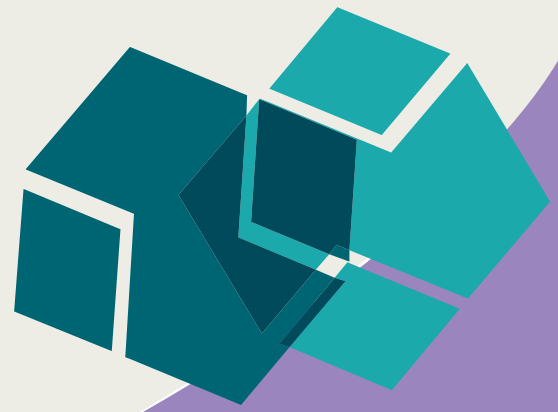




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Outward FDI and company performance in CEECs

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Outward FDI and company performance in CEECs

Abstract

Using a large sample of micro data we investigate what kind of CEECs-9 (Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Poland, Romania, Slovakia and Slovenia) firms tend to invest abroad, and what is the impact of outward FDI on their productivity. We find that firms with outward FDI tend to be larger and more productive, i.e. the best firms tend to self-select into outward FDI. There is also a positive effect of outward FDI on productivity growth of investing firms from CEECs, but this effect is driven exclusively by the subsamples of Czech and Romanian firms, while the impact in other countries is substantially less pronounced. In addition, the positive effect does not appear to be long lasting as it is only statistically significant a year after the investment was made, while employing longer lags yielded positive but insignificant correlations. We also find the heterogeneity of effects by different host-country markets, i.e. investments by CEECs firms into either Western European or other CEECs yielded an above average effect on productivity growth of investing firms, investments into other parts of Europe did not significantly impact the growth of productivity, while North American subsidiaries were even negatively correlated with productivity growth.

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1. Introduction

In the context of new EU member states from Central and Eastern Europe (CEECs-11), the issue of foreign direct investment (FDI) has traditionally been looked at from the inward FDI perspective. In the last decade, however, outward FDI from CEECs-11 has become an increasingly important phenomenon deserving proper analytical attention. In 2005-2013, outward FDI stock of CEECs-11 increased from EUR 21.2 billion to as much as EUR 104.5 billion, in terms of share in GDP from 2.5% to 8.3%. In 2005, the ratio between outward and inward FDI stock of CEECs-11 was 7.8%, by 2013 it increased to 18.1%. The main outward investing countries among CEECs-11 are Poland with EUR 37.3 billion outward FDI stock in 2013, followed by Hungary with EUR 28.8 billion, Czech Republic with 15.5 billion and Slovenia with EUR 5.6 billion (Hunya, 2014).

The objective of this paper is to fill the gap in the existing literature by analysing the direction and intensity of causal relationship between outward investing, and growth and performance of CEECs firms. By the way of using individual firm level data we look at what kind of firms invest abroad, what are their main distinctive characteristics, and what is the impact of outward FDI on investing firms' performance. Based on the mainstream international business and new trade theories explaining outward FDI on a firm level, we hypothesize, first, that only the best firms or firms with sufficient ownership specific advantages will engage in outward FDI, and second that due to economies of scale, multinationality of their operations and combining of ownership specific advantages with the best possible location advantages investing firms will benefit by investing abroad. The latter will reflect in the growth of their productivity.

Using a large sample of micro data for CEECs-9 (Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Poland, Romania, Slovakia and Slovenia) we investigate what kind of firms, with which characteristics tend to invest abroad, and what is the impact of outward FDI on investing firms' productivity. The micro data on firms from the analysed CEECs is derived from the AMADEUS database of firm financial accounts for the period 2004-2013 which is provided by the Bureau Van Dijk. We run the regression model on the pooled sample of firms (pooled across countries, industries and years) for all CEECs-9 as well as for individual countries.

Our results can be summarized as follows. Firms with outward FDI tend to be larger and more productive even compared with similar firms that own domestic subsidiaries. There is also a positive effect of having foreign subsidiaries on productivity growth of parent firms in CEECs, but this effect is driven exclusively by the subsamples of Czech and Romanian firms, while the impact in other countries is substantially less pronounced. In addition, the positive effect does not appear to be long lasting as it is only statistically significant a year after the investment was made, while employing longer lags yielded positive but insignificant correlations. We also find the heterogeneity of the measured correlation among different host-country markets, i.e. investments by CEECs firms into either Western European or other CEECS yielded an above average effect on productivity growth, investments into other parts of Europe did not significantly impact the growth of productivity, while North American subsidiaries were even negatively correlated with productivity growth.

The paper is the first analysis of the characteristics of outward investing firms from CEECs-9 and of the impact of investing abroad on their performance, which is based on large firm-level dataset and use proper econometric technique. Existing analyses of CEECs' outward FDI are based on macro/sectoral data, on questionnaire surveys or on case studies. In this way the paper fills the gap

in the existing literature relating to the proper testing of the mainstream outward FDI theories in CEECs.

The paper is structured as follows. In section two we look at theoretical considerations and empirical evidence of existing literature. Section three describes the data characteristics and provides descriptive statistics, section four describes methodology and section five deals with econometric issues. Section six discusses the results, section seven self-selection into outward FDI, section eight controlling for endogeneity, and section nine concludes.

2. Theoretical considerations and empirical evidence

Theoretical considerations. Dunning's OLI (Ownership-Location-Internalisation advantages) paradigm (Dunning, 1981a, 1993; Dunning and Lundan, 2008) has been the first that provided a coherent firm level theoretical concept of outward FDI. In OLI paradigm three conditions should be met that firms embark on investing abroad: a firm possess ownership specific advantages, foreign location is better than the home one and internalisation of transactions is the best mode for the maximisation of firm specific advantages. In trade theory, the focus has shifted from sectoral views of trade and FDI to a firm-based perspective by models within new theories of trade (Krugman 1983, Helpman and Krugman 1985) that incorporate product differentiation, economies of scale and monopolistic competition, and, finally, by the introduction of firm heterogeneity (Melitz, 2003) and studying of firm boundaries (Helpman, Melitz and Yeaple, 2004; Antras and Helpman, 2004; Helpman, 2006, 2013; Antras and Yeaple, 2013). Here, the type of organisational form of firm in terms of servicing the markets and sourcing the intermediate inputs depends on its productivity. The least productive firms serve domestic market, firms with intermediate productivity export, while only the most productive firms serve foreign markets via foreign affiliates (horizontal FDI). The pattern of firm's sourcing also depends on its productivity, i.e. among firms which service foreign markets, the most productive vertically integrate procurement of intermediate products via foreign subsidiaries producing intermediate products, while the least productive buy intermediate products from independent foreign firms (outsourcing abroad). The pattern also depends on sectoral characteristics; firms in sectors with higher headquarter intensity and larger productivity dispersion are more prone to integration, i.e. to engage via FDI (Antras and Yeaple, 2013).

