM}) / (O_T - O_{UM})$ and $(O_T - O_M) / (O_T - O_{UM})$ for the purposes of comparisons across time and variables⁵).

5 Results

We define several structural indicators that help us characterize the performance, foreign market orientation and capital intensity of firms under consideration. We define the *Profits/Assets*, *Profits/Employment*, *Investment/Assets*, *Export share* and *Technical Efficiency* variables. Unfortunately, export revenues cover only direct exports, and not exports through other local firms, which may underestimate export value. The variables under consideration are summarized in the Table 2.

Table 2: Performance indicators

Variable	Full Sample	Foreign-owned firms	Privatized firms
Technical Efficiency	.1358 (.2597)	.1526 (.2694)	.0464 (.1122)
Profits/Assets	.0513 (.1734)	.0589 (.1435)	.007 (.1244)
Profits/Employment	10.1211 (145.1214)	24.958 (186.2487)	11.1696 (105.3916)
Investment/Assets	.0795 (.2521)	.0909 (.1137)	.0673 (.08)
Export/Revenues	.1211 (.3481)	.3432 (.3662)	.1669 (.2291)
Observations	125958	15546	5356

Note: Own calculations based on F-01 data sets. Standard deviations in the parentheses.

⁵ UM denotes untreated companies (still SOEs or privatized to a domestic investor; the reference group), T denotes privatized companies (the treated group), M denotes the matched untreated companies (the control group). Treated are all companies that changed a form of ownership from state to private foreign in a particular year. Controls are all companies that were state owned at any point in time, including the particular year.

We focus on the direct effects of privatization through FDI. Treatment follows from the presence of a foreign owner and the reference group consists of companies that were “ever” state owned, but in a particular year have no foreign ownership. Consequently, the control group comprises both firms previously privatized to a domestic investor and those who have not been privatized yet.

Propensity score matching procedure requires testing the balancing of the matching procedure. Due to the fact that we actually run 13 independent matching procedures (one for each year) as well as the multiplicity of variables, it is not possible to report the direct balancing properties⁶. However, one may compute the percentage of the bias reduction thanks to matching. In Table 3 we report the bias reduction and the number of treated units with respect to each analyze for each year in the sample.

Table 3: Bias reduction due to matching and sample sizes

Mean bias (%)	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Before matching	17.7	17.6	21.6	24.2	28.8	25.0	22.8	23.2	21.7	24.5	24.9	23.9
After matching	5.6	4.1	3.2	3.7	2.3	2.9	2.7	2.9	2.5	2.5	2.6	1.9
Sample size	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Treated	16	51	82	87	96	125	156	164	172	169	173	173
Control group	967	2585	2558	2402	1983	2305	2419	2064	1813	1445	1594	1474

Note: Own calculations based on F-01 data sets. Mean, unweighed averaging applied to compute the mean bias in the selection bias.

Figures 2-4 present the estimates of the direct effect of privatization to the foreign investors on firm performance. As suggested earlier, we inspect the changes in performance by analyzing return on assets, profits per employee (π/L ratio), investment intensity, export share and technical efficiency. In each case we compare the performance of the firms privatized to the foreign investor (solid line) and non-privatized state owned enterprises (dashed line). In addition, we present the relative contributions of the self-selection effect (light bar) and the privatization effect (dark bar). If the difference between the privatized and the state owned enterprises is statistically significant neither before nor after the matching procedure, no bar is displayed.

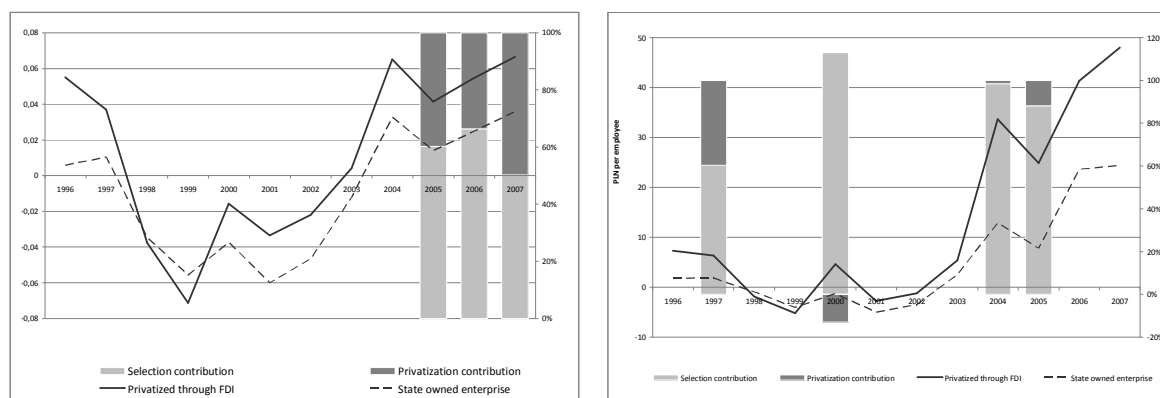


Figure 2: Profits over assets (left) and per employee (right)

