The wiiw Balkan Observatory

Working Papers | 070 | August 2006

*Jože P. Damijan, José de Sousa and Olivier Lamotte*

# The Effect of Trade Liberalization in South-Eastern European Countries

# The wiiw Balkan Observatory

## www.balkan-observatory.net

*About*

Shortly after the end of the Kosovo war, the last of the Yugoslav dissolution wars, the Balkan Reconstruction Observatory was set up jointly by the Hellenic Observatory, the Centre for the Study of Global Governance, both institutes at the London School of Economics (LSE), and the Vienna Institute for International Economic Studies (wiiw). A brainstorming meeting on Reconstruction and Regional Co-operation in the Balkans was held in Vouliagmeni on 8-10 July 1999, covering the issues of security, democratisation, economic reconstruction and the role of civil society. It was attended by academics and policy makers from all the countries in the region, from a number of EU countries, from the European Commission, the USA and Russia. Based on ideas and discussions generated at this meeting, a policy paper on Balkan Reconstruction and European Integration was the product of a collaborative effort by the two LSE institutes and the wiiw. The paper was presented at a follow-up meeting on Reconstruction and Integration in Southeast Europe in Vienna on 12-13 November 1999, which focused on the economic aspects of the process of reconstruction in the Balkans. It is this policy paper that became the very first Working Paper of the wiiw Balkan Observatory Working Papers series. The Working Papers are published online at www.balkan-observatory.net, the internet portal of the wiiw Balkan Observatory. It is a portal for research and communication in relation to economic developments in Southeast Europe maintained by the wiiw since 1999. Since 2000 it also serves as a forum for the Global Development Network Southeast Europe (GDN-SEE) project, which is based on an initiative by The World Bank with financial support from the Austrian Ministry of Finance and the Oesterreichische Nationalbank. The purpose of the GDN-SEE project is the creation of research networks throughout Southeast Europe in order to enhance the economic research capacity in Southeast Europe, to build new research capacities by mobilising young researchers, to promote knowledge transfer into the region, to facilitate networking between researchers within the region, and to assist in securing knowledge transfer from researchers to policy makers. The wiiw Balkan Observatory Working Papers series is one way to achieve these objectives.

# The wiiw Balkan Observatory

# Global Development Network Southeast Europe

*This study has been developed in the framework of research networks initiated and monitored by wiiw under the premises of the GDN–SEE partnership.*

The Global Development Network, initiated by The World Bank, is a global network of research and policy institutes working together to address the problems of national and regional development. It promotes the generation of local knowledge in developing and transition countries and aims at building research capacities in the different regions.

The Vienna Institute for International Economic Studies is a GDN Partner Institute and acts as a hub for Southeast Europe. The GDN–wiiw partnership aims to support the enhancement of economic research capacity in Southeast Europe, to promote knowledge transfer to SEE, to facilitate networking among researchers within SEE and to assist in securing knowledge transfer from researchers to policy makers.

The GDN–SEE programme is financed by the Global Development Network, the Austrian Ministry of Finance and the Jubiläumsfonds der Oesterreichischen Nationalbank.

For additional information see www.balkan-observatory.net, www.wiiw.ac.at and www.gdnet.org

# The effect of trade liberalization in South-Eastern European countries*

Joze Damijan† José de Sousa‡ Olivier Lamotte§

August 1st, 2006

**Abstract**

South-Eastern European (SEE) countries have recently engaged in a regional integration process, through the establishment of free trade agreements between themselves and with the European Union (EU). This study evaluates the impact of this process on trade and firm performance.

Three complementary approaches are used. The first consists in evaluating the degree of trade integration of SEE countries and determining their trade potential with their main partners, i.e. themselves and the EU. The second approach tries to evaluate the evolution of tariffs and nontariffs barriers, faced by SEE countries and estimate their effects on manufactured trade. The third part investigates the impact of trade liberalization on performance of firms in SEE. In particular, we are interested in what extent foreign trade and foreign direct investment contributed to improvements in firm performance.

