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Working Paper

Does international openness affect productivity of local firms? Evidence from Southeastern Europe

LICOS Discussion Paper, No. 219

Provided in Cooperation with:
LICOS Centre for Institutions and Economic Performance, KU Leuven

Suggested Citation: Damijan, Jože P.; de Sousa, Jose; Lamotte, Olivier (2008) : Does international openness affect productivity of local firms? Evidence from Southeastern Europe, LICOS Discussion Paper, No. 219, Katholieke Universiteit Leuven, LICOS Centre for Institutions and Economic Performance, Leuven

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LICOS Discussion Paper Series

Discussion Paper 219/2008

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Does international openness affect productivity of local firms? Evidence from Southeastern Europe*

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Abstract

This paper examines the role of international openness on the change of firm productivity in Southeastern Europe (SEE). This is a crucial question for middle income countries. Using firm-level data for six transition economies over the period 1994-2002, we identify whether foreign ownership and propensity to trade with more advanced countries can bring about higher learning effects. We find that (i) foreign ownership has helped at restructuring and enhancing productivity of local firms in four out of six countries, (ii) exporting to advanced markets has a larger impact on productivity growth in four countries, especially when firm's absorptive capacity is taken into account, (iii) in contrast, exporting to the less competitive markets of ex-Yugoslavia seems to affect negatively the productivity growth in three countries, and (iv) learning effects from importing follow a similar path than exporting. Our results suggest that trade liberalisation is not uniformly beneficial. Regional composition of trade flows and absorptive capacity of local firms matter. Trade liberalisation within the SEE region thus may not provide a substitute for a general trade liberalisation and access to the more competitive markets of OECD countries.

JEL classification: F14, D24, L25.

Keywords: trade liberalisation, international trade, foreign ownership, total factor productivity, transition economies

*We gratefully acknowledge financial support of Global Development Network. We would like to thank the editor and the anonymous referee for offering very constructive and helpful suggestions. We also thank Mario Holzner, Michael Landesmann, Jeffrey Reimer, T. N. Srinivasan, Robert Stehrer, and the participants at two GDN-WIIW workshops in Vienna, at the University of Orleans and at the Global Development Network Conference in Beijing for helpful comments. The usual disclaimer applies.

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1 Introduction

Southeastern Europe (SEE) represents one of the poorest region in Europe,[1] with an average real GDP per capita of 2,760 US$ in 2006, representing 13% of the eurozone average.[2] However, with an average real GDP per capita growth rate of 5% per annum, the region is slowly recovering from the war episodes and the drastic output falls of the 1990s. In the meantime, SEE countries have engaged in a recent worldwide integration process, through the joining of the World Trade Organization (WTO),[3] the joining of the European Union (EU)[4] and the establishment of bilateral and multilateral free trade agreements.[5] This integration process echoes the current globalization with its two key drivers: cross-border trade and cross-border investment. As a result, inflows of foreign direct investment (FDI) and exports of goods and services of SEE countries more than doubled between 2000 and 2005. An obvious question is posed: does a link exist between this international openness and recent rapid growth in the region? We attempt to answer this question at the microeconomic level by investigating the link between international openness and performances of local firms.

International openness may affect firm productivity through various channels. International trade is a first obvious channel of technology transfer, in particular through imports of intermediate products and capital equipment (Markusen, 1989; Grossman and Helpman, 1991; Feenstra, Markusen and Zeile, 1992) and exports

[1] According to the World Bank, SEE includes 3 low middle income countries (Albania, Bosnia-Herzegovina and Macedonia), 4 up middle income countries (Bulgaria, Croatia, Roumania and Serbia-Montenegro) and one high income country (Slovenia).

[2] Authors' calculations using data from the World Development Indicators (World Bank). If we drop Slovenia, the highest income country in SEE, the average GDP per capita falls to about 2,400 constant 2000 US$.

[3] As of January 2008, all SEE countries are WTO members except Bosnia-Herzegovina and Serbia-Montenegro which are under negotiation as "observer governments". For more details see Table 8 in Appendix and http://www.wto.org.

[4] Slovenia joined the EU the 1st of May 2004 and adopted the euro the 1st of January 2007. Bulgaria and Romania joined the EU the 1st of January 2007, after the establishment of cooperation and association agreements aimed at creating a free trade area. The other SEE countries signed Stabilization and Association agreements with the EU since 2001 except Bosnia-Herzegovina and Serbia-Montenegro which are still under negotiation. They are official (Croatia and Macedonia) or potential (Albania, Bosnia-Herzegovina and Serbia-Montenegro) candidate member states.

[5] A regional economic integration process has emerged within the framework of the Central European Free Trade Agreement (CEFTA) and various bilateral trade agreements entered in force at the beginning of the 2000s. For more details see Table 9 in appendix and the list of trade agreements notified to the GATT/WTO: http://www.wto.org/english/tratop_e/region_e/summary_e.xls.

into industrial countries (Clerides *et al.*, 1998). In both cases the geographic destination of trade flows is extremely important. Firms exporting to advanced markets can learn more due to the higher quality, technical, safety and other standard requirements as well as tougher competition (and lower markups). Similarly, firms importing capital and intermediate inputs from more advanced markets have to meet according technical standards to use the advanced western technology. Hence, higher propensity to trade with more advanced countries may obviously result in higher level of productivity and faster total factor productivity (hereafter TFP) growth.

The microeconomics of transition offers rather mixed evidence about the role of international trade as a determinant of firm productivity growth. Djankov and Hoekman (1998) investigate the initial post-reform period (1991-95) in Bulgaria. They find that exports and imports are important sources of TFP growth at the level of the firm. However, they do not control for the self-selection of the most productive firms in international trade. Controlling for selection sample, Halpern *et al.* (2005) find that imports have a statistically significant and large effect on firm productivity in Hungary over the period 1992-2003. In the export side, a robust evidence is the self-selection of the most productive firms in export markets.[6] Less conclusive is the learning-by-exporting effect. The study of a panel of Slovenian firms from 1994 to 2000 offers a striking controversy. De Loecker (2006) documents that firms learn from exporting. However, Damijan and Kostevc (2006) qualify this result. They find that productivity improvements, although present, are far from permanent and tend to dissipate shortly after initial entry on the export market.

A second obvious channel of external knowledge spillovers is the form of ownership, foreign vs. domestic. An exhaustive line of research has been conducted on different effects of foreign ownership on firm performance. Firms that are foreign owned are expected to be better managed and governed, to have access to up-to-date technology and business links of the parent firm. All this taken together may result in higher performance of foreign owned firms in terms of higher level and growth of productivity and higher wages. However, the literature highlights that the presence

[6]See Greenaway and Kneller (2007) for a comprehensive survey.

of foreign owned firms may also generate adverse effects by driving domestic firms out of the market.

A bunch of empirical studies on transition economies address the question of the performance of foreign vs. domestic ownership and document mixed evidence. Foreign investment has a positive impact on TFP growth of recipient firms in the initial post-reform period in Czech Republic (1992-96: Djankov and Hoekman, 2000; 1994-98: Damijan *et al.*, 2003), Poland (1993-97: Konings, 2000; 1994-98: Damijan *et al.*, 2003) as well as in Estonia and Slovenia (Damijan *et al.*, 2003). These findings are robust to corrections for the sample selection bias that arises because foreign investors tend to invest in domestic firms with above-average productivity. However, foreign firms do not seem to perform better than domestic firms in Bulgaria (Konings, 2000; Damijan *et al.*, 2003), Hungary and Slovakia (Damijan *et al.*, 2003). Romania even offers conflicting results: no effect in Konings (2000) and a positive one in Damijan *et al.* (2003). Evidence of spillovers of foreign affiliates to *other firms* within industries (horizontal spillovers) and across industries (vertical spillovers) is ambiguous. The literature in transition economies finds no or negative horizontal spillovers (Djankov and Hoekman, 2000; Konings, 2000; Damijan *et al.*, 2003) due to a competition effect which drives local firms out of the market. In contrast, recent papers find convincing evidence of positive vertical spillovers (Schoors and van der Tol, 2002; Javorcik, 2004; Merlevede and Schoors, 2006; Gorodnichenko *et al.*, 2007).

