Impact of FDI and regional trade propensity on firm performance in South-Eastern European countries

Jože P. Damijan[1]

Olivier Lamotte[2]

Jose de Sousa[3]

1. Introduction

Since the beginning of the 1990s, some initiatives aimed at creating a dynamic of regional integration in South-Eastern Europe have emerged. The most significant initiative is provided by the creation of the Stability Pact for South-Eastern Europe in 1999, at the initiative of the EU. Within the Stability and association agreements from 2000 the SEE gained asymmetric trade preferences for exporting to EU markets. On the other side EU has also stimulated bilateral free trade agreements between individual SEE countries. It is argued that liberalization of trade associated with free movements of capital can significantly contribute to the restructuring of local firms. In this analysis we study the impact of these different sources of potential outward knowledge spillovers that may be important determinant of productivity growth of individual firms in the countries of South East Europe. We investigate two important sources of external knowledge spillovers – foreign direct investment (FDI) and trade flows. In particular, we are interested in what extent foreign trade flows in addition to foreign direct investment contributed to improvements in firm performance over the period 1995-2002.

For firms in the area of Southeast Europe it is crucial to have free access to as much as possible large foreign markets to place their goods. Trade liberalization among the group of SEE countries may thus be important for local firms to expand their sales. Data show that countries of former Yugoslavia do continue to trade extensively with each other with the export shares close to 15% and import shares about 10%. Some of the countries (Bosnia and Macedonia) seem to rely even more heavily on SEE markets. Though beneficial for expanding firms' sales, it is a relevant question whether high propensity to trade within the SEE region can bring about accordingly high learning effects as compared to the trade with advanced countries.

We perform our analysis by using the firm level data base for these countries, matched with bilateral trade flows (exports and imports). The impact of foreign ownership and trade reliance on firm performance (measured with total factor productivity (TFP)) is estimated by using different panel data techniques and by controlling for potential selection bias. Our results confirm that foreign ownership in an important determinant of firms' TFP growth in some of the countries. Exports is also found to have a significant impact on firm performance, but it is mostly exports to advanced countries (EU-15 and other OECD countries) that matters, while exporting to countries of SEE region is found important only for firms is one country. On the other hand, for firms in Romania and Macedonia importing

[1] University of Ljubljana; Vienna University of Economics and Business Administration; LICOS - Katholieke Univesitetit Leuven; Institute for Economic Research Ljubljana.

[2] CES-EureQua, University of Paris 1

[3] CES-EureQua, University of Paris 1

from countries of former Yugoslavia provides a dominating learning effect. For other countries in our sample no learning effects from exporting to and importing from individual geographic regions could be found.

The remainder of this paper is organized as follows. Next section discusses datasets and provides basic descriptive statistics. Section 3 discusses empirical model and methodology, while section 4 presents the results. Last section summarizes the findings.

2. Data and Descriptive statistics

Data

We make use of firm level data for Bosnia and Herzegovina (BiH), Croatia (HR), Macedonia (MK), Slovenia (SI), Bulgaria (BG) and Romania (RO). We cannot perform similar estimations for firms in Serbia-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), which also contains information on foreign ownership. Data on bilateral trade flows – exports and imports – is obtained from CEPII database. For Slovenia the source of data is AJPES. For Slovenia and Bulgaria, datasets comprise period 1994 – 2002, for Croatia, Macedonia and Romania for the period 1995 – 2002, while for Bosnia and Herzegovina we only have on disposal dataset for 1999-2002. Firm samples size is very different across countries. For Macedonia and Bosnia we have data for about 130 and 220 firms only, while for other countries samples of firms are much bigger: Bulgaria (2,600 firms), Croatia (3,100 firms), Slovenia (4,000 firms) and Romania (10,000 firms).