Inspecting the performance in terms of ROA, one may observe that the superior results of enterprises privatized to the foreign investors are visible only in the period of 2005-2007. The difference between the treated and the comparison group is not significant before 2005. However, in the recent years the difference is significant both pre- and post-matching, while majority of the differential is attributable to the self-selection effect only. These results suggest that in fact only post-EU accession the profitability of SOEs privatized to the foreign investors is in fact superior⁷.

⁶ Detailed logs are available from authors upon request.

⁷ It is possible that the insignificance of the ROA differential emerged from large increases of the assets by foreign owners. While this assertion may not be empirically tested (the size of the assets is a matching variable and thus cannot be used as a performance measure). Nonetheless, the analysis of the sales efficiency seems to shed some more light.

π/L ratio behaves fairly similarly to ROA. It has been fairly comparable over most of analyzed period time. Both pre- and post-matching differences were not statistically significant in most of the analyzed period. 1997 and 2000 were associated with relatively larger privatisation activity (1997 was the largest post-1994). When significant, the contribution from privatization is very low and sometimes even negative while most of the differential is attributable to self-selection. This may be explained by the fact that many of the privatized companies implemented employment reduction plans already prior to privatization event.

The results seem to suggest also a lack of convergence in terms of profits over assets between firms privatized to foreign investors and other privatized or SOEs. This is opposite to the findings of Greenaway, Sousa and Wakelin (2004) in the case of UK. However, while most of the differential for both ROA and π/L is attributable to the selection effect, recently privatization contributions seem to be augmenting the differential between the two groups of the enterprises. Comparing the contributions of privatization for the π/L ratio and for ROA with less pronounced contribution in the former case suggests that changes in assets (e.g. capital and intangible intellectual property brought by foreign investors into companies) are unable to explain the emerging gap. The lack of convergence suggests also that indeed there may be little support for the hypothesis of positive spillovers, as previously argued by Zukowska-Gagelmann (2000). However, the reference group consists of present and former SOEs only which makes our analysis unsuited to evaluate the size of the potential spillovers for the inherently private firms.

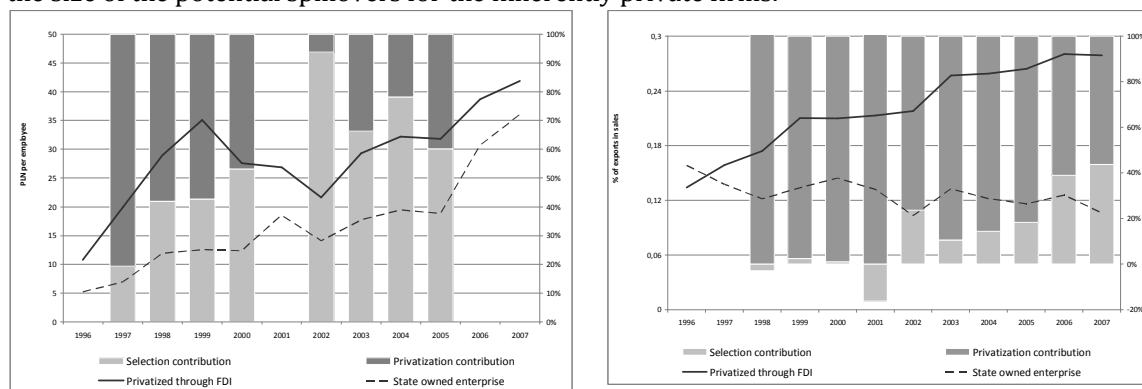


Figure 3: Investment over employee (left) and share of export in sale revenues (right)

Unlike profits, investment intensity measured by the ratio of investment to assets seems to exhibit convergence. Decomposition analysis suggests that foreign ownership fosters propensity to invest, with the impact of treatment ranging between 40% and 90% over the 1997-2000 period (years of relatively weak performance of the economy). As of 2002 foreign ownership contribution decreases to eventually become insignificant in 2006. This suggests that - former or present - state owned enterprises are actually relatively successful in obtaining finance and mobilizing resources for investment.