This paper participates in the ongoing debate over the microeconomics of transition. In particular, we are interested in what extent both foreign trade flows and foreign investments contributed to improvements in firm performance in Southeastern Europe. In that way, we assess the crucial relationship between international openness and firm productivity growth of middle income countries. Former studies have generally focussed on more advanced transition economies, on one channel at a time or/and on the initial post-reform period. We perform our analysis by using firm level data matched with bilateral trade flows (exports and imports) for 6 SEE countries over the period 1994-2002. The impact of foreign ownership and trade reliance on firm performance, measured with total factor productivity (TFP), is estimated with different panel data techniques and a control for potential selection

bias. We lack appropriate firm level data to investigate the indirect spillover effects of foreign capital on other firms.[7] However, using a longer period of time, we have more hindsight to analyze the direct effects of trade reorientation and foreign ownership. Indeed, ownership effects may take time to have an impact on performance due to lags in restructuring (Konings, 2000).

We do not find a clear link between international openness and firm performance. The effects vary across countries and channels. Considering the trade channel, we find in Slovenia and Romania that exporting to advanced countries provides larger learning effects than exporting to less advanced markets. In Bulgaria, we find that positive spillovers from exporting to the advanced EU-15 markets benefit only firms with higher absorptive capacity. In Croatia, positive spillovers for firms with higher absorptive capacity stem from the rest of OECD countries, but not from the EU-15 countries. On the other hand, exporting to less competitive markets of ex-Yugoslavia seems to affect negatively the productivity growth of firms in Bulgaria, Croatia and Romania. Similar results are found for importing links.

Considering the FDI channel, we also find contrasting results on the impact on foreign ownership on TFP growth. Four out of six countries (Bosnia-Herzegovina, Croatia, Romania and Slovenia) experience faster TFP growth in foreign owned firms, despite a documented selection process in FDI decisions. It seems that after restructuring foreign owned firms have improved their TFP at a much faster rate than purely domestic owned firms. However, in Bulgaria and Macedonia, no significant robust difference on TFP growth has been found between domestic and foreign ownership.

The remainder of the article is organized as follows. We first present our data sets and provide basic descriptive statistics (Section 2). Then, we discuss the empirical model and the methodology (Section 3). Finally, we report the results and summarize the findings (Section 4).

[7] See Gorodnichenko *et al.* (2007) on this important topic.

2 Data and descriptive statistics

2.1 Data

To study the link between international openness and firm performance, we make use of firm level data for 6 out of the 8 SEE countries: Bosnia-Herzegovina (BIH), Bulgaria (BGR), Croatia (HRV), Macedonia (MKD), Romania (ROM) and Slovenia (SVN). We cannot perform similar estimations for firms in Albania and Serbia and Montenegro, since we are lacking the necessary information on foreign ownership and trade flows. For all countries, except Slovenia, firm level data is obtained from Amadeus database provided by Bureau van Dijk. For Slovenia, the source of data is the Statistical Office of Slovenia. Firm level data contain value added, labor and value added per employee as well as information on foreign ownership.

As shown in Table 1, the *time span* and coverage of the data varies across countries. For Bulgaria, Croatia, Macedonia, Romania and Slovenia datasets cover the period 1995-2002, while for Bosnia-Herzegovina we only have data for 1999-2002. Firm samples *size* varies also across countries. In 2000, for Macedonia and Bosnia-Herzegovina we have data for about 130 and 220 firms only, while for other countries samples are much larger: Bulgaria (8,300 firms), Croatia (3,100), Slovenia (3,800) and Romania (27,000). Similar differences can be seen also in terms of *representativeness* of the datasets. In Slovenia, our dataset represents 61 per cent of all manufacturing firms in 2000 and covers about 90 per cent of employment, output and value added of the total manufacturing sector. Data coverage is also quite good for Romania (about 70 per cent of manufacturing output in 2000), while in Bulgaria and Macedonia our dataset covers some 47 per cent of manufacturing output in 2000. Unfortunately, for Croatia and Bosnia-Herzegovina less reliable national accounts are available and thus no good judgement about the representativeness of the datasets can be made. Nevertheless, comparing the Croatian firm numbers to Slovenia, we may speculate that our sample covers a large proportion of the Croatian manufacturing sector. Based on this data coverage, we can argue that the results obtained below may be fairly representative of the developments in the economies of Slovenia, Romania, Croatia and Bulgaria, but less so for Bosnia-Herzegovina and

Macedonia.

Data on bilateral trade flows - exports and imports - is obtained from CEPII database (see http://www.cepii.fr). Tables 2 and 3 report the dependence of SEE countries on exports to and imports from advanced markets. Shares of exports of individual SEE countries to EU-15 markets range between 65% and 75%, while share of imports from the EU-15 region is close to 80%. On the other side, Tables 2 and 3 reveal that countries of former Yugoslavia do continue to trade extensively with each other, reflecting the hysteresis of trade patterns (de Sousa and Lamotte, 2007). Bosnia-Herzegovina (export share to SEE region of 30%) and Macedonia (import share from SEE region of 20%) seem to rely heavily on SEE markets. In the next subsection we determine empirically whether high propensity to trade within the SEE region can bring about learning effects compared to trade with advanced countries.

3 Empirical model and methodology

3.1 Modeling impact of trade and FDI effects on firm performance

In this subsection we estimate the impact of external sources of technology transfer, such as foreign ownership and trade flows, on productivity growth of SEE firms. We use the standard growth accounting approach that is typically used in this sort of analysis. Production function is being used to measure the importance of knowledge spillovers for individual firm. In this model, value added Y of each firm i at time t takes on the following form:

$$Y_{it} = H^i(K_{it}^{\alpha}, L_{it}^{\beta}, T_{it}^{\gamma}), \tag{1}$$

where K_{it}, L_{it}, and T_{it} are the capital stock, the number of employees and technology (knowledge), respectively. The production function is homogenous of degree r in K and L, so long as it has non-constant returns to scale ($\alpha + \beta \neq 1$).

Differentiating equation (1) with respect to time, we get:

$$y_{it} = \alpha k_{it} + \beta l_{it} + \gamma \tau_{it}, \tag{2}$$

Table 1: Data samples and coverage of the data for six SEE countries

		1995	1996	1997	1998	1999	2000	2001	2002	% of population[a]
BIH	# Firms					219	219	220	221	
	# Foreign Firms					1	1	5	5	
	Value Added					78 940	61 288	191 649	189 715	
	shVA_for[b]					0.042	0.069	0.016	0.009	
	Employment					45 297	46 960	38 267	34 391	
	Sales					287 889	323 411	299 319	330 788	
BGR	# Firms	1.332	3.052	1.531	1.541	7.309	8.357	9.549	3.403	0.336
	# Foreign Firms	31	94	48	59	284	325	387	151	
	Value Added	355.46	474.238	417.141	391.809	504.187	468.485	477.245	276.51	0.833
	shVA_for[b]	0.015	0.022	0.036	0.042	0.045	0.047	0.053	0.054	
	Employment	1,207,769	777.639	2,568,554	1,548,078	2,006,033	2,547,526	2,858,518	2,009,973	0.343
	Sales	5,001,364	2,574,027	6,463,700	5,112,335	6,211,294	7,750,010	7,379,755	5,407,629	0.474
HRV	# Firms	71	185	345	3.001	3.093	3.108	3.111	3.121	0.613
	# Foreign Firms	0	8	15	59	64	78	80	84	
	Value Added	45.873	90.404	122.294	206.529	213.267	222.27	225.717	226.265	0.859
	shVA_for[b]	0.000	0.127	0.092	0.067	0.072	0.088	0.094	0.095	
	Employment	84.067	141.683	172.728	2,594,288	2,970,492	3,738,190	4,321,526	4,225,805	
	Sales	1,867,941	3,890,341	5,012,296	8,268,446	8,576,967	1.00E+07	1.15E+07	1.18E+07	
MKD	# Firms	2	2	3	5	7	132	130	2	
	# Foreign Firms					1	57	64	22	
	Value Added	1	3	429	254	636	30.813	29.82	250	0.222
	shVA_for[b]					0.000	0.094	0.098	0.087	
	Employment	0	0	0	0	0	221.319	173.48	0	0.356
	Sales	3.617	70.19	3.396	913	2.334	919.8	788.019	602	0.471
ROM	# Firms	2.051	16.979	19.366	21.746	23.94	27.035	27.955	29.749	0.635
	# Foreign Firms	131	926	1094	1368	1667	2070	2318	2542	
	Value Added	129.981	1,452,415	1,442,840	1,403,159	1,402,002	1,680,773	1,474,506	1,487,379	0.539
	shVA_for[b]	0.128	0.094	0.099	0.124	0.138	0.152	0.171	0.188	
	Employment	2.99E+06	3.64E+07	4.05E+07	3.67E+07	4.05E+07	4.87E+06	5.98E+06	6.09E+06	0.600
	Sales	1.13E+07	1.23E+08	1.42E+08	1.33E+08	1.34E+08	1.68E+07	2.14E+07	2.18E+07	0.698
SVN	# Firms	2.911	3.205	3.349	3.586	3.739	3.841	3.727	4.075	0.610
	# Foreign Firms	121	200	217	230	239	252	268	264	
	Value Added	231.076	225.343	211.834	216.127	214.762	216.779	214.234	221.532	0.897
	shVA_for[b]	0.060	0.097	0.128	0.134	0.170	0.196	0.214	0.224	
	Employment	4.79E+08	5.65E+08	6.47E+08	7.20E+08	8.02E+08	901000000	9.94E+08	1.14E+09	0.911
	Sales	1.76E+09	2.01E+09	2.28E+09	2.58E+09	2.75E+09	3.28E+09	3.67E+09	4.05E+09	0.987

Notes: [a]: in % of firm population in 2000; [b]: share of value added by foreign owned firms (in %); Sales in 1000 euros. Source: Firm level data - Amadeus, Bureau van Dijk, except for Slovenia (Statistical Office of Slovenia). Aggregate data - UNIDO Industrial Statistics.

Table 2: Regional export shares, 1994-2002, in %

	Variables	1995	1996	1997	1998	1999	2000	2001	2002
BIH	shX_YUG					30.6	26.4	34.0	33.9
	shX_EU15					45.8	54.6	53.7	52.8
	shX_NEU10					8.9	13.0	9.6	8.6
	shX_OECDoth					14.8	6.0	2.7	4.7
BGR	sh_YUG	0.9	6.0	4.1	3.5	4.4	4.1	3.7	1.2
	shX_EU15	75.8	71.5	73.2	74.6	70.1	67.6	67.3	70.2
	shX_NEU10	7.9	7.8	7.2	6.8	8.7	8.9	8.5	6.4
	shX_OECDoth	15.4	14.7	15.5	15.1	16.8	19.3	20.4	22.1
HRV	shX_YUG	17.4	17.1	16.4	17.3	17.5	16.2	15.3	14.4
	shX_EU15	54.3	57.5	57.4	57.9	57.7	58.6	61.3	59.4
	shX_NEU10	24.1	21.5	20.7	19.9	19.2	17.6	17.3	19.1
	shX_OECDoth	4.2	3.9	5.5	4.9	5.7	7.6	6.1	7.1
MKD	shX_YUG	8.5	15.6	19.0	11.2	14.9	14.8	5.8	3.6
	shX_EU15	80.5	77.1	58.5	67.2	61.0	55.0	69.7	57.4
	shX_NEU10	5.9	5.6	17.8	9.7	10.6	11.6	9.1	5.7
	shX_OECDoth	5.1	1.7	4.7	11.8	13.5	18.6	15.5	33.3
ROM	shX_YUG	1.0	3.7	1.9	2.3	0.9	0.9	0.9	0.6
	shX_EU15	71.0	70.0	66.2	66.3	67.7	70.9	75.5	75.1
	shX_NEU10	8.9	9.6	10.2	17.4	13.9	12.8	11.7	12.5
	shX_OECDoth	19.1	16.7	21.7	14.1	17.4	15.4	11.9	11.9
SVN	shX_YUG	12.7	14.4	15.1	15.6	13.9	14.7	16.1	15.9
	shX_EU15	74.1	71.0	70.2	69.3	70.1	67.7	66.9	66.2
	shX_NEU10	4.9	6.0	6.7	7.4	7.8	9.0	9.2	11.3
	shX_OECDoth	8.3	8.7	8.0	7.7	8.2	8.6	7.8	6.6

Notes: Export shares are shares of exports of individual country to different regions in total country's exports calculated as averages from NACE 4-digit industries. shX_YUG: share of exports to former Yugoslavia (SVN, HRV, BIH, SCG and MKD); shX_EU15: export share to the old 15 EU member states; shX_NEU10: export share to the new 10 EU member states; shX_OECDoth: share of exports to other OECD countries. Source: CEPII, authors' calculations.

Table 3: Regional import shares, 1994-2002, in %

	Variables	1996	1997	1998	1999	2000	2001	2002
BGR	shM_YU	1.8	1.9	1.9	2.1	1.5	2.3	
	shM_EU15	79.3	79.6	81.7	80.6	78.1	80.4	
	shM_NEU10	6.6	8.0	8.4	9.2	13.5	9.4	
	shM_OECDoth	12.4	10.5	8.1	8.1	6.8	7.9	
HRV	shM_YU	11.6	11.3	11.3	11.1	10.2	10.0	9.9
	shM_EU15	60.6	63.7	65.6	65.0	66.1	65.5	65.4
	shM_NEU10	24.8	21.9	20.4	20.5	20.7	21.7	21.5
	shM_OECDoth	3.0	3.1	2.8	3.3	2.9	2.9	3.3
MKD	shM_YU	18.3	12.9	21.1	15.9	20.3	21.3	
	shM_EU15	51.9	60.4	38.5	51.2	42.9	42.3	
	shM_NEU10	26.6	16.9	33.0	23.0	29.3	29.9	
	shM_OECDoth	3.2	9.8	7.4	10.0	7.5	6.5	
ROM	shM_YU	0.4	0.6	0.7	0.9	0.9	0.9	0.8
	shM_EU15	86.3	79.1	74.0	76.8	77.2	79.8	79.3
	shM_NEU10	7.3	12.8	19.3	17.4	17.7	15.3	14.6
	shM_OECDoth	6.0	7.4	5.9	4.9	4.2	4.0	5.3
SVN	shM_YU	9.4	7.7	7.4	7.4	8.1	8.9	9.6
	shM_EU15	82.9	83.4	79.3	83.5	83.0	82.0	81.8
	shM_NEU10	4.5	5.1	4.5	5.2	5.3	5.5	5.2
	shM_OECDoth	3.3	3.7	8.8	3.9	3.6	3.5	3.4

Notes: Import shares are shares of imports of individual country from different regions in total country's imports calculated as averages from NACE 4-digit industries. shM_YU; share of imports from former Yugoslavia (SVN, HRV, BIH, SCG and MKD); shM_EU15: import share from the old 15 EU member states, shM_NEU10: import share from the new 10 EU member states; shM_OECDoth: share of imports from other OECD countries. Source: CEPII, authors' calculations.

where k, l and τ indicate the logarithmic growth rate of K, L, and T, respectively. α, β, and γ represent the elasticity of output with respect to k, l and τ. The basic idea underlying equation (2) is that an individual firm can increase its productivity also by relying on external sources of knowledge spillovers. By assumption, technology growth τ is a function of ownership F_i and various knowledge spillover effects Z_{jt}:

$$\tau_{it} = f^i(F_i, Z_{jt}), \tag{3}$$

Where Z_{jt} includes the potential home market spillovers $SecSize_{jt}$, as well as foreign knowledge spillovers from exporting X_{jt} and importing M_{jt}. The home market spillovers are related to economies of scale proxied by the log of value added at the NACE 2-digit sector j level. Foreign trade spillovers are measured as shares of regional exports and imports at the sector j level. This measure of international knowledge spillovers complies with the Hausman, Hwang and Rodrik (2007)'s study demonstrating that it is not only about how much a country exports, but what and where a country exports. Hausman *et al.* (2007) classify goods according to their main export destinations and assign higher indices for goods that are exported to more developed economies and demonstrate that growth is correlated with the type of goods that a country exports. In this respect, we calculate trade shares at the NACE 2-digit sector for 4 major trade destinations of the SEE countries: the old 15 EU member states (EU15), the other OECD countries (rOECD) and the successor states of former Yugoslavia (exYU), while exports and imports shares with the new 10 EU member states (NEU10) are taken as a control group.[8] We hypothesise that larger learning effects are associated with higher exports shares to more developed markets (EU-15 and other OECD countries) since a higher quality of goods is required for exporting to more competitive markets. Similarly, importing higher shares of goods from more competitive markets provides higher learning effects for local firms due to the latest technology and intermediates that can be purchased in advanced countries.