Foreign ownership

One of the most obvious sources of external knowledge spillovers is the form of ownership, i.e. foreign vs. domestic. An exhaustive line of research has been conducted on different effects of foreign ownership on firm performance in CEECs. Damijan et al (2003) demonstrate that direct effect of foreign ownership is by far the most dominating effect over horizontal or vertical spillovers from foreign ownership in the economy. Firms that are foreign owned are better managed and governed, have access to up-to-date technology of the parent firm and can use the business links of the parent firm. All this taken together results in higher performance of foreign owned firms in terms of higher level of productivity (value added per employee) and higher wages as well as in terms of higher productivity growth. Descriptive statistics in Table 1 reveal productivity and wage superiority of foreign owned firms in Bosnia, Croatia and Slovenia, while in Bulgaria and Romania the opposite might be true.

Table 1: Number of domestic and foreign owned firms and relative wages and value added, 1994 - 2002

	variable	1994	1995	1996	1997	1998	1999	2000	2001	2002
BiH	***# Foreign***						36	35	36	36
	# Domestic						183	184	184	185
	rWage_f						1.02	1.23	0.35	0.56
	rVAe_f						2.22	1.93	0.53	1.00

BG	***# Foreign***	321	506	709	781	1,301	1,511	1,647	1,568	
	# Domestic	404	589	626	623	883	979	1,029	1,011	
	rWage_f	0.89	2.56	1.79	1.10	0.62	0.76	0.72	0.77	
	rVAe_f	0.79	0.74	0.54	1.06	0.66	0.47	0.54	0.76	
HR	***# Foreign***		18	38	54	102	111	113	125	130
	# Domestic		53	147	291	2,899	2,982	2,995	2,985	2,991
	rWage_f		0.00	0.00	0.67	1.29	1.25	1.24	1.44	1.43
	rVAe_f		0.00	0.00	0.81	1.37	1.19	1.11	1.32	1.59
MK	***# Foreign***		0	0	0	0	0	0	0	0
	# Domestic		2	2	3	5	7	132	130	2
	rWage_f									
	rVAe_f									
RO	***# Foreign***		5159	6010	6497	7,050	7,558	7,960	7,633	7,271
	# Domestic		1570	1791	1924	2,063	2,237	2,344	2,281	2,214
	rWage_f		0.52	0.60	0.50	0.73	0.52	0.56	0.60	0.62
	rVAe_f		0.71	0.89	0.80	0.90	1.05	0.94	0.73	1.12
SI	***# Foreign***	109	122	201	222	235	242	255	272	270
	# Domestic	2342	2789	3004	3127	3,351	3,497	3,585	3,455	3,805
	rWage_f	1.15	1.19	1.28	1.18	1.20	1.59	1.29	1.24	1.18
	rVAe_f	1.36	1.26	1.24	1.32	1.14	1.71	1.34	1.50	1.26
YU	***# Foreign***			0	0	0	0	0	0	0
	# Domestic			1	129	113	1,467	1,480	1,399	1,332
	rWage_f									
	rVAe_f									

Note*: rWage_f* and *rVAe_f* are average wage and average value added per employee in foreign owned firms relative to domestic owned firms.

Source: Amadeus, AJPES, authors' calculations.

Trade flows

Another channel of technology transfer is through international trade, in particular imports of intermediate products and capital equipment (see Markusen, 1989; Grossman and Helpman, 1991; Feenstra, Markusen and Zeile, 1992) as well as through learning by exporting into industrial countries (Clerides, Lach and Tybout, 1998). In both cases it is extremely important the geographic destination of trade flows. Firms exporting to more advanced markets can learn more through exports due to higher quality, technical, safety and other standards they have to meet as well as due to tougher competition (and lower markups) they are faced with in the advanced markets. Similarly, firms importing capital and intermediate inputs from more advanced markets have to meet according technical standards in order to be able to use the advanced western technology. Hence, higher propensity to trade with more advanced countries should obviously result in higher level of productivity and faster TFP growth.

Tables 2 and 3 demonstrate high 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%.