Several interesting results emerge from this study. Concerning our first approach, we find three results. First, Western Balkan countries have reached their trade potential for almost all sectors while Eastern Balkan countries have outreached them. One can therefore expect an increase of trade flows between the Western Balkans and the EU. Second, it seems that preferential trade agreements between SEE countries will have a limited impact on their mutual trade since their trade potentials are already reached. Third, all SEE countries' trade is below its potential with the rest of the world.

*This report has been completed within the framework of the Global Development Network project supervised by the WIIW (Austria). We thank Mario Holzner, Robert Stehrer and participants at two WIIW workshops for helpful comments and discussions.

†University of Ljubljana and Licos, University of Leuven, E-mail: joze.damijan@ef.uni-lj.si

‡CES-EureQua, University of Paris 1, E-mail: jdesousa@univ-paris1.fr

§CES-EureQua, University of Paris 1.

Concerning our second approach, we find that exports are increasing in all sectors during the period 1996-2000, while bilateral tariffs are decreasing. However, this liberalization process exhibits small effects on trade. On the other hand, we find that nontariff barriers are *increasing* during the period. Trade liberalization should not be treated as exogenous (Trefler, 1993). Domestic firms, competiting with Balkan exporters, may have increased their lobbying activity for greater protection. As a result, NTBs increase and hurt exports of Balkan countries. In that respect, we find large estimates of NTBs on exports of manufactured goods.

Concerning our third approach, we do not find a general pattern of uniformly significant impact of extensive trade flows on individual firm's TFP growth. Specifically, only 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 members and countries of former Yugoslavia. The role of imports follows a similar path as exporting. Importing from the advanced 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. Thus, one cannot imply that liberalization of bilateral trade within the region of SEE or with the other regions will have uniformly significant impact on individual firm's performance, but in some of the countries analysed trade liberalization might be an important engine of firms' productivity growth.

Our results also indicate some selection process in FDI decisions by parent foreign companies. Foreign parent companies seem to select smaller firms in SEE as well as least productive, less capital and skill intensive firms. However, we find contrasting results on the impact on foreign ownership on TFP growth. Three countries (Bosnia, Croatia and Slovenia) experience faster TFP growth in foreign owned firms. In Romania, in contrast we find faster TFP growth in domestic owned firms, while in Bulgaria no significant differences have been found. However, one can expect that after restructuring these firms would improve their TFP at a much faster rate than purely domestic owned firms.

Key-words: trade potential, trade liberalization, gravity equation, preferential trade agreements, South-Eastern Europe.

JEL Classification: C13, C23, F15, F17

# Contents



# List of Tables

# 1 Introduction

The dissolution of the Council of Mutual Economic Assistance (CMEA) and of the Socialist Federative Republic of Yugoslavia (SFRY) in 1991 have deeply affected economic and trade flows of South-Eastern Europe[1] (SEE) countries. They also have created incentives for a reshaping of trade patterns in the region. The topic of regional trade integration in SEE countries has been largely debated at the end of the 1990s. Some authors have advocated the creation of a free trade area between Successor States of former Yugoslavia. They argued that their poor export performances towards the EU could be compensated by an increase of their mutual exports (Kovac, 1998; Uvalić, 2001). Other authors have considered that this trade policy would have limited economic gains and was risky for the most fragile economies of the region (Kaminsky and de la Rocha, 2003).

New initiatives aimed at creating a dynamic of trade reintegration to the world economy have been launched during the mid 1990s. The dynamic of trade liberalization first took the form of a progressive reintegration of South-Eastern European countries to the World Trade Organization (WTO). Until the 1st of October, 2005 all SEE countries are WTO members except Bosnia-Herzegovina and Serbia-Montenegro[2]. But, more importantly, this dynamic took place at regional and sub-regional levels. For Bulgaria and Romania, regional economic integration with the EU took the form of cooperation agreements between 1990 and 1993 and then association agreements aimed at creating a free trade area. For other SEE countries, Stabilization and Association agreements have entered in force since 2001. At the same time a sub-regional process of economic integration has emerged. On one hand, Bulgaria and Romania have liberalized their trade in the framework of the Central European Free Trade Agreement (CEFTA) signed in 1997. On the other hand, a set of bilateral trade agreements have entered in force between all SEE countries at the beginning of the 2000s.