Export share exhibits strong divergence between firms privatized to foreign investor and the control group. In fact, the contribution of foreign ownership is both consistent and largest in the context of this particular performance indicator but its relative importance decreases over time. The early years seem to be associated with no difference in internationalization, while as of 1998 a strong contribution of privatization becomes apparent. Naturally, foreign investors tend to choose companies already engaged outside the domestic markets but the share of export revenues in total sales is growing radically as of 1997 and this effect gains importance towards the end of the analyzed period.

The increasing disparity between SOEs and the control group is mainly a consequence of increasing export intensity by the privatized companies (the share among SOEs and firms privatized to the domestic investor is relatively constant over time). The difference is as large as threefold towards the end of the analyzed period. Foreign ownership believed to be a crucial mean for accessing the global trading networks creates 50%-60% of the observed differential towards the end of the sample. The rest of the discrepancy should be attributed to the internal potential of the analyzed firms, thus strong self-selection bias. Importantly, we do not analyze the *propensity* to export, but actual export shares in revenues, which reflects more the actual effects of the presence in the global trading networks than access to them. In other

words, our findings suggest that FDI chooses firms that are already export-oriented but also causes the export-intensity to increase even further.

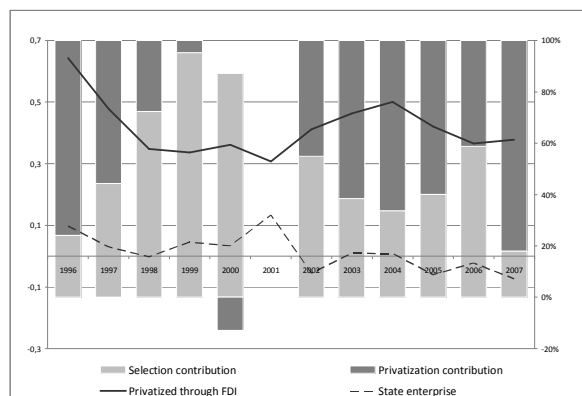


Figure 4: Technical efficiency

As far as technical efficiency is concerned, the superiority of FDI-privatized firms is clear. In fact, SOEs and firms privatized domestically tend to be characterized by efficiency scores below the industry specific mean. However, this effect is largely attributable to the self selection. Only in six out of analysed years majority of the differential follows the foreign ownership. Moreover, an interesting observation concerning the lack “catching up” emerges from this analysis. The superiority of the foreign affiliates was only slightly more pronounced early in the sample and essentially does not seem to have decreased. This suggests that the process is highly heterogeneous across industries and companies and foreign ownership does not bring indispensably crucial premium in efficiency - on the contrary, investors frequently single out better companies to acquire. This implies that statistical twins drew from the population of domestically owned privatized enterprises and SOEs actually keep up with the rate of the efficiency evolution. This finding is not only exceptionally robust (large t -statistics) but also surprising. Many of the SOEs implemented recovery programs, while many of the privatization agreements involved pro-efficiency commitments from the foreign owner (e.g. undertaking certain investment projects, maintaining employment, etc.). Despite these efforts, some statistical twins perform comparably well, suggesting this is not the “hand” of the foreign owner but the effort to modernize and restructure that stands behind relatively good performance of the privatized firms.

To give more context to our findings one should also take into account the nature of FDI flowing into CEECs. Namely, the reallocation towards Eastern and Central Europe was motivated by the lower labor costs, presence of special economic zones and the geographic proximity to the EU markets. Moreover, accession to the EU implies virtually tariff-less trade with other Member States. These characteristics are typical of all CEECs, while our analysis covering the Polish enterprises provides insights into the role the process of privatization to the foreign investor might have played in this context.

Summing up, for the majority of the performance indicators, there is relatively little evidence on the positive direct effects of the privatization *via* FDI. While the literature typically found that in the context of transition the effect of foreign ownership is unequivocally positive, Konings (2001), our results are fairly consistent with the findings concerning developed countries, e.g. Girma (2005), Girma, Görg and Pisu (2008). We find a positive contribution to the internationalization as well as transitory effect on investment intensity and efficiency. However, the self-selection effects are not only statistically significant, but in the case of some variables - e.g. ROA, π/L ratio - are actually capturing most of the observed performance differential.

6 Conclusions

In evaluating the effect of FDI on the performance in the hosting country, controlling the self-selection of FDI into sectors of economy and firms within sector is a necessary precondition to achieve reliable results. It is natural to expect that FDI may actually be only interested in acquiring already well-performing

companies. The process of privatization for most of the transition countries typically consisted of choosing among relatively few buyers. With the exception of spectacular privatizations *via* the stock exchange, typical path involved a recovery plan implemented prior to privatization and finding an interested buyer. The performance of foreign owned firms, especially in transition economies, was usually believed to be higher than that of the local ones due to the technological spillovers and know-how transfer. In practice, this is equivalent to an implicit assumption about a considerable value added *via* the means of foreign ownership. Therefore, one needs to resort to firm-level data and preferably control for the potential selection bias.