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

		1995	1996	1997	1998	1999	2000	2001	2002
BiH	***sh_YU***					30.6	26.4	34.0	33.9
	sh_EU15					45.8	54.6	53.7	52.8

	sh_EU10					8.9	13.0	9.6	8.6
	sh_OECDoth					14.8	6.0	2.7	4.7
BG	***sh_YU***	0.9	6.0	4.1	3.5	4.4	4.1	3.7	1.2
	sh_EU15	75.8	71.5	73.2	74.6	70.1	67.6	67.3	70.2
	sh_EU10	7.9	7.8	7.2	6.8	8.7	8.9	8.5	6.4
	sh_OECDoth	15.4	14.7	15.5	15.1	16.8	19.3	20.4	22.1
HR	***sh_YU***	17.4	17.1	16.4	17.3	17.5	16.2	15.3	14.4
	sh_EU15	54.3	57.5	57.4	57.9	57.7	58.6	61.3	59.4
	sh_EU10	24.1	21.5	20.7	19.9	19.2	17.6	17.3	19.1
	sh_OECDoth	4.2	3.9	5.5	4.9	5.7	7.6	6.1	7.1
MK	***sh_YU***	8.5	15.6	19.0	11.2	14.9	14.8	5.8	3.6
	sh_EU15	80.5	77.1	58.5	67.2	61.0	55.0	69.7	57.4
	sh_EU10	5.9	5.6	17.8	9.7	10.6	11.6	9.1	5.7
	sh_OECDoth	5.1	1.7	4.7	11.8	13.5	18.6	15.5	33.3
RO	***sh_YU***	1.0	3.7	1.9	2.3	0.9	0.9	0.9	0.6
	sh_EU15	71.0	70.0	66.2	66.3	67.7	70.9	75.5	75.1
	sh_EU10	8.9	9.6	10.2	17.4	13.9	12.8	11.7	12.5
	sh_OECDoth	19.1	16.7	21.7	14.1	17.4	15.4	11.9	11.9
SI	***sh_YU***	12.7	14.4	15.1	15.6	13.9	14.7	16.1	15.9
	sh_EU15	74.1	71.0	70.2	69.3	70.1	67.7	66.9	66.2
	sh_EU10	4.9	6.0	6.7	7.4	7.8	9.0	9.2	11.3
	sh_OECDoth	8.3	8.7	8.0	7.7	8.2	8.6	7.8	6.6

Note: Exports shares are shares of exports of individual country to different regions in total country's exports calculated as averages from NACE 4-digit industries. sh_YU is share of exports to countries of former Yugoslavia (SI, HR, BiH, SMN, MK), sh_EU15 is export share to old EU member states, sh_EU10 is export share to new EU member states and sh_OECDoth is share of exports to other OECD countries.

Source: CEPII, authors' calculations.

On the other side, for firms operating in the area of Southeast Europe it is crucial to have free access to as much as possible large foreign markets to place their goods. Trade liberalization among the group of SEE countries may thus be important for local firms to expand their sales. Tables 2 and 3 show that countries of former Yugoslavia do continue to trade extensively with each other with the export shares close to 15% and import shares about 10%. Bosnia (export share to SEE region of 30%) and Macedonia (import share from SEE region of 20%) seem to rely even more heavily on SEE markets. Though beneficial for expanding firms' sales, it is, however, a relevant question whether high propensity to trade within the SEE region can bring about accordingly high learning effects as compared to the trade with advanced countries. Next section has the ambition to empirically verify whether high propensity to export and high import penetration from the SEE markets relative to advanced markets are about to generate similar learning effects for individual firms.

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

		1996	1997	1998	1999	2000	2001	2002
BiH	***sh_YU***							
	sh_EU15							
	sh_EU10							
	sh_OECDoth							
BG	***sh_YU***	1.8	1.9	1.9	2.1	1.5	2.3	
	sh_EU15	79.3	79.6	81.7	80.6	78.1	80.4	
	sh_EU10	6.6	8.0	8.4	9.2	13.5	9.4	
	sh_OECDoth	12.4	10.5	8.1	8.1	6.8	7.9	
HR	***sh_YU***	11.6	11.3	11.3	11.1	10.2	10.0	9.9
	sh_EU15	60.6	63.7	65.6	65.0	66.1	65.5	65.4
	sh_EU10	24.8	21.9	20.4	20.5	20.7	21.7	21.5
	sh_OECDoth	3.0	3.1	2.8	3.3	2.9	2.9	3.3
MK	***sh_YU***	18.3	12.9	21.1	15.9	20.3	21.3	
	sh_EU15	51.9	60.4	38.5	51.2	42.9	42.3	
	sh_EU10	26.6	16.9	33.0	23.0	29.3	29.9	
	sh_OECDoth	3.2	9.8	7.4	10.0	7.5	6.5	
RO	***sh_YU***	0.4	0.6	0.7	0.9	0.9	0.9	0.8
	sh_EU15	86.3	79.1	74.0	76.8	77.2	79.8	79.3
	sh_EU10	7.3	12.8	19.3	17.4	17.7	15.3	14.6
	sh_OECDoth	6.0	7.4	5.9	4.9	4.2	4.0	5.3
SI	***sh_YU***	9.4	7.7	7.4	7.4	8.1	8.9	9.6
	sh_EU15	82.9	83.4	79.3	83.5	83.0	82.0	81.8
	sh_EU10	4.5	5.1	4.5	5.2	5.3	5.5	5.2
	sh_OECDoth	3.3	3.7	8.8	3.9	3.6	3.5	3.4