[8]Trade shares and not the volumes of exports and imports are taken as the latter may well be correlated with the absolute sector levels, which stand for sector economies of scale and enter our model on the right hand side. Note also that we use sector trade since we do not dispose with trade flows at the firm level.

Finally, we estimate the following regression model:

$$y_{it} = \alpha k_{it} + \beta l_{it} + \delta F_i + \kappa \ln SecSize_{jt} + \mu X_{jt} + \sigma M_{jt} + \phi_t + \chi_{jt} + u_{it}, \qquad (4)$$

where ϕ indicates time specific effects which capture the time specific economic shocks typical for each country under investigation. In addition, we also include χ_{jt}, that indicates time and sector specific $(T_t * S_j)$ effects, which capture the effects of the actual evolution of sector specific institutional improvements in each country.[9] u_{it} is the error term and

$$shX_{jt}\_EU15, shX_{jt}\_NEU10, shX_{jt}\_exYU, shX_{jt}\_rOECD \in X_{jt},$$

$$shM_{jt}\_EU15, shM_{jt}\_NEU10, shM_{jt}\_exYU, shM_{jt}\_rOECD \in M_{jt},$$

are regional export and import shares.

3.2 Econometric issues

Estimating (4) poses at least two econometric problems that can potentially lead to seriously biased estimations of the estimated coefficients. First problem arises due to possible non-random selection process of firms into exporting as well as into their foreign ownership status. The second problem typically arises in growth accounting approach where output and inputs are simultaneously determined. We have to deal with both issues in order to get robust and reliable estimations of our coefficients of interest.

3.2.1 Correction for selection bias

In this approach there are two potential sources of selection bias. The first bias stems from the fact that only the most productive firms start exporting. This self-selection issue is well documented in the literature since the seminal work of Bernard and Jensen (1995), Clerides et al. (1998) or Roberts and Tybout (1997). The newer strand of literature also documents that due to the required higher productivity threshold only the most productive firms exports towards many markets (see Eaton,

[9] One may argue, that especially in the SEE region institutional improvements may increase the relative performance of sectors that rely more heavily on those institutions, such as sectors producing complex goods, and may therefore also impact the pattern of export shares across sectors. This point is made quite clear in Costinot (2007).

Kortum and Kramarz, 2004; Bernard, Jensen and Schott, 2007) and towards more competitive markets.[10] Ideally, in our attempt to estimate the impact of trade liberalisation on firm performance in SEE firms we would be able to control for this self-selection of more productive firms into exports and more specifically into exports towards more competitive markets. This would allow us to disentangle the pure learning-by-exporting and learning-by-importing effects from the selection issue. Unfortunately, in our datasets we do not dispose with the information on firm exports status, not to speak of the information on firm export destinations. There is little therefore one can do about this selection issue. What we can do, however, is to control for possible amplified effects of trade liberalisation in firms with higher absorptive capacity, which is typically higher for more productive firms.[11] Firm's absorptive capacity is usually measured by firm's skill intensity measured by labour costs per employee. Based on this, we control for amplified effects of trade liberalisation in firms with higher absorptive capacity by introducing the interaction terms of firm specific skill intensity with the sector and region specific export and import shares. Hence, we estimate the following regression model:

$$y_{it} = \alpha k_{it} + \beta l_{it} + \delta F_i + \kappa \ln SecSize_{jt} + \mu w_{it} * X_{jt} + \sigma w_{it} * M_{jt} + \phi_t + \chi_{jt} + u_{it}, \quad (5)$$

where w_{it} stands for firm's average skill intensity. Estimating equation (5) will enable us to check whether exporting to (importing from) different regions (EU-15, other OECD countries, ex-Yugoslav markets) has a differential effect on firms with higher absorptive capacity than on firms with lower absorptive capacity.

The second potential bias arises due to the fact that firms that are foreign owned were not acquired randomly by their parent companies but according to some selection process. This selection may be correlated with firm characteristics which introduces additional bias in our empirical model. This study deals with this selection problem using the two-step method proposed by Heckman (1979).[12] In the

[10] See Damijan and Kostevc (2006) for empirical findings and Melitz and Ottaviano (2006) for theoretical exposition.

[11] The literature on spillover effects from FDI documents that firms with higher absorptive capacity may benefit more from FDI spillovers (see Damijan *et al.*, 2003, 2008 and Javorcik, 2004).

[12] Another approach to deal with the endogeneity of foreign ownership is the propensity score matching (see e.g. Arnold and Javorcik, 2004). In a related study, Damijan *et al.* (2008) make use of a propensity score approach as a robustness check on estimations with Heckman correction, but obtain quite similar results both in terms of magnitude and significance of the estimates.

Heckman procedure, the bias that results from using non-randomly selected samples is dealt with as an ordinary specification bias arising due to omitted variables problem.[13] Heckman proposes to use estimated values of the omitted variables (which when omitted from the model give rise to the specification error) as regressors in the basic model. Hence, in the first step we account for the probability p_i [0, 1] that a firm's selection for FDI is conditional on its initial structural characteristics before the take over. The following probit equation has been estimated:

$$\Pr(p_{it_0} = 1 \mid \mathbf{X}_{i,jt_0}) = S\left(\mathbf{X}_{it_0} \neq \mathbf{X}_{jt_0}\right) \tag{6}$$

where i and j $(i = 1, ..., n, \quad j = 1, ..., m)$ are indicating individual foreign and domestic firm, respectively. The error terms are assumed to be IID and normally distributed, thus $S(\cdot)$ is a cumulative distribution function of the standard normal distribution. $\mathbf{X}_{i,jt_0}$ is a matrix of firms' structural characteristics in the initial year t_0. These are the firm size measured by the number of employees (Employment), the capital to labor ratio (K/L-ratio), the value added by employee (VA/employment), the skill intensity measured by labour costs per employee (Skill Intensity) and economies of scale at the NACE two-digit sector j level (SecSize). Due to data limitation on ownership changes within the observed period, we are forced to assume unchanged ownership over the whole period for all of the countries with the exception of Slovenia, whereby we took firms' structural characteristics in the first year of our sample as their initial characteristics. In order to avoid autocorrelation, the first year of observation is then excluded from the second stage estimations.[14]

Results, reported in Table 4, indicate some selection process in FDI decisions by parent foreign companies. Foreign parent companies seem to select smaller firms in SEE countries (significant for BIH, ROM and SVN) as well as less initially productive (not true for ROM) and less capital and skill intensive firms.

Based on these probit results, the so-called inverse Mill's ratio, λ_i, for all observations (for non-zero as well as zero observations regarding foreign investment

[13]The problem of sample selection bias has been extensively dealt with in the econometric literature. See for instance Amemiya (1984) and Wooldridge (2002) for excellent surveys of the literature and correction methods.

[14]Note that by construction the firm's characteristics that enter the second stage, i.e. the main empirical model, are not correlated with the firm's characteristics in the first (Heckman) stage as the initial year data does not enter the main empirical estimations.