Apart from above mainstream theories, alternative explanations exist which tend to explain specificities of outward FDI from the so called 'non-traditional sources' (Sosa Andres et al., 2012) which include CEECs. Thus sequential internationalisation models (Johanson and Vahlne, 1977; Johanson and Wiedersheim-Paul, 1975) suggest that firms follow a sequential step-by-step learning process of internationalisation in stages, i.e. they start internationalising by exports and in nearby countries and then by accumulating experiences enter more sophisticated forms of internationalisation, like FDI, and in more distant countries. Critics of the sequential internationalisation model claim that internationalisation is not necessarily sequential and that some multinational enterprises (MNEs) from non-traditional sources show a leapfrog approach. Intensive globalisation processes and the need to gain technology, other skills and knowledge urge firms to enter internationalisation as early as possible (Cantwell and Tolentino, 1990; Dunning et al., 2008; Luo and Tung, 2007; Moon and Roehl, 2001; Fosfuri and Motta, 1999). On a macro level, outward FDI from non-traditional sources is explained by Dunning's investment development path (IDP) paradigm (Dunning, 1981b; Dunning and Narula, 1996), a stage approach claiming that country's development path gradually creates conditions for outward FDI, i.e. countries at a lower development stage first host FDI and only later become also outward investors. IDP has been tested

for various CEECs (Kalotay, 2004; Andreff, 2002, 2003; Svetličič and Bellak, 2001; Masca and Vaidean, 2010) confirming that outward FDI activity broadly depends on investing country's level of development. Still, the final outcome is also determined by a number of other factors, such as industry distribution of GDP (Andreff, 2003; Svetličič and Belak, 2001), the stage of transition reforms and EU accession process (Kalotay, 2004), and the quality of business environment (Balkarova, 2010; Kayam, 2009).

Investing abroad will eventually have a positive impact on the performance of investing firms. Following the OLI paradigm, exploiting economies of scale, especially as far as ownership specific advantages is concerned, specialisation and concentration on core competences with cost-efficiency based offshoring (creation of global supply chains), advantages of multinationality of operations, combining of ownership specific advantages with the best possible location advantages and spillovers from host countries' firms are expected to bring benefits to investing firms in terms of productivity and extent of operations. Investing abroad means entering new markets, strengthening of own advantages, access to new technologies and knowledge, which will result in expanding and efficient restructuring of parent firm activities (Lall, 1996:13). If the impact on outward FDI on parent firm's productivity and competitiveness is more or less self-evident, this is not necessarily so for parent firm's employment and exports. It much depends on whether FDI and trade (exports) are complements or substitutes, and what is the impact of outward FDI on the economies of scale and competitiveness of parent company. Production of foreign affiliates may substitute parent company's exports and employment but, on the other hand, outward FDI increases parent company's competitiveness and output leading to more exports and employment at home. In this context, efficiency seeking FDI may be more of a threat to parent firm's employment and exports than market-seeking FDI (Agarwal, 1996).

Empirical evidence. The issue of self-selection of firms in outward FDI and of learning/upgrading by investing abroad has been empirically widely documented for firms from traditional investing countries, but not so for firms from CEECs-11. With only very few exceptions (Damijan et al., 2007; Klimek, 2009; Vahter and Masso, 2006; Masso et al., 2007; Damijan and Decreamer, 2014; Al-Sadig, 2013; Cantner et al., 2014), proper econometric assessment of these issues in the case of CEECs-11 is almost non-existent and limited to individual countries.

Self-selection in outward FDI. Antras and Yeaple (2013) provide the most comprehensive overview of theoretical models and empirical evidence on the self-selection of firms in outward FDI. Empirical evidence confirms that MNEs (parents and affiliates) are not only more productive than non-MNEs, but also larger, more R&D intensive and more export oriented. Also, within MNEs, 'parents are relatively specialised in R&D while affiliates are primarily engaged in selling goods in foreign markets, particularly in their host markets' (Antras and Yeaple, 2013: 9). This suggests that outward FDI results in further specialisation of parent in higher value added activities, leaving the rest to affiliates (the so called 'smile curve', see Baldwin, 2012). Other empirical studies (for instance, Helpman, Melitz and Yeaple, 2004; Girma et al., 2004; Mayer and Ottaviano, 2007), as well as own empirical work of Antras and Yeaple (2013), confirm the productivity hypothesis in terms of horizontal FDI. Also, Helpman et al. (2004), Yeaple (2009) and Chen and Moore (2010) find that 'increase in firm productivity predicts affiliate entry into a larger number of countries' (see, Antras and Yeaple, 2013: 24). The productivity hypothesis is also confirmed as far as vertical FDI (sourcing) is concerned (Antras and Yeaple, 2013: 34-35). As of lately, several analyses have appeared, which analyse and broadly confirm the productivity hypothesis in sourcing (Nunn and Trefler, 2008; Kohler and Smolka, 2009; Tomiura, 2007; Corcos et al., 2013; Jabbour, 2012; Marin, 2006; Altomonte and

Rungi, 2013; Acemoglu, Johnson in Mitton, 2009; Fort, 2013). Of course, in real life most MNEs not only invest abroad but also export. According to Yeaple (2003) and Grossman, Helpman and Szeidl (2006), the least productive firms will not undertake FDI, while more productive firms choose complex strategies that involve mix of FDI and exports. Greenaway and Kneller (2007) report on a number of studies claiming of positive correlation between exports and FDI of MNEs but not really enter in the explanation of this correlation.

The only firm-level empirical assessment of the self-selection in outward FDI from CEECs based on large firm-level data sets are Damijan et al. (2007) for Slovenia, Klimek (2009) for Poland and Vahter and Masso (2006) for Estonia. Damijan et al. (2007) find a roughly 20% average productivity advantage of Slovenian exporting firms and firms with outward FDI over firms that serve only domestic market, but no advantage of exporting over outward investing firms. The probability that a firm invests in the first ever foreign affiliate increases with TFP, firms that invest only in low-income countries have lower average productivity, more productive firms are more likely to have more foreign affiliates, and larger firms and firms with higher capital intensity are more likely to invest abroad. Firms are also more likely to invest in countries with higher past exporting experience. Klimek (2009) claims that Polish firms investing abroad are significantly more productive comparing to counterparts operating only in home country. The most productive firms produce in several locations. Also, older firms are more likely to invest abroad but, contrary to expectations, not the larger ones. Quite the opposite, larger firms in Poland are less likely to undertake outward FDI. For Estonia, Vahter and Masso (2006) report that only the most productive firms with adequate knowledge and managerial skills are able to undertake outward FDI. Based on a 2001 survey among 180 investors from Czech Republic, Estonia, Hungary, Poland and Slovenia with 477 subsidiaries abroad, Svetličič and Jaklič (2003) claim that typical outward investors from CEECs are the best firms in their home countries, large exporters with long-time and substantial international experience. Still, the type of MNEs differs very much by countries; in the case of Hungary and Czech Republic, foreign owned subsidiaries are the most important, in Poland state-owned extractive and infrastructure companies are the major players, while in Slovenia the major exporters plus private indigenous-grown MNEs are the major players (Rugraff, 2010). Neighbouring countries and countries with strong trade, historical and cultural ties dominate as hosts of CEECs outward FDI (Svetličič and Jaklič, 2003). Kayam (2009), Baalkarova (2010) and Kalotay (2004) point to the home country push factors of developing and transition countries outward FDI, such as small local market size, import competition, development level, costs of production and local business conditions.

Learning/upgrading by outward FDI. Empirical literature on learning/upgrading by investing abroad deals with the impact on investing firm/home country extent of activity (employment, exports, investment), productivity and restructuring. Overall, the literature on the learning/upgrading by outward FDI confirms positive effects for the investing firm but produces mixed results for a home country as a whole. Still, studies confirming positive impact of outward FDI for home country's economy far prevail (see, UNCTAD, 2006, Lipsey, 2002; Kokko, 2006; Lee et al., 2009; Al-Sadig, 2013; Herzer, 2011).