Note: Imports shares are shares of imports of individual country from different regions in total country's imports calculated as averages from NACE 4-digit industries. sh_YU is share of imports from countries of former Yugoslavia (SI, HR, BiH, SMN, MK), sh_EU15 is import share from old EU member states, sh_EU10 is import share from new EU member states and sh_OECDoth is share of imports from other OECD countries.

Source: CEPII, authors' calculations.

3. Empirical model and methodology

3.1. Modelling impact of FDI and trade effects on firm performance

In this Section 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 analyses. 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:

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

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:

$$(2) \quad y_{it} = \alpha k_{it} + \beta l_{it} + \gamma t_{it},$$

where the small letter variable indicates its logarithmic growth rate of *K*, *L*, and *T*, and α, β, and γ represent the elasticity of output with respect to *k*, *l* and *t*. 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 *t* is a function of ownership F_i and of various knowledge spillover effects Z_{it}:

(3) $t_{it} = f^i(F_i, Z_{jt})$,

Where $ES_{jt}, X_{jt}, M_{jt} \in \mathbf{Z}_{jt}$. Elements of $\mathbf{Z}_{jt}$ include the potential home market spillovers ES_{jt} (external economies of scale at the NACE 2-digit industry *j* level), knowledge spillovers from exporting Xj_{it} and importing M_{jt}. Foreign trade spillovers are measured as shares of regional exports and imports to EU-15, EU-10, ex-YU and other OECD countries in total exports and imports. As we do not dispose with the firm level information on trade flows we use trade shares calculated at the NACE 2-digit sector.

Finally, we estimate the following regression model:

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

where ϕ_t indicates time effects which capture time specific economic shocks typical for each of the countries under investigation, u_{it} is the error term and

$$shX_{jt}\_EU15, shX_{jt}\_EU10, shX_{jt}\_exYU, shX_{jt}\_rOECD \in X_{jt}$$

$$shM_{jt}\_EU15, shM_{jt}\_EU10, shM_{jt}\_exYU, shM_{jt}\_rOECD \in M_{jt}$$

are regional export and import shares.

3.2. Econometric issues

Estimating (4) pose at least two econometric problems that can potentially lead to seriously biased estimations of the estimated coefficients in our regression model (4). First problem typically arises in growth accounting approach where output and inputs are simultaneously determined. The second problem 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. We have to deal with both issues in order to get robust and reliable estimations of our coefficients of interest.

Dealing with the simultaneity problem

In order to see how inputs and output are simultaneously determined and how this creates serial correlation in our regression model, one can rewrite (4):

(5) $$y_{it} = a_{it} + \alpha k_{it} + \beta l_{it} + t_{it} + \phi_t + (\eta_i + v_{it} + m_{it}),$$

$$v_{it} = \rho v_{i,t-1} + e_{it} \qquad |\rho| < 1$$

$$e_{it}, m_{it} \sim \text{MA}(0)$$

where t_{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, v_{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 potentially correlated with firm-specific effects (η_i) as well as with both productivity shocks (e_{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 dependent 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 (5) that is captured by the autoregressive productivity shock v_{it}, 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 (5). The time dimension of panel data enable 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 (5) can then be written as:

$$(6) \qquad y_{it} = \rho y_{i,t-1} + \alpha k_{it} - \rho\alpha k_{i,t-1} + \beta l_{it} - \rho\beta l_{i,t-1} + (\delta_t - \rho\delta_{t-1}) + (\gamma t_{it} - \rho\gamma t_{i,t-1} + \eta_i(1-\rho) + e_{it} + m_{it} - \rho m_{i,t-1}) .$$