This study evaluates the impact of the integration process of SEE countries. Three complementary approaches are used. The first consists in evaluating the degree of their trade integration between 1994 and 2002, and determining their

[1]South-Eastern Europe refers to Western Balkans (Albania, Bosnia-Herzegovina, Croatia, Macedonia, Serbia-Montenegro) and Eastern Balkans (Bulgaria and Romania).

[2]Situations of each country towards the WTO are presented in Table (26) in appendix.

trade potential with their main partners, i.e. themselves and the EU. We can therefore identify potential gains of trade linked to the regional integration process. The second approach first tries to evaluate the evolution of tariffs and nontariffs barriers, faced by SEE countries, between 1996 and 2000, and to estimate their effects on manufactured trade. The third part investigates the impact of trade liberalization on performance of firms. In particular, we are interested in what extent foreign trade and foreign direct investment contributed to improvements in firm performance over the period 1995-2002[3].

In our first approach, the calculation of trade potentials is based on the estimation of a gravity equation. This method has been largely used to determine *ex ante* and *ex post* the effects of preferential trade agreements or, in the case of Eastern European countries, the effects of international openness. The calculation of trade potentials allows comparing the intensity of trade flows of a country pair or a country group to a sample which constitutes the counterfactual. The choice of the reference sample represents a crucial step (Fontagné *and alii*, 2002) and depends of the goal of the study. Two dimensions must be taken into account: the sample of countries and the time period.

Many recent articles have studied trade reorientation of Central European countries during the 1990s but very few authors have studied trade flows of SEE countries. Some exceptions are noticeable. Christie (2002) evaluates the trade potential of SEE countries by estimating a gravity equation and simulating the evolution of their national income. The author identifies an unbalanced integration in 1996-1999, since trade flows are much higher or much lower than their "natural" level. Kaminski and de la Rocha (2003) show, through a gravity equation, that there is no potential for the increase of trade flows between SEE countries but a potential with other European countries. These two studies use cross-section data and techniques, which do not take account for the time dimension or the country heterogeneity. This elements are particularly important as the countries of the region have known episodes of conflicts and sanctions in the 1990s, which have deeply affected their trade flows.

Our approach concerning the computation of trade potential is different and

[3]The three different approaches retain three different periods due to severe data constraints on the 1994-2002 period (see below).

our contribution stands at three levels. First we highlight the effects of the recent process of trade liberalization between SEE countries and between themselves and the EU. Second, we use panel data and panel techniques. We use the Hausman-Taylor (1981) methodology, which allows taking account the endogeneity of free trade agreements[4]. Thirdly, our estimations are based on sectoral data, which allows taking account trade specialization and to evaluate trade liberalization limited to some sectors.

With respect to our second approach, concerning the effects of tariffs and non-tariffs barriers on manufactured trade flows, we get also interesting results. We find that exports are increasing in all sectors during the period 1996-2000, while bilateral tariffs are decreasing. However, this liberalization process exhibits small effects on trade. In other hand we find that, if tariffs are decreasing, nontariff barriers are *increasing* during the period. Trade liberalization should not be treated as a given (Trefler, 1993). Domestic firms, competiting with Balkan exporters, may have increased their lobbying activity for greater protection. As a result, NTBs increase and hurt exports from Balkan countries. In that respect, we find large estimates of NTBs on exports of manufactured goods.

Concerning our third approach, we investigate different sources of potential outward knowledge spillovers that may be important determinant of productivity growth of individual firms. International trade is an obvious channel of technology transfer, 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). 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). 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 should obviously result in higher level of productivity and faster TFP growth.