Table 4: Heckman probit estimates

	BIH	BGR	HRV	ROM	SVN
Employment	-0.0159	-2.8E-05	0.0003	-0.0003	-0.0015
	[-4.42]^a	[-0.52]	[1.32]	[-1.91]^c	[-2.15]^b
K/L-ratio	-0.0023	2.6E-06	-0.0003	-0.0012	-3.6E-06
	[-0.73]	[0.40]	[-2.60]^a	[-1.73]^c	[-0.76]
VA/employment	0.0510	-4.4E-05	-0.0206	0.0271	-8.3E-05
	[1.06]	[-1.31]	[-2.53]^b	[3.70]^a	[-2.86]^a
Skill Intensity	0.1019	-2.9E-05	-0.0705	-0.1113	-3.2E-04
	[0.48]	[-0.29]	[-3.47]^a	[-3.81]^a	[-7.37]^a
SecSize	0.0001	-5.1E-10	-1.3E-06	4.8E-07	-2.2E-09
	[0.87]	[-1.24]	[-7.21]^a	[17.7]^a	[-7.70]^a
Observations	173	946	4.893	4.619	7.587
Prob > chi2	0.00	0.00	0.00	0.00	0.00

Notes: Dependent variable: Foreign =1 if the firm is foreign owned, and 0 otherwise. Year before the t takeover or first year in the dataset is taken for probit estimates. t-statistics in brackets. ^{a}, ^{b} and ^{c} denote significance at 1%, 5% and 10%, respectively.

choices) are calculated. A vector of λ_i is then included in the estimations of model (5) as an additional independent variable which controls for the unobserved impact of foreign investment decisions.[15]

3.2.2 Dealing with the simultaneity problem

To see how inputs and output are simultaneously determined and how this creates serial correlation in our regression model, one can rewrite (4) by decomposing the error term u_{it}:

$$\begin{aligned} y_{it} &= \alpha k_{it} + \beta l_{it} + \gamma \tau_{it} + \phi_t + \chi_{jt} + (\eta_i + \nu_{it} + m_{it}), \qquad (7) \\ & \nu_{it} = \rho \nu_{i,t-1} + \epsilon_{it} \qquad |\rho| < 1 \\ & \epsilon_{it}, m_{it} \sim MA(0) \end{aligned}$$

where τ_{it} is a productivity shock that depends on various knowledge spillovers factors described above. Of the error components, η_i is an unobserved firm-specific effect, ν_{it} is an autoregressive (productivity) shock, and m_{it} represents serially uncorrelated measurement errors. Note that both labor (l_{it}) and capital (k_{it}) are po-

[15]It is worth mentioning that our results are robust also without the Mill's ratios, but the we omit these results in order to save space.

tentially correlated with firm-specific effects (η_i) as well as with both productivity shocks (ν_{it}) and measurement errors (m_{it}).

When estimating growth accounting model, one should take into account the inherent endogenous structure of the model. This means that not only present and lagged dependent variables are correlated, but lagged dependent variable (value added) might be correlated with present independent variables (inputs); i.e. past performance determines demand for inputs in the present period. This creates serial correlation between the inputs and the error term on right hand side of (7) that is captured by the autoregressive productivity shock, which shows up in econometric estimations as AR(1) autoregressive process of the error term. This should be explicitly controlled for in econometric estimations. In order to deal with this simultaneity problem one has to estimate dynamic version of (7). The time dimension of panel data enables us to capture the dynamics of adjustment by inclusion of lagged dependent as well as lagged independent variables. A dynamic version of the growth model (7) can then be written as:

$$\begin{aligned} y_{it} &= \rho y_{i,t-1} + \alpha k_{it} - \rho\alpha k_{i,t-1} + \beta l_{it} - \rho\beta l_{i,t-1} + (\phi_t - \rho\phi_{t-1}) + (\chi_{jt} - \rho\chi_{j,t-1}) \\ &+ (\gamma_{it} - \rho\gamma_{i,t-1} + \eta_i(1-\rho) + \epsilon_{it} + m_{it} - \rho m_{i,t-1}). \end{aligned} \tag{8}$$

The OLS estimator is unbiased and consistent when all explanatory variables are exogenous and are uncorrelated with the individual specific effects. This, however, is not the case in our model, which includes lagged variables. One can show that the OLS estimator will be seriously biased due to correlation of the lagged dependent variable with the individual specific effects as well as with the independent variables. This is due to the fact that y_{it} is a function of η_i in (8), and then $y_{i,t-1}$ is also a function of η_i. As a consequence, $y_{i,t-1}$ is correlated with the error term, which renders the OLS estimator biased and inconsistent, even if the ν_{it} and m_{it} in (8) are not serially correlated. This holds also whether the individual effects are considered fixed or random (see Hsiao, 1986, Baltagi, 1995, Wooldridge, 2002).

There are several ways of controlling for the unobserved heterogeneity and simultaneity. One way is to include exogenous variables into the first-order autoregressive process. This, in turn, reduces the bias in the OLS estimator, but its

magnitude still remains positive. Another way of controlling for the simultaneity is apply the Anderson-Hsiao instrumental variable approach. We may first-differentiate our model (7) in order to eliminate η_i, which is the source of the bias in the OLS estimator. Then we may take the second lag of the level ($y_{i,t-2}$) and the first difference of this second lag ($\Delta y_{i,t-2}$) as possible instruments for ($\Delta y_{i,t-1}$), since both are correlated with it ($\Delta y_{i,t-1} = y_{i,t-1} - y_{i,t-2}$) but uncorrelated with the error term ($\Delta u_{it} = u_{it} - u_{i,t-1}$). This approach, though consistent, is not efficient since it does not take into account all the available moment conditions (i.e. restrictions on the covariances between regressors and the error term).

Hence, a natural approach that allows for controlling for the unobserved heterogeneity and simultaneity in (8) is the application of GMM (general method of moments) estimators. As shown by Arellano and Bond (1991, 1998), Arellano and Bover (1995) and Blundell and Bond (1998, 1999), an application of the system GMM estimators is a more appropriate approach to dynamic panel data than using difference GMM estimators. Our model will be estimated in first differences in order to obtain estimates of coefficients on growth performance of firms as well as to eliminate unobserved firm-specific effects. Since lagged level instruments used in the difference GMM approach are shown to be weak instruments for first-differenced equation, we apply the system GMM approach, which in addition to lagged levels uses also lagged first-differences as instruments for equations in levels. As our model is estimated in first differences, corresponding instruments for ($\Delta x_{i,t-3}$) are ($x_{i,t-1}$) and ($\Delta x_{i,t-1}$) (where x stands generally for all included variables), and so on for higher time periods. This allows for a larger set of lagged levels and first-differences instruments and therefore to exploit fully all of the available moment conditions. Hence, the system GMM approach maximizes both the consistency as well as the efficiency of the applied estimator.

There are other ways of dealing efficiently with simultaneity problem, such as Olley-Pakes (1996) and Levinsohn-Petrin (2003) approaches. A drawback, however, of these approaches, including the system GMM, is that they are computationally very expensive. They also require good quality and long time series of data on inputs and output. In our case, we are dealing with less advanced transition countries where

both the quality of datasets as well as availability of long time series is not warranted. For instance, we face very poor availability of data for Bosnia-Herzegovina and Macedonia (only three years of observations), while for the other four countries data series are longer. The quality of data in terms of the persistency of series is however quite poor. We can observe extremely large changes of value added, labor and value added per employee in the early years of our sample, while in the second part of our sample period the changes become more moderate. This is due to the transition process, characterized by an initial huge drop in economic activity and a fast recovery afterwards. Thus, the lack of persistency makes GMM estimations less efficient as even lagged levels are poor instruments for the model estimated in levels. Accordingly, we have to limit our econometric efforts to the availability of data. We will therefore first estimate our empirical model (7) in log first differences (i.e. growth rates) to obtain estimates of coefficients on firm's TFP growth as well as to eliminate firm fixed effects (η_i), which is the source of bias in the OLS estimator. This will give us the benchmark estimates. In addition, we will run GMM estimates for the countries where the length of the time series makes this approach reasonable.