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 (5), 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 v_{it} and m_{it} in (5) 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 this 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 (4) 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 Δu_{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 choice of approach that allows for controlling for the unobserved heterogeneity and simultaneity in (6) 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 privatized companies as well as to eliminate unobserved firm-specific effects. Since lagged level instruments used in diff-GMM approach are shown to be weak instruments for first-differenced equation, we apply sys-GMM approach, which in addition to lagged levels uses also lagged first-differences as instruments for equations in levels. As model is estimated in first differences, corresponding instruments for Δx_{i3} are x_{i1} and Δx_{i1} (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 also other ways of dealing with simultaneity problem, such as Levinsohn-Petrin (1996) and Olley-Pakes (2002) approach. Both of them as well as the system GMM approach might be used efficiently to deal with this problem. A drawback, however, of all of these approaches is that they are computationally very expensive and 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. We will therefore have to limit our econometric efforts to the availability of data.

Correction for sample selection bias

This study deals with the sample selection problem using the two-step method proposed by Heckman (1979).[4] In the first step a probit model of structural characteristics of firms with respect to foreign investment choices is estimated (see Table 4 for results). Results indicate some selection process in FDI decisions by parent foreign companies. Foreign parent companies seem to tend to select smaller firms in SEE countries (significant for BiH, RO an SI) as well as less initially productive (not true for RO) and less capital and skill intensive firms.

Based on these probit results, the so-called inverse Mill's ratios, λ_i, for all observations (for non-zero as well as zero observations regarding foreign investment choices) are calculated. A vector of λ_i is then included in the estimations of model (4) as an additional independent variable which controls for the unobserved impact of foreign investment decisions.

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

Table 4: Heckman probit estimates

	BIH	BG	HR	RO	SI
Size (emp)	***-0.0159	-2.8E-05	0.0003	**-0.0003	**-0.0015
	-4.42	*-0.52*	*1.32*	*-1.91*	*-2.15*
K/L-ratio	-0.0023	2.6E-06	***-0.0003	*-0.0012	-3.6E-06
	-0.73	*0.40*	*-2.60*	*-1.73*	*-0.76*
VA/emp	0.0510	-4.4E-05	***-0.0206	***0.0271	***-8.3E-05
	1.06	*-1.31*	*-2.53*	*3.70*	*-2.86*
Skill int.	0.1019	-2.9E-05	***-0.0705	***-0.1113	***-3.2E-04
	0.48	*-0.29*	*-3.47*	*-3.81*	*-7.37*
Secsize	0.0000	-5.1E-10	***-1.3E-06	***4.8E-07	***-2.2E-09
	0.87	*-1.24*	*-7.21*	*17.69*	*-7.70*
# obs	173	946	4893	4619	7587
Prob > chi2	0.00	0.00	0.00	0.00	0.00

Notes: First year in the dataset is taken for probit estimates. t-statistics in italics. ***, **, and * indicate statistical significance of coefficients at 1, 5 and 10 per cent, respectively.

4. Results

In this Section we provide estimates of the impact of foreign ownership and trade liberalization on firm performance in SEE firms. As indicated above 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. This can be seen in Table 5 which reveals very poor availability of data for Bosnia 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 very poor. One 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 then become more moderate. This is due to the transition process which is characterized by initial huge drop in economic activity and fast recovery afterwards. This process of transition, thus, lacks the persistency which 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 and will therefore first estimate our empirical model (4) in log first differences (i.e. growth rates) in order 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 the bias in the OLS estimator. This will also give us the benchmark estimates. In addition, we will run GMM estimates for those countries only where the length of the time series makes this approach reasonable.