Level of activity in terms of employment, exports and investment. The findings on the impact of outward FDI on investing firm and/or home country level of economic activity in terms of employment, exports and investment are not fully unanimous but they far predominantly go in the direction of positive effect with a number of specific outcomes. The studies that report positive or, at worst neutral impact include Lipsey (2002) where fears that foreign production of MNEs from a

number of developed economies would cause home country exports and employment to fall have not been confirmed, Blomstrom and Kokko (1994) where the net effect of Swedish outward FDI on home country's investment, exports employment is the one of complementarity, Desai, Foley and Hines (2009) with strong positive correlation between domestic and foreign activity levels of US MNEs in terms of investment and employee compensation, HM Government (2014) where UK outward FDI complements exports and has a neutral or positive effect on UK employment, Alejandro et al. (2011) with positive effect of US services outward FDI on parent companies employment, Sakura and Kondo (2014) with positive effects of Japanese services firms outward FDI on domestic employment, Hijzen, Jean and Mayer (2009) with positive impact of French manufacturing outward FDI on parent companies' employment, Gazaniol (2012) with positive impact of outward FDI on French parent firms' value added, employment and exports, Chen, Hsu and Wang (2012) with positive impact of Taiwanese outward FDI on home country exports, Ahn et al. (2006) for Korea, Liu and Lu (2008) for China, Masso et al. (2007) for Estonia, and Sunesen et al. (2010) for EU parent firms who all find positive impact of outward FDI on domestic employment. According to Svetličič and Jaklič (2003: 68-71) the most important impact of outward FDI on parent firms from CEECs has been to gain additional market shares (see also Cantner et al, 2014), followed by increase of exports and increase of production volume of the parent company while the impact on parent company's employment has been somehow weaker. On the other hand, Lee and Huh (2009) report of a negative impact of Korean outward FDI on employment and of positive on exports, and Lee, Lin and Tsui (2009) of a decreasing employment and exports/GDP ratio in the case of outward FDI from small (Asian Four Tigers) to a large (China) developing country. Several studies deal specifically with the impact on domestic investment. Again, most of them – Goedegebuure (2006) for Dutch MNEs, Devereux and Freeman (1995) for seven OECD countries find that there is no substitution between domestic and foreign investment, and Desai, Foley and Hines (2005) for US - report on positive correlation or no substitution between outward FDI and domestic investment. Contrary to that, Al-Sadig (2013) for developing and transition countries and Feldstein (1995) for OECD economies claim that investing abroad has negative impact on domestic investment.

A number of authors report considerable heterogeneity of the impact of outward FDI on investing firm/home country employment mostly with regards to host countries and industries, but also with regards to the types of investments. In terms of host countries, the prevailing finding is that outward FDI more often lead to employment relocation or employment substitution in the case of FDI flows between the countries of similar level of development than in the case of outward FDI from developed to less developed or transition countries. For the US case, Brainard and Riker (1997) claim that competition for jobs mostly takes place among affiliates in different developing countries, particularly in low value added industries. Konings and Murphy (2001, 2003) for European MNEs, Braconier and Ekholm (2000) and Becker et al. (2005) for Swedish and German MNEs find employment substitution between parent firms and subsidiaries in high income but not in low income locations. Thus, employment relocation mostly takes place between high wage locations. Along the same lines, Falk and Wolfmayr (2008) report that substitution of jobs due to outward FDI from EU-15 to CEECs is only limited. Substitution possibilities are higher between employment in affiliates in high wage countries and in the parent company.

The impact of outward FDI on investing firm/home country economic activity also demonstrates sectoral heterogeneity. Sakura and Kondo (2014) report on differences in effects of Japanese services firms outward FDI on home country employment; the most positive effects are in sectors where parent companies administrative and other support functions should be strengthened due

to outward FDI (retail construction, personal and business services, whole sale, transportation). The impact of outward FDI of Estonian firms on home country employment growth is stronger for services than for manufacturing firms (Masso et al. (2007). In the case of Taiwanese outward FDI, positive impact on home country exports is stronger in traditional than in the modern sectors (Chen, Hsu and Wang, 2012). Quite the opposite, negative impact of Korean outward FDI on home country employment is particularly severe in labour intensive industries (Lee and Huh, 2009). In another study of Korean outward FDI (Ahn et al., 2006) similarly find that outward FDI leads to a decrease in trade for low-tech and medium low-tech industries.

Outward FDI seems to have a different impact on different segments of investing firm/home country labour force. In this regard, the most important effect is reduction of labour intensity in parent firms and decreasing demand for low skilled labour at home. Fors and Kokko (2001) find that Swedish MNEs gradually decrease their labour intensity, Geishecker and Gorg (2008) find that due to offshoring skilled labour gains relative to unskilled labour, Chen and Ku (2003) find that in Taiwanese parent firms technical workers tend to benefit most, followed by managerial workers, blue collar workers benefit the least, Elia et al. (2009) claims that internationalisation of Italian firms has negative impact on home country's demand for low-skilled workers, and also on the demand of high skilled workers when FDI goes to high income countries.

Productivity. Increase of parent firm's productivity is probably the most logical and theoretically supported expectation of outward FDI. Indeed, the empirical evidence does not leave any doubt in this regard. Navaretti and Castellani (2004) for Italian MNEs claim positive impact of outward FDI on parent firms productivity (4.6% higher growth rate in TFP than comparable firms with no affiliates abroad). Productivity gains seem to be larger in firms that invested in high-wage countries. Sunesen et al. (2010) report of positive impact of outward FDI on EU parent firms competitiveness by reducing costs and allowing economies of scale. HM Government (2014) claims that outward investment enables UK firms to take advantage of opportunities which would otherwise not be available to them, increasing their productivity, profitability and competitiveness. Gazaniol (2012) finds positive impact of outward FDI on the restructuring of French parent firms and their value added. The effect is the strongest in parent firms dedicated to auxiliary functions. Imbriani et al. (2011), finds positive effects of outward FDI on the productivity of Italian manufacturing firms. In Korea (Ahn et al, 2006) and China (Wei et al, 2010) also, outward FDI tends to affect positively the TFP of investing firms. Damijan and Decramer (2014) confirm positive effect of outward FDI on the productivity of Slovenian parent firms, the effect being much stronger for investments outside of former Yugoslavia.

Apart from economies of scale, increasing productivity of investing firms is importantly due to specialisation and restructuring following investing abroad. Restructuring impact of outward FDI is characterised by the offshoring of labour intensive activities to countries with lower wages, while more advanced operations are kept at home (Kokko, 2006). According to Blomstrom and Kokko (1994), the effect of outward FDI on the structure and volume of exports may be the most important for investing firms/host country. The restructuring may be accompanied by an increased investment in R&D. Goedegebuure (2006) for Dutch, and Chen and Yang (2013) for Korean outward FDI finds positive impact on parent firms domestic R&D spending, particularly in high tech industries/firms.

Hypotheses. Based on the mainstream international business and new trade theories explaining outward FDI on a firm level and within the limitations of the available data, we hypothesize, first,

that only the best firms or firms with sufficient ownership specific advantages will engage in outward FDI, and second that due to economies of scale, multinationality of their operations and combining of ownership specific advantages with the best possible location advantages investing firms will benefit by investing abroad. The latter will reflect in the growth of their productivity.