4 Results

We now provide estimates of the impact of foreign ownership and trade liberalisation on firm performance in SEE firms, using both first differences (section 4.1) and GMM estimations (section 4.2).

4.1 Results with first differences estimation

Availability of data for imports is smaller than for exports. We therefore present results for the model first with exports shares only (Table 5) and then with export and imports shares (Table 6). In Table 5, we also report results with and without controlling for absorptive capacity.[16] As we are regressing growth rate of value added on the growth rate of inputs, we can interpret the results in terms of the contribution

[16]Note that due to small sample sizes for Bosnia-Herzegovina and Macedonia, we bootstrapped the standard errors with 500 replications to get more reliable estimates. For the other countries, we have enough observations to get reliable standard errors. Nevertheless, we have checked that when bootstrapping the estimates do not change.

of different factors to the growth of TFP.

Results presented in Table 5 show for three countries (Bosnia-Herzegovina, Romania and Slovenia) faster TFP growth in foreign owned firms as compared to purely domestic owned firms. Despite some selection process of foreign ownership, documented in Table 4, these results suggest that after restructuring foreign owned firms improve their TFP at a much faster rate than purely domestic owned firms.[17] However, in Bulgaria and Croatia, we do not observe such a significant differential impact between foreign and domestic owned firms on TFP growth. The coefficient on foreign ownership is significant at 20 per cent only.[18]

In terms of the impact of export propensity to different regional markets, we find that in Romania and Slovenia the higher propensity to export to advanced markets (EU-15, rest of OECD countries) has a larger impact on TFP growth than exporting to less advanced markets such as new EU member states and countries of former Yugoslavia. In Bulgaria the positive spillovers from exporting to advanced EU-15 markets benefit only firms with higher absorptive capacity, while in Croatia these positive spillovers for firms with higher absorptive capacity stem from the rest of OECD countries, but not from the EU-15 countries. On the other side, relying on exporting to less competitive markets of ex-Yugoslavia seem to affect negatively the productivity growth of firms in Bulgaria, Croatia and Romania. Note that in Romania the spillovers from exporting to markets of ex-Yugoslavia is less negative for firms with higher absorptive capacity. Based on this, one can conclude that exporting to advanced market provides much larger learning effects for a typical firm than exporting to less advanced markets. Furthermore, relying on exporting to less competitive markets may even generate negative spillovers for TFP growth.

In Table 6, we include the imports shares into our empirical model without altering our results on export shares substantially. In most countries the significant impact of exports to more competitive markets on firms' TFP growth remains preserved as well as the negative impact of export reliance on ex-Yugoslav markets. It is

[17] A similar pattern is found in Indonesia, where foreign ownership leads to significant productivity improvements in the acquired plants (Arnold and Javorcik, 2005). The rise in productivity is also found to be the result of restructuring.

[18] We do not elaborate on the estimates for Macedonia. They are all insignificant and less reliable due to the small sample size and the a lack of degrees of freedom.

Table 5: Impact of FDI and export propensity on productivity growth in SEE firms, period 1995-2002, first differences specification.

	BGR (1)	BGR (2)	BIH (3)	BIH (4)	HRV (5)	HRV (6)	MKD (7)	MKD (8)	ROM (9)	ROM (10)	SVN (11)	SVN (12)
d_k	0.324	0.323	0.155	0.129	0.079	0.078	0.139	0.122	0.232	0.232	0.338	0.332
	[36.39]^a	[36.33]^a	[0.52]	[0.47]	[10.25]^a	[10.13]^a	[0.23]	[0.19]	[77.01]^a	[76.84]^a	[34.03]^a	[33.53]^a
d_l	0.209	0.211	0.064	0.072	0.465	0.464	0.729	0.655	0.358	0.361	0.542	0.543
	[18.28]^a	[18.34]^a	[0.42]	[0.40]	[34.15]^a	[33.45]^a	[1.29]	[1.02]	[82.06]^a	[82.42]^a	[44.71]^a	[44.61]^a
Foreign	0.040	0.040	0.419	0.378	0.039	0.039			0.053	0.051	0.048	0.050
	[1.27]	[1.26]	[3.35]^a	[2.85]^a	[1.32]	[1.31]			[5.45]^a	[5.25]^a	[2.49]^b	[2.56]^b
ln(SecSize)	0.065	0.060	-0.075	-0.092	-0.102	-0.148	-0.258	-0.248	0.081	0.075	-0.058	-0.077
	[2.33]^b	[2.15]^b	[0.47]	[0.55]	[5.39]^a	[7.68]^a	[0.25]	[0.01]	[3.41]^a	[3.17]^a	[5.38]^a	[7.11]^a
shX_EU15	-0.075	-0.077	-0.779	-1 387	0.086	0.102	-3 927	-5 163	0.140	0.134	0.189	0.384
	[0.59]	[0.60]	[0.43]	[0.66]	[0.40]	[0.47]	[0.18]	[0.04]	[2.99]^a	[2.86]^a	[1.76]^c	[3.48]^a
w*shX_EU15		0.002		0.005		-0.005		-0.001		0.001		-0.001
		[2.02]^b		[0.05]		[1.96]^b		[0.00]		[1.88]^c		[6.34]^a
shX_OECDoth	0.005	0.032	-1 120	-1 707	0.034	-0.246	-2 749	-4 020	0.228	0.227	0.188	-0.056
	[0.03]	[0.23]	[0.66]	[0.77]	[0.13]	[0.88]	[0.12]	[0.03]	[4.06]^a	[4.02]^a	[1.29]	[0.37]
w*shX_OECDoth		-0.016		0.076		0.040		0.001		-0.003		0.001
		[1.20]		[0.15]		[2.77]^a		[0.01]		[5.81]^a		[6.12]^a
shX_YU	-0.690	-0.790	-0.374	-0.847	0.177	0.231	-10 110	-12 351	0.195	-0.945	0.016	0.025
	[2.27]^b	[2.49]^b	[0.17]	[0.34]	[0.42]	[0.54]	[0.16]	[0.05]	[0.65]	[2.86]^a	[0.10]	[0.14]
w*shX_YU		0.077		-0.010		-0.016		0.001		0.158		0.001
		[1.07]		[0.08]		[1.98]^b		[0.00]		[7.85]^a		[0.79]
Lambda	0.389	0.380	0.019	0.063	-1 401	-1 957			0.794	0.721	-1 274	-1 832
	[1.27]	[1.24]	[0.25]	[0.54]	[18.12]^a	[20.19]^a			[13.19]^a	[11.61]^a	[21.71]^a	[24.95]^a
Constant	-2 802	-2 749	1 226	1 811			5 752	6 757				3 888
	[4.08]^a	[4.00]^a	[0.53]	[0.67]			[0.23]	[0.05]				[12.67]^a
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector*Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	20,483	20,483	181	181	10,237	10,231	84	84	127,376	127,376	23464	23457
R-sq	0.20	0.20	0.24	0.26	0.15	0.16	0.32	0.33	0.48	0.48	0.19	0.19
Bootstrap reps.			500	500			500	500				

Notes: Dependent variable: d_VA, value added in log first differences. t-statistics in brackets. ^{a}, ^{b} and ^{c} denote significance at 1%, 5% and 10%, respectively. (d_) denotes log first differences. Foreign=1 if the firm is foreign owned, and 0 otherwise. (shX_) denotes regional export shares. (w*shX_) denotes interaction of export shares with absorptive capacity. Lambda is the so-called inverse Mill's ratio. Bootstrap reps. denotes bootstrap replications.

only for Slovenia, where exports shares become generally insignificant after including the import shares into the empirical model.