Table 5: Average rates of growth of value added, labor and value added per employee in SEE, 1994-2002, in %

		1994	1995	1996	1997	1998	1999	2000	2001	2002
BiH	**d*VA***							-45.5	120.4	6.8
	d*L*							4.1	-32.3	-2.3
	d*VAe*							-49.7	153.9	9.5
	d*VAe_f*							-8.2	17.2	5.2
BG	**d*VA***	-74.8	-516.7	-108.7	65.7	34.4	-5.2	6.2	7.9	4.9
	d*L*	-7.1	0.6	0.9	1.7	0.4	-3.2	-4.0	-6.2	5.8
	d*VAe*	-23.9	-592.1	-108.3	67.9	37.1	-8.0	14.7	5.8	-0.1
	d*VAe_f*	-9.6	-234.4	-48.2	30.4	16.3	-3.1	7.6	3.9	-0.2

HR	**d*VA***		6.9	-0.5	-7.1	7.4	11.0	12.7	1.0
	d*L*		-1.4	-3.5	-2.5	5.7	3.1	5.2	4.6
	d*VAe*		5.6	12.4	-5.6	0.4	7.7	7.0	-4.3
	d*VAe_f*		6.4	16.5	-1.0	0.4	0.5	0.1	0.3
MK	**d*VA***							-7.4	
	d*L*						-1.3	-2.6	-14.8
	d*VAe*							-4.6	
	d*VAe_f*								
RO	**d*VA***		10.1	1.3	-4.4	-0.8	8.2	25.0	-3.5
	d*L*		6.4	19.4	15.4	8.6	11.5	2.7	-5.7
	d*VAe*		7.0	-13.8	-13.8	-4.4	0.9	18.0	-4.5
	d*VAe_f*		5.8	-11.9	-10.3	-5.0	-0.7	13.4	-4.0
SI	**d*VA***	25.2	22.6	21.2	11.6	14.2	10.7	12.2	9.9
	d*L*	7.6	3.7	5.1	4.4	3.9	4.0	3.5	0.6
	d*VAe*	17.6	19.0	16.1	7.2	10.3	6.6	8.8	9.3
	d*VAe_f*	-0.4	17.9	3.7	1.0	1.4	3.1	5.8	-1.4

Source: Amadeus, AJPES, authors' calculations.

4.1. Results with first differences estimation

Availability of data for imports is smaller than for exports. We therefore first present results for the model with exports shares only and then proceed with presenting results for the model with imports shares. As we are regressing growth rates of inputs on the growth rate of value added, one can interpret the results in terms of the contribution of different factors to the growth of TFP.

Table 6: Impact of FDI and export propensity on productivity growth in SEE firms, period 1995 – 2002

	BIH	**BG**	**HR**	**RO**	**SLO**	**MK**
d*K*	0.137	***0.796	***0.067	***0.539	***0.339	*0.357
	0.56	*48.61*	*12.32*	*68.96*	*34.11*	*1.98*
d*L*	0.067	***0.294	***0.424	***0.319	***0.540	0.080
	0.47	*11.82*	*44.12*	*45.26*	*44.59*	*0.29*
Foreign	***0.441	0.016	**0.066	***-0.064	0.048	
	4.40	*0.79*	*2.16*	*-7.32*	*2.49*	
log *Secsize*	0.008	-0.001	***-0.126	***-0.079	***-0.057	0.038
	0.18	*-0.10*	*-18.63*	*-8.90*	*-7.71*	*1.22*
EXsh_EU15	-0.611	0.062	0.036	***0.248	*0.146	0.489
	-0.85	*0.77*	*0.25*	*4.78*	*1.72*	*0.38*
EXsh_OECDoth	-0.197	-0.040	0.014	***0.304	*0.212	0.705
	-0.27	*-0.35*	*0.08*	*5.94*	*1.93*	*0.52*
EXsh_YU	-0.467	-0.391	0.115	***0.703	0.006	-0.756
	-0.54	*-1.38*	*0.40*	*2.87*	*0.06*	*-0.25*
lambda	0.017	-0.466	***-1.662	***0.185	***-1.167	
	0.25	*-0.98*	*-28.43*	*10.37*	*-20.70*	
Year dummies	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
# Obs	181	4461	21368	33366	23464	106
Adj R2	0.135	0.807	0.113	0.248	0.186	0.149
Prob > chi2	0.00	0.00	0.00	0.00	0.00	
# BS Replications						500

Notes: Dependent variable d*VA* (value added, specified in log first differences). t-statistics in italics.
***, **, and * indicate statistical significance of coefficients at 1, 5 and 10 per cent, respectively.