3. Data

The data used for the analysis comes from the Amadeus databased compiled by Bureau van Dijk. The database provides accounting detail and ownership information on 14 million companies across Europe. The included companies represent a sample of the relevant populations of firms and are representative with respect to industry and size class within a given country. We use data on 9 CEECs: Bulgaria, Estonia, Czech Republic, Hungary, Latvia, Poland, Romania, Slovenia, and Slovakia. In order to acquire data on firm ownership (global ultimate owner and more detailed information on subsidiaries) on an annual basis, we supplemented the latest edition of Amadeus data with historical Amadeus databases, what enables us to establish a historical timeline of ownership changes (both outward FDI as well as inward FDI) from 2008 to 2013. After data cleaning¹ we are left with 5,746,453 firm-year observations. The reference year for data extraction was 2013 and only firms observed in that year are traced back to 2004. The reference year for Slovenia was 2012.² It is for that reason that the number of observations progressively decreases from 2013 backward. Table 1 describes the sample characteristics for the sample period.

Table 1. Sample size by country and year (CEECs from 2004-2013)

country\ year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Bulgaria	54,758	55,244	61,994	81,629	95,724	115,640	128,557	141,709	154,979	327
Czech Rep.	30,243	38,205	46,670	57,334	65,993	76,128	79,503	81,000	71,893	18,481
Estonia	15,978	18,062	20,910	24,429	28,067	30,814	35,453	38,741	42,095	20,718
Hungary	29,930	32,554	9,453	12,786	10,843	17,379	16,741	15,967	18,459	328
Latvia	1,360	1,528	1,707	1,998	2,042	2,263	3,319	3,799	4,114	4,119
Poland	6,688	10,814	17,372	22,473	29,133	46,038	41,104	43,297	37,487	2,490
Romania	171,695	199,012	192,622	266,338	289,616	304,554	321,005	349,665	379,781	378,640
Slovakia	5,938	14,819	21,577	26,282	27,070	49,277	60,989	68,513	76,128	70,361
Slovenia	5,207	6,000	7,448	7,929	8,267	9,031	75,029	83,540	91,257	n.a.

Source: Amadeus

The prevailing features of the data, as revealed by Table 1, are that the largest country sub-samples are those for Bulgaria and Romania. In 2012 the observations for Romania outnumber those for Latvia by almost a hundred fold. Data for 2013 is incomplete compared with the preceding period. Further detail on the composition of the dataset is provided in Table 2, where we present qualitative features of the data.

¹ The criteria for data cleaning were that a firm had to have at least one period with non-missing information on employment, turnover, tangible assets, depreciation and information on the industry code. Firms with one or more of the above variables missing in all years of the sample were dropped from the sample.

² Lithuania was also included in the sample, but no firms from Lithuania passed the basic filtering and data cleaning.

Table 2. Descriptive statistics for the CEECs sample in 2004 (average values)

	# of firms	sales	employment	labor prod	labor cost
Bulgaria	54,758	148.93	13.32	7.05	2.08
Czech rep.	30,243	240.49	13.14	12.58	7.16
Estonia	15,978	151.42	7.30	16.20	4.81
Hungary	29,930	149.74	34.31	17.50	7.84
Latvia	1,360	136.87	9.42	12.17	2.86
Poland	6,688	525.07	28.09	14.86	8.21
Romania	171,695	90.62	7.71	6.30	1.23
Slovakia	5,938	271.75	20.70	38.58	18.18
Slovenia	5,207	338.76	6.04	33.57	13.82

Source: Amadeus

Note: sales, labor productivity (measured by value added per employee) and labor cost (measured by total labor costs per employee) in 000 euros.

While most observations for 2004 are Romanian firms, they are also by far the smallest in terms of sales, labor costs and comparable to Bulgarian firms in terms of labor productivity. The differences between country subsamples seem pronounced as the range equals almost three times the minimum value for sales and up to 16 times for labor costs. In both cases Romanian firms have the lowest average, while Slovenian firms have the highest average.

As the focus of the paper is on the outward FDI of enterprises, Table 3 describes the size of the subsamples of foreign-owned firms and firms that have domestic or foreign subsidiaries.

Table 3. Summary statistics on inward and outward FDI (9 CEE countries for 2012)

country	# with inward FDI	# with domestic subsidiaries	# with foreign subsidiaries	median # of foreign subsidiaries	mean # of foreign subsidiaries	maximum # of foreign subs
Bulgaria	4676	9030	118	1	2.11	591
Czech rep.	20138	3147	440	1	1.63	83
Estonia	25674	1732	223	1	1.58	39
Hungary	179	2666	64	1	2.10	50
Latvia	291	201	9	1	1.41	9
Poland	4715	3177	85	1	1.95	312
Romania	31844	5341	382	1	1.47	79
Slovenia	616	579	126	1	1.29	9
Slovakia	26928	406	455	1	1.32	34

Source: Amadeus

Note: Number of foreign subsidiaries statistics are only calculated for firms with at least one foreign subsidiary.

The largest share of foreign-owned firms is found in Estonia, followed by Slovakia and Czech Republic. Similarly, Slovakia and the Czech Republic have the highest ratios of firms with outward FDI to total firms in the sample. The smallest share of firms with foreign subsidiaries can be found in Hungary and Latvia. While the median number of foreign subsidiaries is 1, the distribution of the number of foreign subsidiaries has a heavy right tail as evidenced by maximum value reaching almost 600 subsidiaries in Bulgaria. Judging from the maximum and average numbers of foreign subsidiaries, Slovenian firms appear to be the smallest in terms of the number of affiliates.

Table 4 displays key differences in firm characteristics with respect to firms' engagement in inward and outward FDI (foreign subsidiaries) and domestic investment (domestic subsidiaries). Evidently, firms that engage in cross-border exchanges in ownership tend to be larger, more productive and pay higher wages. Interestingly, it appears that, while the differences between foreign-owned firms and firms with domestic subsidiaries are ambiguous, firms with outward FDI outperform foreign firms. Finally, the best performing firms are those with inward FDI as well as both domestic and foreign subsidiaries. In order to determine if all of these features (larger size, higher productivity

and wages) are an artefact of different aspects of firm size or a consequence of genuine advantages gained through inward or outward FDI, we will resort to regression methods in the remainder of the paper.

Table 4. The differences between foreign-owned and investing firms in 2012

type	sales	employment	labor prod	labor cost
0	124.24	6.62	10.86	4.29
1	176.32	9.59	15.27	7.23
2	269.33	20.79	16.43	6.46
3	302.75	18.45	25.48	12.08
4	320.87	26.46	27.93	17.81

Source: Amadeus

Note: Firm types are: "0" domestically owned, no subsidiaries, "1" foreign-owned, no subsidiaries, "2" domestically-owned, domestic subsidiary, no foreign subsidiaries, "3" domestically-owned, foreign subsidiaries, no domestic subsidiaries, "4" foreign-owned, domestic and foreign subsidiaries. Sales, labor productivity and labor costs in 000 euro.