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

[4]See on this point Baier and Bergstrand (2003, 2004).

than exporting to less advanced markets such as new EU members 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. The role of imports follows a similar path as exporting. Importing from the advanced EU and OECD countries is important for firms in Romania. Thus, in terms of policy implications, trade liberalization within the region of SEE might be an important engine of firms' growth in some of the countries.

Another obvious channel is the form of ownership, foreign vs. domestic. Damijan *et alii* (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. Our results also indicate some selection process in FDI decisions by parent foreign companies. Foreign parent companies seem to select smaller firms in SEE as well as least productive, less capital and skill intensive firms. However, we find contrasting results on the impact on foreign firms on TFP growth. Three countries (Bosnia, Croatia and Slovenia) experience faster TFP growth in foreign owned firms. In Romania, in contrast we find faster TFP growth in domestic owned firms, while in Bulgaria no significant differences have been found. However, one can expect that after restructuring these firms would improve their TFP at a much faster rate than purely domestic owned firms.

In section 2, we present the regional trade process in South-Eastern Europe. In section 3, we compute trade potentials. In section 4, we evaluate the effects of tariffs and nontariffs barriers on trade. In section 5, we investigate the impact of trade liberalization on firm performance. In the last section, we conclude.

# 2 Regional integration

Since the beginning of the 1990s, some initiatives aimed at creating a dynamic of regional integration in South-Eastern Europe have emerged. For several reasons presented in the core of this paper, these initiatives have not led to the creation of an institutional framework that could enhance trade flows of the countries of the region. This dynamic has however been renewed by the creation of the Stability

Pact for South-Eastern Europe in 1999, at the initiative of the EU. Actually, the process of reconciliation and regional cooperation constitutes "the cornerstone of the EU policy for the region" (Commission of the European Communities, 2003) and it constitutes the core of the Pact for the stabilization, the reconstruction, and the transformation of the Balkan economies[5]. Foreign trade promotion was developed through two main initiatives: the stabilization and association agreements (sub-section 1), and the free trade agreements between the beneficiary countries of the Stability Pact, initiated by the *Memorandum of Understanding on Trade and Transport Facilitation*[7] (sub-section 2).

## 2.1 Measures of trade liberalization between the EU and SEE countries

The process of stabilization and association is a component of the Stability Pact and includes trade measures as well as measures aimed at favoring the political, economical, financial and humanitarian cooperation. Concerning trade measures, the relationships of the beneficiary countries and the EU have been reinforced by two kinds of measures: the asymmetric trade preferences from 2000 and the stabilization and association agreements.

The first package of measures has been consigned in the regulation (EC) 2007 / 2000 of the EU which introduces free access to the EU for the products originating from the SEE countries[8]. There are very few restrictive measures and they take the

[5]The Stability Pact for South-Eastern Europe was created at the aftermath of the Kosovo war and the NATO bombings to propose long run solutions for Western Balkans. This approach was highly necessary since SEE countries had not, to the contrary of Eastern European countries, intense and new relationships with the EU (Van Brabant, 2001). On 30 June 1999, the leaders of 39 countries and the representatives of 17 international organizations met in Sarajevo to adopt the Stability Pact for South-Eastern Europe, engaging themselves to sustain the stabilization and the reconstruction of the region. Seven countries benefited from the financial assistance: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Romania, Macedonia and Federal Republic of Yugoslavia (FRY)[6]. Because of the high number of implied actors the Stability Pact constitutes what Welfens qualifies the " the most complex political initiative of the 20th century " (Welfens, 2001, p.9). The Pact is organized around three working tables: (1) democratization and human rights, (2) economic reconstruction, development and cooperation and (3) intern and extern security.

[7]The full text of the Memorandum is available at the EU-WB common website for South-Eastern Europe: www.seerecon.org/ttfse/.

[8]" Products originating in the Republics of Albania, Bosnia and Herzegovina and Croatia as

form of quantitative restrictions for the textile products originating from Serbia-Montenegro, some fish products, some wines and sugar originating from these countries.