Results presented in Table 6 confirm for three countries (Bosnia, Croatia and Slovenia) faster TFP growth in foreign owned firms as compared to purely domestic owned firms. In Romania, in contrast we find faster TFP growth in domestic owned firms, while in Bulgaria no significant differences have been found. The results are in line with the results on the

selection process which showed that foreign parent companies have acquired mainly least productive, less capital and skill intensive firms. However, one can expect that after restructuring these firms would improve their TFP at a much faster rate than purely domestic owned firms.

In terms of the impact of export propensity to different regional markets we find that 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 other words, exporting to advanced countries provide much larger learning effects for a typical firm than exporting to less advanced markets.

Including the imports shares into our empirical model does not alter our results on export shares (see Table 7). The role of imports follows a similar path as exporting. Importing from the advanced EU and OECD countries is important for firms in Romania. At the same time, for firms in Romania and Macedonia importing from countries of former Yugoslavia provides a dominating learning effect. For other countries in our sample no learning effects from exporting to and importing from individual geographic regions could be found. However, in none of the countries significant negative effects of trade shares on firm's performance is found. Thus, in terms of policy implications, liberalization of bilateral trade within the region of SEE might be an important engine of firms' growth in some of the countries.

Table 7: Impact of FDI, export and import propensity on productivity growth in SEE firms, period 1995 – 2002

	BG	HR	RO	SLO	MK
d*K*	***0.464	***0.086	***0.533	***0.365	*0.374
	15.46	*8.71*	*57.65*	*27.49*	*1.67*
d*L*	***0.340	***0.458	***0.319	***0.525	0.045
	11.75	*27.35*	*38.36*	*33.39*	*0.14*
Foreign	0.021	0.037	***-0.087	0.035	
	0.84	*1.15*	*-8.24*	*1.46*	
log *Secsize*	-0.013	***-0.074	***-0.137	***-0.080	-0.027
	-0.83	*-5.97*	*-10.10*	*-8.35*	*-0.45*
EXsh_EU15	0.156	*0.370	0.056	*0.173	0.665
	1.57	*1.75*	*0.88*	*1.70*	*0.42*
EXsh_OECDoth	0.056	0.315	***0.238	***0.390	0.471
	0.40	*1.21*	*3.71*	*2.83*	*0.27*
EXsh_YU	-0.330	0.620	0.192	0.111	-1.194
	-0.87	*1.50*	*0.70*	*0.89*	*-0.33*
IMsh_EU15	-0.115	-0.219	***0.651	0.251	1.895
	-0.56	*-1.14*	*8.51*	*1.31*	*1.52*
IMsh_OECDoth	-0.110	-0.276	***1.329	0.177	0.649
	-0.44	*-0.91*	*8.29*	*0.92*	*0.18*
IMsh_YU	0.086	-0.606	***1.647	-0.144	*5.990
	0.14	*-1.08*	*3.28*	*-0.75*	*1.66*
lambda	0.779	***-1.123	***0.384	***-1.548	
	1.00	*-10.70*	*13.49*	*-19.42*	
Year dummies	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
# Obs	3193	6860	24899	14349	92
Overall R2	0.317	0.134	0.244	0.186	0.202
Prob > chi2	0.00	0.00	0.00	0.00	
# BS Replications					500

Notes: Dependent variable d*VA* (value added, specified in log first differences). t-statistics in italics. ***, **, and * indicate statistical significance of coefficients at 1, 5 and 10 per cent, respectively.