4. Methodology

Though informative, the above correlations do not control for other pertinent variables that could affect the relationship between firm performance and cross-border ownership of firm equity (either inward or outward). Furthermore, correlations do not offer sufficient insight into the ultimate issue of causality between ownership issues and firm performance. In order to control for other variables that impact productivity, we will firstly estimate the following specification³:

$$\begin{aligned} (VA/emp)_{t+1} = & a + b_1 emp_t + b_2 k_t + b_3 foreign_t + b_4 for_subs_t + b_5 dom_subs_t + \\ & + b_6 lab_costs_t + b_7 no_subs_t + \hat{a}_{t-1}^T g_t D_t + \hat{a}_{c-1}^C f_c D_c + \hat{a}_{m-1}^M h_m D_m + e_t \end{aligned} \quad (1)$$

where $(VA/emp)_{t+1}$ is value added per employee, measuring labor productivity of firm i at time t . While we measure the level of productivity with value added per employee, we also explore possible effects of inward and outward foreign ownership on productivity dynamics. For this purpose we modify the above specification by using growth in value added per employee as a measure of labor productivity growth:

$$D(VA/emp)_{t+1} = \frac{(VA/emp)_{t+1} - (VA/emp)_t}{(VA/emp)_t} \quad (2)$$

The explaining variables included in equation 1 are emp_t , denoting employment of firm i at time t , k_t denotes capital of firm i at time t and is measured by firm equity. $foreign_t$ is the foreign-ownership indicator assuming value "1" for firms where at least 10 per cent of the equity is foreign owned. We expect that foreign ownership will, in general, have a positive effect on labor productivity. for_subs_t and dom_subs_t represent indicator variables for firms that have foreign and domestic subsidiaries, respectively. for_subs_t takes on value "1" for firms that have subsidiaries abroad and "0" otherwise. By analogy, dom_subs_t equals "1" if a firms has domestic subsidiaries at time t and "0" otherwise.⁴ Labor costs per employee are denoted by lab_costs_t , while the number of subsidiaries both foreign and domestic are denoted by no_subs_t . Finally, time, country and NACE

³ For the sake of notational convenience we drop the firm subscript (i) from the equation.

⁴ As was the case with inward FDI, only firms that own at least 10 per cent of the equity of a foreign entity are considered outward foreign direct investors.

rev. 2 4-digit industry dummy variables (D_t , D_c , and D_m) are also included in the estimation equation, while ε_t is the error term.

5. Econometric issues

The first issue in estimating (1) is the question of endogeneity. Namely, as key factors impacting firm productivity, such as managerial ability, firm-specific product quality and firm-specific demand shocks cannot be reliably measured, they are captured by the error term. This, in turn, means that the error term is likely correlated with regressors such as employment, capital, and potentially also other regressors. The regression coefficients estimated with OLS are hence likely to be biased. In order to mitigate the effects of endogeneity, we lagged the regressors one period, relative to the dependent variable. If the contemporaneous error is correlated with contemporaneous regressors, then it may not be correlated with lagged regressors eliminating the issue of endogeneity. However, if both regressors and the regressant are serially correlated (AR 1 processes), lagging the regressors does not resolve the endogeneity issue.

In order to deal with the endogeneity issue more rigorously, we implement the Akerberg, Caves and Frazer (2006) estimator, by following Wooldridge's (2009) estimation procedure. Olley-Pakes (1996) and Levinsohn-Petrin (2003)⁵ estimation algorithms, which are often applied to measure TFP indices, were shown by Akerberg et al. (2006) to suffer from colinearity issues, preventing identification in the first stage of the estimation. The issue is particularly critical when variable inputs are employed as a proxy variable as is the case with the Levinsohn-Petrin (2003) approach. Wooldridge (2009) shows that these estimators can be implemented using a single set of moments, while information on error covariances can be used to address their inefficiencies. We estimate equation (1) separately for each 2-digit NACE Rev. 2 industry and use obtained estimates of TFP in the following estimations steps. Based on the estimated TFP, we test the relationship between importing status, probability of becoming a new exporter and the probability of becoming a first-time innovator separately for industry-leaders and laggards. We define leaders as those in the top half of the industry's productivity distribution and laggards as those in the bottom half of the respective industry-year pairing.⁶

Secondly, OLS regressions, even if the regressors are lagged relative to the regressant, may not definitively resolve the question of direction of causality. Again, if the variables are serially correlated, and lagged regressors are employed, we could be detecting mere correlation between the two time series and not necessarily the causal effect of foreign direct investment indicators on firm performance. Namely, it is equally likely that more productive firms would be targeted by foreign investors and especially that they would themselves become investors (self-selection into outward foreign direct investment) as that firms with outward foreign direct investment would become more productive as a consequence. In order to be able to establish more robust evidence on the direction of causality, we introduce longer (2 and 3 period) lags of the dependent variable.

⁵ Note that we cannot employ the (complete) Olley-Pakes (1996) algorithm, which would also account for firm survival, to estimate (1) as we only dispose with a sample of small firms and not their entire population. We could therefore not infer about firm survival from the data available to us.

⁶ Greater detail of disaggregation of the results with respect to productivity would have been warranted, but is unfortunately not possible because of the very small sample size.

6. Results

The above descriptive statistics indicate that both inward and outward FDI are correlated with aspects of firm performance. In order to establish the benchmark estimates and provide a robustness test of the established correlations between foreign ownership (inward and outward) and firm performance, we estimate (1) on the pooled sample of firms (pooled across industries, countries and years). Table 5 presents OLS estimates of equation 1 on labor productivity (column 1) and labor productivity growth (column 2) and fixed effects estimates of labor productivity (column 3) and of labor productivity growth (column 4).

The estimates show that, predictably, larger firms have lower productivity but they exhibit higher productivity growth. While capital intensity is an important predictor of productivity levels, it has no effect on productivity growth. Foreign firms are revealed to be more productive than domestically owned firms, but the effect is not robust to changes in estimation methods, while foreign ownership has no statistically significant effect on productivity growth. The two indicators of particular interest, those for the ownership of foreign and domestic subsidiaries show mixed results. While OLS estimates indicate that firms with foreign and domestic subsidiaries are more productive than firms without subsidiaries, there appears to be no effect on productivity growth. If anything the effect of subsidiaries on productivity levels appears bigger for domestic than for foreign subsidiaries.

Table 5. Benchmark regression estimates (1) on labor productivity and labor productivity growth (pooled sample, 2004-2013)

VARIABLES	OLS	OLS	FE	FE
	VA/emp _{t+1}	Δ(VA/emp) _{t+1}	VA/emp _{t+1}	Δ(VA/emp) _{t+1}
Employment _t	-0.071*** (0.001)	0.009*** (0.003)	-0.043*** (0.003)	0.031*** (0.010)
Capital/emp _t	0.101*** (0.009)	-0.000 (0.001)	0.069*** (0.017)	-0.002 (0.003)
Foreign _t	0.183*** (0.060)	0.007 (0.022)	0.100 (0.065)	0.024 (0.030)
For. Subs _t	1.088** (0.547)	0.103 (0.106)	-0.121 (0.582)	0.491*** (0.182)
Dom. Subs _t	2.583*** (0.173)	-0.013 (0.062)	0.073 (0.256)	-0.112 (0.095)
Labor cost _t	1.301*** (0.021)	-0.010*** (0.001)	1.351*** (0.025)	-0.030*** (0.006)
# subs _t	0.062** (0.030)	-0.002 (0.007)	0.049 (0.070)	-0.014 (0.021)
Constant	15.403*** (0.150)	0.447*** (0.081)	5.580*** (0.127)	0.190 (0.141)
Time	YES	YES	YES	YES
Country	YES	YES	YES	YES
Industry	YES	YES	YES	YES
Observations	1,291,544	837,919	1,291,544	837,919
R-squared	0.246	0.002	0.153	0.003

Source: Amadeus, own calculations

Note: Employment_t measured by the number of full time employees at the end of year t, Capital/emp_t measured by firm equity per employee in year t, Foreign_t is an indicator variable of foreign ownership (at least 10 per cent foreign owned), For. Subs_t denotes an indicator of outward FDI ("1" if a firm owns foreign subsidiaries, "0" otherwise), Dom. Subs_t denotes an indicator of domestic ownership of subsidiaries, Labor cost_t denotes firm labor expenses per employee at time t and # subs_t is the number of subsidiaries. Robust standard errors in parenthesis.