In terms of trade liberalization, Stabilization and Association agreements constitute the main device of the Stability Pact for South-Eastern Europe. They have been signed by Croatia and Macedonia in 2001, other countries being at the stage of negotiations[9]. The content of these agreements is very close to the content of the Association Agreements signed in the 1990s between the EU and the Central and Eastern European countries. They establish a free trade area within 6 years. Tariffs and quantitative restrictions are suppressed immediately except for a small number of products for which the tariff reduction is progressive. It concerns chemicals, textile, steel, agricultural and fishery products[10].

A certain number of gains are expected from such a trade liberalization process. They can lead to trade creation with the EU countries and to trade diversion with other countries and in particular with SEE countries. This justifies the EU pressure for the development of sub-regional free trade agreements. Since the majority of free trade agreements are realized with the European countries[11] trade diversion to tier countries will be limited. We can also expect dynamic gains, notably through market enlargement. However, the EU trade policy towards the SEE countries are mainly motivated by non trade gains. A deeper integration to the EU leads to import the EU institutions, accelerate the structural reforms and make them irreversible. Moreover it constitutes a mean to liberalize trade flows of these countries out of the multilateral framework.

This economic integration with the EU was linked, as from as the establishment of the Stability Pact for South-Eastern Europe, to the development of the sub-regional cooperation, notably in the field of trade liberalization. Integration to the

well as in Kosovo [...] shall be admitted for import into the Community without quantitative restrictions or measures having equivalent effect and with exemption from customs duties and charges having equivalent effect" (Regulation EC 2007/2000).

[9]On the advancement of negotiations with other countries see the Report of the Commission of 30 March 2004; "The Stabilization and Association Process for South-Eastern Europe", Third Annual Report, COM(2004) 202 Final.

[10]Commission of the European Community, COM(2001), 371 Final.

[11]In 2002, more than 80% of the trade of SEE countries are realized with European countries (Lamotte, 2003).

EU has to be accompanied by a mutual integration process for two main reasons (Kaminski and de la Rocha, 2003). First, a hub and spoke type regional integration process, i.e. only oriented only towards the EU, could benefit only to EU firms, to the detriment of SEE firms. EU firms has the advantage to have access to all markets of South-Eastern Europe while the latter have not a free access to SEE markets. Second, free trade agreements need the establishment of rules of origins to avoid the development of transit trade. These rules provide another supplementary advantages to EU firms: *(i)* they have access to a higher number of intrants locally, to the contrary of SEE firms that depend from imports for their production, *(ii)* they don't support supplementary costs due to the justification of the origins of their intrants since they are already embedded in a network of preferential trade agreements, *(iii)* firms of South-Eastern Europe are specialized in sensitive sectors (Astrov, 2001) for which the justification of the origin is more complex, notably because the technical criteria for production are required for this kind of products.

One of the remedies to the negative effects of regional integration between the EU and the SEE lies in the set up of preferential trade agreements between SEE countries themselves. However this should not constitute an alternative to the deepening of integration to the EU, notably because the small size of SEE economies does not allow foreseeing important benefits of trade integration between these countries (World Bank, 2000).

## 2.2 Trade integration between SEE countries

Since the beginning of the 1990s, many authors advocated the development of regional cooperation between SEE countries[12]. The disintegration of the economic areas in Eastern Europe has deeply affected trade flows. The reinsertion of Balkan economies in a network of institutional links aimed at enhancing trade became a priority. Moreover, the idea according to which economic dependance is a factor

[12]The first known experience of regional trade integration between SEE countries dates from the end of the nineteenth century. The Balkan Conferences took place between 1930 and 1933. They led to the creation of a regional economic agreement aimed at reducing trade barriers between the Balkan States. An exhaustive presentation of regional integration process in SEE is provided in Lopandić (2001).

of peace still prevails since the World War II, even if the strong dependency of Yugoslav Republics did not prevent a violent disintegration. A plethora of multilateral initiatives has emerged in the 1990s[13] (Daianu and Veremis, 2001). None of them gave convincing results in terms of economic cooperation (Lopandić, 1999). This can be explained by three main reasons (Lamotte, 2003): the poor financial and human resources of the country members, the low support of the foreign partners, the political tensions and the mutual distrust between countries, and finally the absence of Serbia-Montenegro in these arrangements. The democratic turn-point engaged by Serbia-Montenegro after the overthrow of Milosević the 5 October 2000 has opened new perspectives.