The role of imports follows a similar path as exporting. Importing from the advanced EU and OECD countries is highly important for firms in Romania and Slovenia. At the same time, for firms in Bulgaria and Romania importing from countries of former Yugoslavia provides a dominant learning effect. In contrast, for Croatian firms with higher absorptive capacity importing from ex-Yugoslav markets provides a negative spillover.[19]

In general terms, considering the results of Tables 5 and 6, trade liberalization is not uniformly benefiting firms. The regional composition of trade flows seems important. Exporting to or importing from more competitive markets is found to generate more likely stronger and positive learning effects for individual firms. In contrast, trade reliance on less competitive markets may generate even negative impact on firm TFP growth. Trade liberalisation within the SEE region thus may not provide a substitute for general trade liberalisation in competitive markets. Access to the competitive markets of EU-15 and other advanced OECD countries is essential for benefitting from learning-by-exporting as well as learning-by-importing. In addition, individual absorptive capacity may play an important role in enhancing the firm potential for taking advantages of the trade spillovers that arise due to the trade liberalisation.

4.2 Results with system GMM estimation

In this section we provide a robustness check for our results obtained using log first-differences. To control for simultaneity between the inputs and output we estimate a dynamic model by employing the system GMM estimations (as described above) for four countries with longer time series. We again present results for two specifications of the model, i.e. with exports shares only and with both exports and imports shares. Note that we report the most robust results obtained by trying many alternative specifications. All countries, but Romania, do pass the Hansen test

[19]For Macedonia no learning effects from exporting to and importing from individual geographic regions could be found. However, again, these results are less reliable due to the small sample size for Macedonian firms.

Table 6: Impact of FDI, export and import propensity on productivity growth in SEE firms, period 1995 - 2002, first differences specification.

	BGR	HRV	MKD	ROM	SVN
	(1)	(2)	(3)	(4)	(5)
d_k	0.276	0.085	-0.106	0.228	0.365
	[25.75]^a	[8.67]^a	[0.18]	[63.92]^a	[28.11]^a
d_l	0.231	0.461	0.632	0.365	0.515
	[16.87]^a	[26.88]^a	[1.10]	[69.86]^a	[33.16]^a
Foreign	0.027	0.036		0.048	0.038
	[0.76]	[1.10]		[4.15]^a	[1.55]
ln(SecSize)	0.088	-0.156	0.607	0.114	-0.106
	[1.91]^c	[7.03]^a	[0.63]	[2.93]^a	[8.83]^a
shX_EU15	-0.058	-0.394	-0.641	-0.061	0.145
	[0.32]	[1.10]	[0.00]	[1.06]	[0.79]
w*shX_EU15	0.003	0.062	0.699	0.008	0.001
	[0.09]	[1.88]^c	[0.31]	[2.40]^b	[0.01]
shX_OECDoth	0.054	-1125	-0.546	0.151	0.428
	[0.28]	[2.71]^a	[0.00]	[2.27]^b	[1.64]
w*shX_OECDoth	-0.006	0.164	0.584	0.003	-0.001
	[0.11]	[4.32]^a	[0.20]	[0.89]	[0.14]
shX_YU	-0.951	-0.312	-1.586	-0.556	-0.237
	[2.49]^b	[0.47]	[0.00]	[1.39]	[1.09]
w*shX_YU	0.245	0.056	1953	0.089	0.001
	[2.04]^b	[0.93]	[0.36]	[3.26]^a	[1.84]^c
shM_EU15	0.082	0.140		1.186	0.353
	[0.19]	[0.26]		[9.17]^a	[1.56]^c
w*shM_EU15	0.022	-0.052	-1.093	-0.007	-0.001
	[0.55]	[1.60]	[0.54]	[2.23]^b	[1.52]
shM_OECDoth	0.441	0.729		1.179	0.448
	[0.99]	[0.84]		[5.33]^a	[1.66]^c
w*shM_OECDoth	-0.117	-0.015	-0.742	0.007	-0.001
	[3.10]^a	[0.48]	[1.02]	[1.22]	[1.76]^c
shM_YU	2081	0.439		1.381	-0.305
	[1.77]^c	[0.35]		[1.57]	[1.02]
w*shM_YU	-0.433	-0.254	1.213	0.100	0.000
	[2.68]^a	[2.75]^a	[0.18]	[2.31]^b	[0.55]
Lambda	0.328	-2.041		0.427	-2.465
	[0.88]	[13.32]^a		[5.40]^a	[22.54]^a
Constant		5.058	-4.010		5.436
		[5.64]^a	[0.55]		[4.90]^a
Year dummies	Yes	Yes	Yes	Yes	Yes
Sector*Year dummies	Yes	Yes	Yes	Yes	Yes
Observations	15,498	6,855	77	91,219	14,584
R-sq	0.16	0.15	0.39	0.49	0.19
Bootstrap replications			500		

Notes: Dependent variable: d_VA, value added specified in log first differences. t-statistics in brackets. ^{a}, ^{b} and ^{c} denote significance at 1%, 5% and 10%, respectively. Foreign=1 if the firm is foreign owned, and 0 otherwise. (shX_) and (shM_) are regional export and imports shares, respectively; (w*sh_) denotes interaction of trade shares with absorptive capacity. Lambda is the so-called inverse Mill's ratio.

of over-identification as well as the AR(2) test for serial correlation. For Romania, we tried also alternative specifications of the model with different lag lengths as well as a one-step GMM approach as proposed by Wooldridge (2005). In each case, we found fairly robust results compared to those of Tables 5 and 6.

Results in Table 7 basically confirm those obtained by first-differences estimations. In particular, foreign ownership remains a significant determinant of TFP growth in Romania and Slovenia. In Bulgaria and Croatia, we find contrasting results for the foreign ownership estimates. In the first-differences specification, the coefficient was significant at 20 per cent only, now it becomes significant at 1 or 5 per cent, respectively. However, this result does not hold in the specifications where both export and import shares are included.

Unfortunately, positive impact of high export propensity to EU-15 countries is not being preserved for Croatia, Slovenia and Romania. For Romania a positive impact of exports to other OECD countries is still significant, while in Bulgaria and Croatia only firms with higher absorptive capacity benefit from exporting to other advanced OECD markets. In Bulgaria and Romania significant positive impact of high imports from the EU-15 and other OECD countries is still documented. On the other side, Bulgaria and Romania also show substantial learning effects from importing from markets of ex-Yugoslavia, while these markets tend to generate negative spillovers for Croatian firms.

These differences in estimates between the first-differences and GMM estimators might arise due to poor quality of the data and lack of persistency of datasets. Therefore, GMM estimations are likely to be less efficient because even lagged levels are poor instruments for the model estimated in levels.

5 Conclusion

In this paper, we attempt to establish a link between two stylized facts of South-eastern European countries: rapid growth and increasing integration in the world economy. We investigate this relationship at the micro level by analyzing the impact of foreign ownership and international trade orientation on firm productivity. We use firm level data matched with bilateral trade flows for 6 SEE countries over the

Table 7: Impact of FDI, export and import propensity on productivity growth in SEE firms, period 1995 - 2002, robustness check with system GMM estimations