Once fixed effects are controlled for, we observe that firms with foreign subsidiaries experience significantly higher productivity growth than either firms with no subsidiaries or those with domestic subsidiaries. Owning domestic subsidiaries has no significant effect on productivity growth on the other hand. Labor costs per employee, which represent a measure of human capital intensity of a firm, have a significantly negative impact on productivity growth, but they are positively correlated with productivity levels. Finally, the number of subsidiaries is significantly correlated with productivity only when OLS is used as the estimation method.

As is evident from the descriptive statistics there are substantive differences between the country subsamples both in terms of their size as well as the correlation between firm performance and exposure to international capital flows. In order to better understand these differences as well as determine which country subsamples contribute most to the results in Tabel 5, we estimate the fixed effects regression of equation 1 on growth of value added country-by-country in Table 6.

Table 6. Fixed effects estimates of (1) by country (2004-2013) [Dependent variable: growth in labor productivity in $t+1$]

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	BUL	CZ	HUN	LAT	POL	ROM	SLO	SVK
Employment _t	0.014*** (0.005)	0.068** (0.033)	0.159 (0.155)	0.039** (0.019)	0.079* (0.047)	0.031** (0.015)	-0.008 (0.020)	0.015 (0.023)
Capital/emp _t	-0.001 (0.001)	-0.012 (0.009)	-0.001 (0.003)	-0.004* (0.002)	0.0023 (0.0031)	-0.001* (0.0004)	0.023 (0.022)	-0.004* (0.002)
Foreign _t	0.122 (0.0945)	0.0585 (0.0848)	0.296 (0.315)	-1.340 (1.110)	-0.406 (0.405)	0.0368 (0.0375)	-0.012 (0.029)	0.230* (0.134)
For. Subs _t	0.094 (0.244)	1.542** (0.717)	3.864 (7.616)	0.0896 (0.749)	0.133 (0.227)	1.282** (0.505)	0.062 (0.243)	0.600 (0.690)
Dom. Subs _t	-0.243 (0.261)	-0.0647 (0.201)	-0.538 (0.759)	-0.150 (0.419)	-0.361** (0.141)	0.0283 (0.126)	-0.176 (0.389)	0.165 (0.237)
Labor cost _t	-0.031** (0.012)	-0.027** (0.014)	0.028 (0.050)	0.060 (0.165)	-0.018 (0.022)	-0.063*** (0.014)	-0.034*** (0.002)	-0.017* (0.010)
# subs _t	-0.044 (0.063)	-0.014 (0.044)	-0.032 (0.161)	-0.0545 (0.330)	0.005 (0.008)	-0.138 (0.0845)	0.033 (0.231)	0.044 (0.045)
Constant	0.390* (0.215)	0.0615 (0.725)	-2.119 (2.860)	0.568 (0.595)	-1.478 (1.084)	0.198 (0.172)	-0.0458 (0.564)	0.594 (0.473)
Time	YES	YES	YES	YES	YES	YES	YES	YES
Industry	YES	YES	YES	YES	YES	YES	YES	YES
Observations	114,281	94,074	4,801	2,959	9,300	535,749	19,635	57,120
R-squared	0.001	0.016	0.052	0.005	0.032	0.004	0.063	0.004

Source: Amadeus, own calculations.

Note: There were not enough observations in the Estonian subsample to have its regression results included in the Table.

Note: Employment_t measured by the number of full time employees at the end of year t, Capital/emp_t measured by firm equity per employee in year t, Foreign_t is an indicator variable of foreign ownership (at least 10 per cent foreign owned), For. Subs_t denotes an indicator of outward FDI ("1" if a firm owns foreign subsidiaries, "0" otherwise), Dom. Subs_t denotes an indicator of domestic ownership of subsidiaries, Labor costs_t denotes firm labor expenses per employee at time t and # subs_t is the number of subsidiaries. Robust standard errors in parenthesis.

The results provided in Table 6 indicate that the aggregate correlation found between the outward FDI (foreign subsidiary) variable and productivity growth was generated almost solely by the Romanian and Czech Republic subsamples. Particularly due to the size of the Romanian sample, which accounts for almost two thirds of the total observations, the aggregate results most closely mirror those for Romania. The remaining countries display a positive but statistically insignificant correlation between existence of foreign subsidiaries and productivity growth. Firms with domestic subsidiaries, on the other hand, have lower productivity growth than firms with no subsidiaries, insignificantly lower in all but Poland, where the effect is significant.

In order to explore the temporal dynamics of the correlation between firm productivity growth and outward FDI, we extend our analysis by testing longer lags of foreign ownership, foreign subsidiaries and domestic subsidiaries variables. Table 7 presents estimates of (1) with 2 (column 1) and 3 period lags (column 2) relative to the dependent variable. The table shows that positive correlation between productivity growth and outward FDI dissipates after one period. Namely, the correlation between the two although positive is no longer significant. The estimates in Table 7, thus, suggest that learning effects from outward FDI, if they are present in the first place, only last a very short time. Although the effect of owning foreign subsidiaries on labor productivity growth is still positive after two or even three periods after the initial investment, it is not significantly different from zero. Going further back to four years prior to the observed growth episode, owning foreign subsidiaries does not have a significant effect on labor productivity growth.

Table 7. Estimates of (1) on the pooled sample of 9 CEE countries between 2004 and 2013
[Dependent variable: Growth in labor productivity (t+1)]

VARIABLES	(1) $\Delta(\text{VA}/\text{emp})_{t+1}$	(2) $\Delta(\text{VA}/\text{emp})_{t+1}$	(3) $\Delta(\text{VA}/\text{emp})_{t+1}$	(4) $\Delta(\text{VA}/\text{emp})_{t+1}$
Employment _t	0.036** (0.014)	0.035** (0.018)	0.043* (0.026)	0.050 (0.031)
Capital/emp _t	-0.003 (0.004)	-0.000 (0.005)	-0.000 (0.007)	-0.003 (0.011)
Foreign _{t-1}	-0.056 (0.044)			
For. Subs _{t-1}	0.100 (0.210)			
Dom. Subs _{t-1}	0.015 (0.152)			
Foreign _{t-2}		0.062 (0.038)		
For. Subs _{t-2}		0.456 (0.292)		
Dom. Subs _{t-2}		0.147 (0.125)		
Foreign _{t-3}			-0.028 (0.044)	
For. Subs _{t-3}			0.227 (0.347)	
Dom. Subs _{t-3}			-0.088 (0.243)	
Foreign _{t-4}				0.057 (0.057)
For. Subs _{t-4}				-1.106 (0.730)
Dom. Subs _{t-4}				0.303 (0.193)
Labor cost _t	-0.038*** (0.005)	-0.044*** (0.006)	-0.052*** (0.008)	-0.053*** (0.010)
# subs. _t	-0.047 (0.046)	-0.074 (0.059)	-0.096 (0.059)	-0.099 (0.066)
Constant	0.142 (0.183)	-0.310 (0.265)	-0.378 (0.387)	-0.527 (0.488)
Time	YES	YES	YES	YES
Observations	736,766	615,417	490,706	370,005
R-squared	0.004	0.003	0.004	0.004

Source: Amadeus, own calculations.