The *Memorandum of Understanding on Trade and Transport Facilitation* signed between the Ministries of Foreign Affairs of seven countries of South-Eastern Europe the 27 June 2001 in Brussels, advocated the set up of 21 free trade agreements between these countries by the end 2002[14]. It led to an important movement of trade liberalization during the past four years, both on a bilateral and on a multilateral basis[15]. Since the beginning of 2005, all trade flows in the region are realized in the framework of free trade agreements. Practically, these agreements provided *(i)* the elimination of tariffs on 90% of the volume of trade and 90% of the tariffs lines, *(ii)* the elimination of non tariffs barriers to trade for intra-regional trade and the strengthening of trade in services and *(iii)* the facilitation in trade (Bjelić, 2005).

Free trade agreements can be classified according to the degree of liberalization they reached (Messerlin and Miroudot, 2004). The classification of agreements according to the criteria *(i)* is presented in Table (1). One third of the agreements satisfies the criteria of liberalization of 90% of the volume of trade and of 90% of the tariff line, one third satisfies one the two criteria and the last third does not satisfy any of the criteria. One should notice that there are differences in terms of tariff concessions between manufactured and agricultural products. Trade of industrial products is almost completely free. On the other hand, for agricultural

[13]They are presented in the **Table ???** 12, in appendix.

[14]The process of cooperation with Moldova started later but it also led to the creation of trade agreements.

[15]The dates of entry in force of the mutual trade agreements between SEE countries are presented in Table (24) in appendix.

products, tariffs concessions granted in the framework of the second and third types (*cf.* Table 1) cover only a small part of the traded goods. Finally, it is important to note that trade liberalization for agricultural goods is often asymetric. The most striking example concerns the free trade agreement between Bulgaria and Serbia-Montenegro. The first has eliminated its tariffs on 45% of its imports from Serbia-Montenegro, while only 2,5% of Bulgarian exports to Serbia-Montenegro are tariffs-free (Messerlin and Miroudot, 2004).

Table 1: Classification of the free trade agreements according to the degree of trade liberalization

| | Degree of liberalization | Bilateral free trade agreements | |
|---|---|---|---|
| Group 1 | Agreements fulfilling the criteria of liberalization of 90% of the volume of trade and 90% of the tariff lines | BIH-HRV, BIH-MKD, BIH-MDV, BIH-SCG, BGR-HRV, BGR-ROM, MKD-SCG, MLD-ROM | |
| Group 2 | Agreements fulfilling one of the 90% criteria | 90% of the volume of trade:<br>ROM-SCG | 90% of the tariff lines:<br><br>ALB-BIH, ALB-MKD, ALB-SCG, BIH-BGR, BIH-ROM, HRV-MKD, HRV-SCG |
| Group 3 | Agreements fulfilling none of the 90% criteria | ALB-BGR, ALB-HRV, ALB-ROM, BGR-MKD, BGR-SCG, HRV-ROM, MKD-ROM | |

Notes: Table based on Messerlin and Miroudot (2004). Five free-trade agreements are not classified by the authors. Countries are signaled by their ISO codes: BIH=Bosnia-Herzegovina, BGR=Bulgaria, HRV=Croatia, MKD=Macedonia, MLD=Moldova, ROM=Romania, SCG=Serbia-Montenegro.