4.2. Results with system GMM estimation

In order to control for simultaneity between the inputs and output we estimate a dynamic model by employing the system GMM estimations for four countries with longer time series. Results in Table 8 basically confirm results obtained by first differences estimations. In particular, foreign ownership remains significant determinant of TFP growth in Croatia and Slovenia. Unfortunately, positive impact of high export propensity to EU-15 and other OECD countries is not being preserved for Croatia, Slovenia and Romania, while in Romania a positive impact of high imports from the EU-15 and other OECD countries is still preserved. These differences in estimated coefficients between the first differences estimator and GMM estimator might arise due to poor quality of the data and due to the lack of the persistency of datasets. Therefore, GMM estimations are likely to be less efficient due to the fact that even lagged levels are poor instruments for the model estimated in levels.

Table 8: Impact of FDI, export and import propensity on productivity growth in SEE firms, period 1995 – 2002, system GMM estimations

	BG	SI	HR	RO
dVA_1	*0.138	**0.138	***0.303	***0.220
	1.92	*2.29*	*4.73*	*5.12*
d*K*	***0.562	***0.302	*0.047	***0.506
	5.43	*5.05*	*1.90*	*12.16*
d*L*	***0.359	***0.317	***0.634	***0.413
	3.14	*3.67*	*8.87*	*8.77*
Foreign	0.225	***0.028	*0.011	0.061
	0.76	*5.23*	*1.84*	*0.51*
log *Secsize*	-0.053	*-0.229	-0.146	***-1.216
	-0.47	*-1.92*	*-0.75*	*-4.79*
EXsh_EU15	0.825	0.163	-1.225	**-0.721
	0.93	*0.50*	*-1.08*	*-2.15*
EXsh_OECDoth	-0.280	0.644	-1.907	0.136
	-0.41	*1.14*	*-0.85*	*0.77*
EXsh_YU	4.535	0.179	2.82	***1.676
	1.09	*0.35*	*-1.17*	*4.50*
IMsh_EU15	-0.539	-2.717	0.550	***3.142
	-0.56	*-0.96*	*0.30*	*5.15*
IMsh_OECDoth	-0.198	-2.921	0.495	***5.461
	-0.19	*-1.01*	*0.18*	*6.02*
IMsh_YU	-3.203	-3.743	1.110	-2.597
	-0.84	*-1.12*	*0.20*	*-0.30*
lambda	-7.926	***-4.417	***-5.185	***2.655
	-0.89	*-6.11*	*-2.70*	*8.07*
Year dummies	*Yes*	*Yes*	*Yes*	*Yes*
# *Obs*	3568	14352	6916	25418
Prob > chi2	0.000	0.000	0.000	0.000
Hansen test of overid. (p)	0.29	0.001	0.961	0
AR(1) test (p)	-3.49	-6.4	-7.6	-9.54
AR(2) test (p)	-1.35	0.45	0.91	0.76

Notes: Dependent variable d*VA* (value added, specified in log first differences). t-statistics in italics. ***, **, and * indicate statistical significance of coefficients at 1, 5 and 10 per cent, respectively.

5. Conclusions

In this analysis we investigated the impact of trade liberalization on performance of firms in the countries of South-East Europe. In particular, we were interested in what extent foreign trade in addition to foreign direct investment contributed to improvements in firm performance over the period 1995-2002. We find that in three countries (Bosnia, Croatia and Slovenia) foreign ownership contributed to faster TFP growth in foreign owned firms as compared to purely domestic owned firms. In Romania, in contrast we find faster TFP growth in domestic owned firms, while in Bulgaria no significant differences have been found.

Concerning the impact of trade on firms' performance, we find no general picture. It is revealed that in three out of five countries (Croatia, Romania and Slovenia) higher propensity to export to advanced markets (EU-15 and 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 other words, in these three countries exporting to advanced countries provide much larger learning effects for a typical firm than exporting to less advanced markets. On the other side, importing from the advanced EU and OECD countries is important only for firms in Romania. At the same time, for firms in Romania and Macedonia importing from countries of former Yugoslavia provides a dominating learning effect. For other countries in our sample no learning effects from exporting to and importing from individual geographic regions could be found. However, in none of the countries significant negative effects of trade shares on firm's performance is found. Thus, in terms of policy implications, liberalization of bilateral trade within the region of SEE did not harm local firms but might be an important engine of firms' growth in some of the countries.

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