Note: Employment_t measured by the number of full time employees at the end of year t, Capital/emp_t measured by firm equity per employee in year t, Foreign_t is an indicator variable of foreign ownership (at least 10 per cent foreign owned), For. Subs_t denotes an indicator of outward FDI ("1" if a firm owns foreign subsidiaries, "0" otherwise), Dom. Subs_t denotes

an indicator of domestic ownership of subsidiaries, Labor costs_t denotes firm labor expenses per employee at time t and # subs_t is the number of subsidiaries. Robust standard errors in parenthesis, adjusted for clustering at the firm level.

The final test of the effect of foreign-subsidiary ownership explores heterogeneity with respect to the target country. Namely, it is likely that the benefits from outward FDI differ when a CEEC firm invests in Western Europe, Asia, North America or somewhere else, due to different market conditions, such as demand specificities, level of competition, buyer and supplier linkages etc. in different parts of the global market. In order to explore the possible differences in the strength and direction of correlation depending on the host country of foreign subsidiaries, we replace the foreign-subsidiary ownership indicator with indicator variables for eight regions of the world where the vast majority of CEEC firms' subsidiaries are located.

The regions in question are: EU-15, which includes Austria, Belgium, Germany, Greece, Denmark, Finland, France, Italy, Ireland, Luxemburg, the Netherlands, Spain, Sweden, Portugal and the UK, EU-13, including the CEECs with Malta and Cyprus. Domestic subsidiaries are obviously excluded from the definition of this indicator. NA represents a North America dummy (Canada and the US), Balkan dummy consist of successor countries of the former Yugoslavia not in the EU and Albania (Albania, Serbia, Montenegro, Bosnia and Hercegovina and Macedonia). The FormerSoviet dummy includes the successor countries of the former Soviet Union, i.e. Azerbaijan, Belorussia, Kazakhstan, Moldavia, Russia, Ukraine, and Uzbekistan. Asia indicator subsumes subdisidiaries in China, Japan, India, Indonesia, Republic of Korea, Taiwan, Malesia and Vietnam. MENA dummy includes Middle-Eastern and North African countries of Turkey, Algeria, Lebanon, Egypt, Morocco and Israel. EFTA includes Norway, Iceland, Switzerland and Liechtenstein. The remaining countries constitute less than 3 per cent of the subsidiary hosts and are included in the ROW dummy.

Table 8 presents estimates of (1) with fixed effects on the pooled sample of countries with host country dummies.

It is evident from Table 8 that correlations between productivity growth and ownership of foreign subsidiaries depend heavily on the composition of host countries for a given subsample. Firms with subsidiaries in either Western Europe or other Central European countries have experienced significantly higher productivity growth than the average firm. Firms with North American subsidiaries, on the contrary, have below average productivity growth. The rest of the included indicator variables for the remaining countries either have an insignificant effect or have been dropped due to colinearity.

Table 8. Fixed effects estimates of (1) on the pooled sample 2004-2013 with host-country indicators

VARIABLES	(1) $\Delta(\text{VA}/\text{emp})_{t+1}$
Employment _t	0.031*** (0.010)
Capital/emp _t	-0.002 (0.003)
Foreign _t	0.027 (0.030)
EU15_subs _t	0.983** (0.423)
EU13_subs _t	1.164** (0.525)
NA_subs _t	-0.509*** (0.179)
Balkan_subs _t	-0.179 (0.176)
SOVIET_subs _t	0.002 (0.352)
EFTA_subs _t	4.611 (5.242)
dom_sub _t	-0.134 (0.094)
Labor cost _t	-0.030*** (0.006)
# subs. _t	-0.016 (0.022)
Constant	0.190 (0.141)
Time	YES
Observations	837,919
R-squared	0.003

Source: Amadeus, own calculations.

Note: Employment_t measured by the number of full time employees at the end of year t, Capital/emp_t measured by firm equity per employee in year t, Foreign_t is an indicator variable of foreign ownership (at least 10 per cent foreign owned), (EU15, EU13,...) subs_t denotes indicators of outward FDI ("1" if a firm owns foreign subsidiaries in EU15, EU13, etc, "0" otherwise), Dom. Subs_t denotes an indicator of domestic ownership of subsidiaries, Labor costs_t denotes firm labor expenses per employee at time t and # subs_t is the number of subsidiaries. Robust standard errors in parenthesis, adjusted for clustering at the firm level.

7. Self-selection into outward FDI

While the above analysis indicates some tentative and mostly short lasting learning effects from firms' engagement in outward FDI, we have not yet explored the possibility that better performing firms self select into becoming outward investors. Given that learning effects only happen in the initial year after investment is made, there is a high probability that the effect finds its origins before the outward FDI is ever made.

In order to test for the existence of self-selection into outward FDI, we estimate the following specification on the pooled sample:

$$P(\text{OFDI}_t = 1 | \text{OFDI}_{t-1} = 0) = a + b_1 \ln(\text{VA}/\text{EMP})_{t-a} + b_2 \ln(\text{EMP})_{t-1} + b_3 \ln(\text{K}/\text{EMP})_{t-1} + b_4 \text{IFDI}_{t-1} + b_5 (D/A)_{t-1} + b_6 \text{Dom Subs}_{t-1} + \hat{a}_{t-1}^T g_t D_t + \hat{a}_{c-1}^C f_c D_c + \hat{a}_{m-1}^M h_m D_m + e_t \quad (3)$$

where $OFDI_t$ is the indicator variable taking on value “1” if a firm owns foreign subsidiaries at time t , and “0” otherwise. $(D/A)_{t-1}$ is the ratio between long-term debt and total assets at time t . The remaining variables are defined in the same way as above. We test (3) with random effects probit in order to capture unobserved firm heterogeneity. While fixed effects estimation would better reflect the nature of the data, using fixed effects in a probit estimation would certainly introduce incidental parameter bias to both estimates of coefficients and standard errors. With binary outcome models based on maximum likelihood estimation non-trivial numbers of included fixed effects would lead to severe bias in the results. The results are presented in Table 9 with column (1) showing estimates with a one-period lag on labor productivity, results with two- and three-period lags are presented in columns (2) and (3), respectively.

The results indicate a positive correlation between productivity and the probability of a new outward FDI. Although progressively smaller in size, the coefficients on labor productivity remain statistically significant even three years prior to the investment taking place. This conclusively confirms that more productive firms self-select into outward FDI even after controlling for size, foreign ownership and number of domestic subsidiaries. Importantly, foreign owned firms are revealed to be, ceteris paribus, substantially less likely to become outward investors themselves, while larger and more capital intensive firms being more likely to become investors.

Table 9. Random-effects probit on the probability of becoming an outward foreign investor
[Dependent variable: Probability of becoming an outward investor]

VARIABLES	(1) P($OFDI_t=1 OFDI_{t-1}=0$)	(2) P($OFDI_t=1 OFDI_{t-1}=0$)	(3) P($OFDI_t=1 OFDI_{t-1}=0$)
$\ln(VA/EMP)_{t-1}$	0.247*** (0.051)		
$\ln(VA/EMP)_{t-2}$		0.142*** (0.053)	
$\ln(VA/EMP)_{t-3}$			0.124* (0.066)
$\ln(EMP)_{t-1}$	0.561*** (0.057)	0.595*** (0.066)	0.628*** (0.090)
$\ln(K/EMP)_{t-1}$	0.083*** (0.033)	0.157*** (0.038)	0.148*** (0.048)
$Foreign_{t-1}$	-0.648*** (0.096)	-0.793*** (0.116)	-0.839*** (0.148)
$Debt/Assets_{t-1}$	0.019 (0.055)	0.015 (0.053)	0.033 (0.087)
$Dom. Sub_{t-1}$	4.588*** (0.096)	4.091*** (0.119)	3.779*** (0.166)
Constant	-12.484*** (0.556)	-12.196*** (0.648)	-12.892*** (0.847)
Observations	345,895	226,722	151,807
Number of idn	144,542	102,416	78,375

Source: Amadeus, own calculations.