In this paper we revisited the effect of privatization to a foreign owner on firm-level performance in a hosting economy using data from 1995-2007 period for all Polish medium and large enterprises. We applied propensity score matching to provide basis for decomposing the performance differentials into the part attributable to the self-selection of privatized companies and a part attributable to the foreign ownership itself. Previous studies found superior performance despite self-selection using Heckman (1979) approach. We contribute to the literature in two ways: using new data and decomposing the differential while controlling for considerable heterogeneity across firms.

The conclusions of this study shed new light on the role that FDI played in privatization. Namely, we find FDI-driven improvements in terms of the access to the global markets. In addition, we also find evidence supporting the claim of increased investment intensity by the foreign owner. However, higher production efficiency as well as profitability of the privatized enterprises is partially due to the selection effect as well. Thus, the findings are largely consistent with the existing literature. Similarly to developed economies, in transition countries, privatization through FDI increases access to foreign trading networks. The lack of evidence in support of the higher profitability of foreign owned companies may be explained by corporate policies geared towards shifting profits to the mother company. However, contrary to what has been claimed in most of the transition literature, we find no positive privatization effects on efficiency, as most of the observed productivity differential is attributable to self-selection.

Our results give an important insight into the effect of privatization through foreign direct investment using an example of an economy undergoing transition from centrally planned to market governance. Exploring the data for Polish medium and large enterprises we show that previous estimates tend to underplay the economic importance of the self-selection effects. In practice, these effects may result from both demand and supply factors. The decision to undertake the privatization procedure was typically driven by the fiscal needs and the expected likelihood of success in finding an interested buyer. These odds are naturally influenced by firms performance, thus self-selection is an inherent part of this process. To assure that privatization through FDI actually contributes to improving the performance of the whole economy, however, government should implement instruments assuring that the efficiency gains will actually occur. While further analyses are required to test the robustness of these results and their applicability to other countries, these results seem to suggest that in the case of Poland privatization to a foreign investor did not bring on average expected efficiency gains.

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Data appendix

Table 4: Formerly state-owned firms privatized through FDI (percentage of the number of foreign owned firms)

Sector/year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Construction	1,23	2,17	4,00	3,51	10,71	8,16	9,62	6,25	5,08	3,28
Education	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Health and social work	0,00	0,00	0,00	0,00	0,00	16,67	16,67	11,11	7,14	7,14
Hotels and restaurants	2,38	2,17	4,76	8,70	13,64	15,00	15,79	12,50	10,71	8,00
Manufacturing	3,33	6,01	5,70	6,13	7,28	7,94	7,69	8,21	7,53	7,56
Mining	10,00	18,18	25,00	21,43	35,71	41,67	38,46	35,71	23,08	21,43
Real estate and business	0,00	0,00	0,00	0,00	0,78	0,82	1,33	1,36	0,57	0,48
Trade and repairs	0,00	0,00	0,41	0,32	0,98	0,97	0,91	0,56	0,53	0,50
Transport and storage	0,00	0,00	0,00	0,00	2,99	2,94	2,53	3,03	3,09	3,16
Electricity, gas etc,	0,00	33,33	25,00	25,00	41,67	70,59	70,83	77,78	79,31	82,76

Note: Own calculations based on F-01 data sets.

Table 5: Formerly state-owned firms privatized through FDI (percentage of revenues of all foreign owned firms)

Sector/year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Construction	4,52	6,55	3,49	1,31	16,96	3,93	2,56	2,98	4,24	4,10
Education	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Health and social work	0,00	0,00	0,00	0,00	0,00	16,80	12,88	9,37	5,23	4,43
Hotels and restaurants	7,54	5,73	5,15	4,78	16,36	15,65	13,80	12,72	12,67	4,92
Manufacturing	12,06	18,66	15,76	14,66	17,26	16,70	16,05	21,18	19,15	18,20
Mining	22,58	37,78	49,44	29,31	69,48	75,30	74,95	67,74	48,25	45,85
Real estate and business	0,00	0,00	0,00	0,00	1,81	2,51	2,98	2,03	1,28	1,12
Trade and repairs	0,00	0,00	0,06	0,04	0,16	0,38	0,31	0,11	0,13	0,18
Transport and storage	0,00	0,00	0,00	0,00	0,42	8,12	6,76	5,49	59,06	54,51
Electricity, gas etc,	0,00	77,92	73,79	66,92	89,49	93,43	91,51	92,01	95,57	93,95

Note: Own calculations based on F-01 data sets.



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