	BGR	BGR	HRV	HRV	ROM	ROM	SVN	SVN
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
d_va$_{t-1}$	0.322	0.055	0.254	0.183	0.318	0.222	-0.005	0.067
	[8.49]^a	[1.41]	[3.00]^a	[1.77]^c	[14.56]^a	[5.94]^a	[0.11]	[1.04]
d_k	0.339	0.242	0.037	0.041	0.435	0.307	0.157	0.073
	[6.19]^a	[3.20]^a	[1.59]	[1.31]	[22.63]^a	[14.48]^a	[2.40]^b	[0.79]
d_l	0.168	0.417	0.729	0.752	0.151	0.474	0.616	0.596
	[2.27]^b	[3.77]^a	[8.03]^a	[8.19]^a	[4.12]^a	[9.12]^a	[7.39]^a	[5.09]^a
Foreign	0.076	0.025	0.058	-0.005	0.046	0.019	0.029	0.043
	[6.61]^a	[0.20]	[2.16]^b	[0.03]	[11.45]^a	[4.62]^a	[5.45]^a	[2.76]^a
ln(SecSize)	0.321	-0.348	-0.565	-0.551	-0.606	-0.298	-0.065	-0.126
	[2.20]^b	[1.75]^c	[2.90]^a	[2.91]^a	[3.11]^a	[1.13]	[0.43]	[0.83]
shX_EU15	-4 967	0.448	-1 085	-1 826	-1 268	5 694	0.311	3 777
	[5.75]^a	[0.35]	[0.83]	[0.75]	[1.74]^c	[5.55]^a	[0.11]	[0.76]
w*shX_EU15	-0.001	0.617	-0.053	-0.036	-0.033	-0.343	0.000	-0.001
	[0.12]	[1.63]	[1.07]	[0.19]	[1.48]	[1.38]	[1.78]^c	[0.05]
shX_OECDoth	-5 576	0.544	-3 912	-11 313	-1 219	5 198	-4 520	-2 902
	[5.35]^a	[0.29]	[1.28]	[2.30]^b	[1.39]	[5.97]^a	[1.21]	[0.39]
w*shX_OECDothw	-0.003	1 651	0.430	0.711	0.127	-0.065	-0.001	-0.001
	[0.11]	[2.17]^b	[2.30]^b	[1.98]^b	[1.68]^c	[0.49]	[1.04]	[0.22]
shX_YU	-4 467	-11 516	-2 960	-1 337	-26 006	9 877	-0.169	11 279
	[1.63]	[3.15]^a	[1.03]	[0.28]	[6.73]^a	[1.92]^c	[0.05]	[2.18]^b
w*shX_YU	0.051	0.474	-0.050	-0.162	1 057	-0.569	-0.001	-0.004
	[0.66]	[0.36]	[0.39]	[0.48]	[3.13]^a	[0.66]	[0.93]	[2.43]^b
shM_EU15		8 041		-3 250		1 577		7 252
		[4.68]^a		[1.33]		[1.02]		[0.95]
w*shM_EU15		-0.753		0.190		0.246		0.001
		[1.75]^c		[0.98]		[1.19]		[0.61]
shM_OECDoth		18 149		-9 344		14 486		3 227
		[3.66]^a		[1.74]^c		[3.91]^a		[0.36]
w*shM_OECDoth		-0.540		0.168		0.492		0.003
		[2.11]^b		[0.67]		[1.32]		[0.80]
shM_YU		34 313		4 284		-26 619		2 873
		[4.59]^a		[0.64]		[1.46]		[0.36]
w*shM_impYU		-4 454		-0.915		6 252		0.002
		[3.18]^a		[1.66]^c		[4.47]^a		[1.00]
Lambda	-3 451	1 215	-7 883	-7 291	4 777	2 295	-3 868	-1 884
	[1.44]	[0.52]	[3.89]^a	[3.80]^a	[4.21]^a	[1.26]	[4.78]^a	[1.43]
Constant	6 244	-4 775	21 271	22 953	3 832	-5 050	13 208	1 412
	[1.50]	[1.09]	[3.87]^a	[3.66]^a	[1.19]	[0.78]	[2.85]^a	[0.24]
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector*Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	20,992	15,498	10,340	6,836	132,267	91,219	23,110	14,343
Hansen (p-value)	0.00	0.10	0.88	0.90	0.00	0.00	0.11	0.37
chi2 (p-value)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AR1 (p-value)	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00
AR2 (p-value)	0.25	0.65	0.55	0.14	0.48	0.01	0.92	0.24

Notes: Dependent variable: d_VA-value added, specified in log first differences. t-statistics in brackets. ^{a}, ^{b} and ^{c} denote significance at 1%, 5% and 10%, respectively. Foreign=1 if the firm is foreign owned, and 0 otherwise. (shX_) and (shM_) are regional export and imports shares, respectively; (w*sh_) denotes interaction of trade shares with absorptive capacity. Lambda is the so-called inverse Mill's ratio.

period 1994-2002. We find interesting evidence of differential effects of international openness on productivity growth. The effects vary across countries and channels.

First, the results on the impact on foreign firms on TFP growth are quite uniform. Four out of six countries (Bosnia-Herzegovina, Croatia, Romania and Slovenia) experience faster TFP growth of foreign owned firms. In Bulgaria significant differences have been found only in the case of the GMM estimations. Hence, we can conclude that foreign ownership has helped at restructuring local firms and brought about improvements in their TFP at a much faster rate than in the case of purely domestic owned firms.

Second, the results suggest that trade and its direction is an important source of productivity growth in some countries. In Romania and Slovenia, higher propensity to export to advanced markets (EU-15, rest of OECD countries) has a larger impact on TFP growth than exporting to less advanced markets such as new EU member states and countries of former Yugoslavia. In Bulgaria the positive spillovers from exporting to advanced EU-15 markets benefit only firms with higher absorptive capacity, while in Croatia the positive spillovers for firms with higher absorptive capacity stem from the rest of OECD countries, but not from the EU-15 countries. On the other side, relying on exporting to less competitive markets of ex-Yugoslavia seems to affect negatively the productivity growth of firms in Bulgaria, Croatia and Romania. Similar results are found also for importing links. Importing from the advanced EU and OECD countries is highly important for firms in Romania and Slovenia, while for firms in Bulgaria and Romania importing from countries of former Yugoslavia provides a dominant learning effect. In contrast, for Croatian firms with higher absorptive capacity importing from ex-Yugoslav markets provides a negative spillover. For Macedonia no learning effects from exporting to and importing from individual geographic regions could be found.

Thus, in terms of policy implications, trade liberalisation is not uniformly beneficial. The regional composition of trade flows and absorptive capacity of local firms seem important. Exporting to or importing from more competitive markets is more likely to generate positive learning effects for individual firms, while trade reliance on less competitive markets may generate even negative spillovers. Trade liberali-

sation within the SEE region thus may not provide a substitute for a general trade liberalisation in competitive markets. Free access to the more competitive markets of EU-15 and other advanced OECD countries is essential for local firms in the SEE countries to benefit from learning through trade. In addition, individual absorptive capacity may also play an important role in amplifying the learning effects that arise due to the trade liberalisation.

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6 Appendix

Table 8: SEE countries and WTO membership

	Member since:
Albania	September 8th, 2000
Bulgaria	December 1st, 1996
Croatia	November 30th, 2000
Macedonia	April 4th, 2003
Romania	January 1st, 1995
Slovenia	July 30th, 1995
	Under negotiation since:
Bosnia-Herzegovina	July 15th, 1999
Montenegro	February 15th, 2005
Serbia	February 15th, 2005

Source: WTO's website, www.wto.org.

Table 9: Free trade agreements between SEE countries

	Albania	Bosnia-H.	Bulgaria	Croatia	Macedonia	Romania	Serbia-M.	Slovenia
Albania	-	12/04	09/03	06/03	07/02	01/04	08/04	12/06[b]
Bosnia-H.	12/04	-	12/04	01/05	07/02	12/04	06/02	01/02
Bulgaria	09/03	12/04	-	03/03[a]	01/00	07/97	06/04	01/99[a]
Croatia	06/03	01/05	03/03[a]	-	06/97	03/03[a]	07/04	01/98
Macedonia	07/02	07/02	01/00	06/97	-	01/04	05/05	01/99
Romania	01/04	12/04	07/97	03/03[a]	01/04	-	07/04	01/97[a]
Serbia-M.	08/04	06/02	06/04	07/04	05/05	07/04	-	01/03
Slovenia	12/06[b]	01/02	01/99[a]	01/98	01/99	01/97[a]	01/03	-

Source: www.stabilitypact.org and www.wto.org. Notes: Dates refer to the entry in force of the agreements (mm/yy). [a] Indicates that trade liberalisation took place in the framework of the CEFTA (Central European Free Trade Agreement). Original CEFTA agreement was signed by Czech Republic, Hungary, Poland and Slovakia on December 1992. Slovenia joined in 1996, Romania in 1997, Bulgaria in 1999, Croatia in 2003, Macedonia in 2006 and Albania, Bosnia-Herzegovina, Serbia and Montenegro in 2007. Slovenia, Bulgaria and Romania left CEFTA with the entry in the EU. [b] Indicates that trade liberalisation took place in the framework of the Stabilization and Association Agreement between the EU and SEE countries.