Note: EMP_t measured by the number of full time employees at the end of year t , $(K/EMP)_t$ measured by firm equity per employee in year t , $Foreign_t$ is an indicator variable of foreign ownership (at least 10 per cent foreign owned), $Debt/Assets_{t-1}$ measures the ratio between long-term debt and assets, $Dom. Subs_t$ denotes an indicator of domestic ownership of subsidiaries, $Labor\ costs_t$ denotes firm labor expenses per employee at time t and $\# subs_t$ is the number of subsidiaries. Robust standard errors in parenthesis, adjusted for clustering at the firm level.

8. Controlling for endogeneity

Endogeneity of the key coefficients in equation 1 is very likely an issue when OLS is employed as the estimator of choice. Namely, both labor and capital inputs are likely co-determined with output, causing the causality between inputs and output runs in both directions. This, in turn, leads these regressors to be correlated with the error term, biasing the OLS estimates. Furthermore, other variables in particular foreign ownership status, existence of foreign and domestic subsidiaries are very likely endogenous as well. The same as better performing firms are likely to be chosen as targets of foreign acquisitions, they are also more likely to become outward investors themselves as well as to own domestic subsidiaries. On the other hand, being part of a foreign network both as investor as well as recipient of investments can lead to performance improvements for the firm as well. As before, this circular causality could result in biased coefficients on variables relating to cross-border FDI flows.

To control for endogeneity of production inputs, foreign ownership and subsidiary status, we estimate a dynamic version of equation 1, regressing labor productivity on its lagged value while the remaining regressors stay as above. We estimate this version of the empirical model using the system generalized method of moments (Blundell and Bond, 1998), where all available levels and differences of the regressors (up to the fourth lag in our case) are employed as instruments in the two-stage GMM estimation. Given that the composition of data is a panel dataset with a relatively short time dimension and a comparably large cross-sectional dimension (firm observations in a given year), system GMM estimation is appropriate to use as it was designed specifically for small T, large N panel dataset.

Table 10. System GMM regression (Blundell and Bond, 1998) of (1) on the pooled sample [Dependent variable: Value added per employee]

VARIABLES	(1) 1 period lag	(3) 2 period lag	(4) 3 period lag
$(VA/Emp)_{t-1}$	0.236*** (0.022)	0.197*** (0.024)	0.206*** (0.025)
Emp_{t-1}	-0.021 (0.014)	-0.061*** (0.016)	-0.036** (0.016)
$(K/Emp)_{t-1}$	0.103** (0.044)	0.090* (0.050)	0.023 (0.074)
$Foreign_{t-1}$	0.308** (0.140)	0.167 (0.139)	0.260* (0.142)
$For. Subs_{t-1}$	4.038*** (1.409)		
$Dom. Subs_{t-1}$	3.578** (1.800)		
$For. Subs_{t-2}$		0.018 (0.931)	
$Dom. Subs_{t-2}$		0.481 (0.494)	
$For. Subs_{t-3}$			0.261 (0.731)
$Dom. Subs_{t-3}$			-1.334*** (0.511)
$Lab. Costs_{t-1}$	-0.086 (0.098)	0.114 (0.111)	0.026 (0.127)
$\# \text{ of branches}_{t-1}$	-1.674 (1.256)	0.973** (0.414)	1.279*** (0.406)
Constant	-11.727 (198.159)	-111.454 (187.972)	111.846 (142.391)
Time indicators	YES	YES	YES

Industry ind.	YES	YES	YES
Country ind.	YES	YES	YES
AR(1)	-16.55 (P=0.000)	-15.70 (P=0.000)	-14.31 (P=0.000)
AR(2)	0.525 (P=0.600)	-0.0789 (P=0.937)	1.165 (P=0.244)
Sargan stat (df)	62.95 (59)	17.56 (37)	18.49 (26)
Hansen J (df)	14.61 (59)	13.01 (37)	14.59 (26)
# of observations	845,533	743,485	621,247

Source: Amadeus, own calculations.

Note: $(VA/Emp)_{t-1}$ is labor productivity as measured by value added per employee, EMP_t measured by the number of full time employees at the end of year t , $(K/EMP)_t$ measured by firm equity per employee in year t , $Foreign_t$ is an indicator variable of foreign ownership (at least 10 per cent foreign owned), $For. Subs_t$ indicates whether a firm own foreign subsidiaries, $Dom. Subs_t$ denotes an indicator of domestic ownership of subsidiaries, $Labor\ costs_t$ denotes firm labor expenses per employee at time t and $\# subs_t$ is the number of subsidiaries. All available levels and differences up to the fourth lag are used as instruments in the second step of the equation.

The results confirm the findings of Tables 5 and 7, with a positive significant effect of foreign-subsubsidiary ownership on productivity growth observed only with a one year lag with greater lags displaying non-significant effects. The initial effect of foreign subsidiaries is also statistically significantly larger than the positive effect of owning domestic subsidiaries. These effects, however, could hardly be described as learning-from-outward FDI as they dissipate quickly after the initial positive impact, whereas one would expect them to become progresively larger with firm's longer engagement in outward FDI. Lastly, both the Sargan test and Hansen J test of overidentified restriction indicate that the instruments are valid.

9. Conclusions

Despite its growing importance for CEECs, outward FDI has so far been mostly overlooked as a source of possible performance improvements for CEECs firms. While considerable attention was given to analyses of the impact of inward FDI (foreign ownership) on the performance of individual firms, far less empirical studies exist that deal with the effect of outward FDI on the new EU member states. This paper attempts to fill the void in the empirical literature.

Using data on firms from 9 CEECs from 2004 to 2013, we explore the effect of having foreign subsidiaries on the performance of firms. We find that firms with outward FDI tend to be larger and more productive even compared with similar firms that own domestic subsidiaries. Furthermore there is also a positive effect of having foreign subsidiaries on productivity growth of parent firms in CEECs, but this effect is driven exclusively by the subsamples of Czech and Romanian firms, while the impact in other countries is substantially less pronounced. In addition, the positive effect does not appear to be long lasting as it is only statistically significant a year after the investment was made, while employing longer lags yielded positive but insignificant correlations. We also explore the possible heterogeneity of the measured correlation by making a distinction between host-country markets and find that investments by CEECs firms into either Western European or other CEECS yielded an above average effect on productivity growth, investments into other parts of Europe did not significantly impact the growth of productivity, while North American subsidiaries were even negatively correlated with productivity growth.

As far as self-selection into outward FDI is concerned, we find that labor productivity is a key determinant of the likelihood of becoming an outward investor even as far back as three years prior to the initial outward investment. Even controlling for ownership of domestic subsidiaries, we find that firms that end up becoming foreign investors are significantly more productive than non-

investing firms. Finally, after controlling for endogeneity, we find that the basic results are robust to changes in estimation approach as the positive effect of owning foreign and domestic subsidiaries is only significant early on, while in later years the positive effect dissipates.

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