However, such agreements raise some problems. First the bilateral approach led to a complex structure of concessions and to different agenda. This could be avoided if trade liberalization was realized in a multilateral framework (Adam et alii, 2003). The complexity of the agreements is reinforced by the asymetry of the trade preferences. Second, one can expect limited gains from trade in terms of convergence because of the low income per capita of these countries. Moreover, such a process increases the risk of a shift of the industry from the lower income countries to the higher income countries (Kaminski and de la Rocha, 2003). A concentration of the industry in the highest income country, Croatia, can be expected. However, this effect might be limited. Actually, after trade liberalization, firm's location becomes more and more sensible to labor cost differences (Puga

and Venables, 1998). It is therefore not sure that a shift in industry location to the high-income country will take place. Moreover, Croatia is, along with Bulgaria and Romania, likely to entry in the EU soon, and therefore to converge quickly towards the EU in terms of income per capita.

We showed that SEE countries are embedded in a network of free trade agreements which will determine the evolution of the structure of their trade. In the next section, we present the techniques and the data used for the study of these agreements.

# 3 An estimation of trade potentials of South-Eastern European countries

## 3.1 Trade potentials in the literature

The calculation of trade potentials to evaluate the degree of regional economic integration is one of the most frequent use of the gravity equation (Greenaway and Milner, 2002). The theoretical foundations of the gravity equation has been renewed recently, both from monopolistic competition (Baier and Bergstrand, 2003, 2004) and perfect competition (Anderson and Van Wincoop, 2003) frameworks. Empirical works using the calculation of trade potentials have known an important development during the last 15 years, because of the proliferation of preferential trade agreements and the openness of former socialist countries to the world economy. A high number of articles deals with the trade potential of Eastern and Central European countries and the EU (Table 2).

The calculation of trade potentials from the gravity equation lies on two approaches: the *in-sample* and the *out-of-sample* approach. The out-of-sample approach consists in excluding the countries of interest from the sample. The estimated coefficients are applied to the data of these countries in order to obtain their "natural" level of trade. This methodology has, for example, been used for the calculation of trade potentials of Eastern European countries and between them and Western European countries at the beginning of the 1990s (Wang and Winters, 1992; Baldwin, 1994; Buch and Piazolo, 2001). However, the results obtained

Table 2: Recent literature using trade potentials

| | |
|---|---|
| In-sample approaches | |
| Cross section data and ordinary least square methods | Boillot et alii (2003), Christie (2002), Fontagné *et alii* (2002), Havrylyshyn and Al-Atrash (1998), Paas (2002), Van Bergeijk and Oldersma (1990). |
| Panel data and techniques | Babetskaia-Kukharchuk and Maurel (2004)*, Bussiere *et alii* (2004), Caétano and Galego (2003), De Benedictis and Vicarelli (2004), Duc *et alii* (2004), Egger (2002), Jakab *et alii* (2001), Marques and Metcalf (2005), Martinez-Zarzoso and Nowak-Lehmann (2003), Nilsson (2000), Péridy (2004), Wang and Winters (1992). |
| Out-of-sample approaches | |
| Cross section data and ordinary least square methods | Arnon *et alii* (1996), Baldwin (1993), Batra (2004), Brulhart and Kelly (1999), Buch and Piazolo (2001), Ekholm *et alii* (1996), Festoc (1997), Fidrmuc (1999), Hamilton and Winters (1992), Havrylyshyn and Pritchett (1991). |
| Panel data and techniques | Abraham and Van Hove (2005), Baldwin (1994), Dimelis and Gatsios (1995), Fontagné *et alii* (1999), Gros and Gonciarz (1996), McPherson and Trumbull (2003)*, Péridy (2005a, 2005b)*, |

Note: References in italic indicates that articles dealing with Central and Eastern European countries. * indicates articles using the Hausman-Taylor (1981) methodology, *cf. infra*.

with this methodology are highly dependant of the reference sample (Fontagné et alii, 2002). Actually, they indicate what would be the level of trade of the studied countries if the determinants of their trade flows were the same as those of the reference sample. This methodology lies therefore on a strong assumption, since it is assumed that the determinants of trade of the countries of interest will converge toward those of the target countries. But this methodology allows also estimating the trade potentials according to different scenarios of formal integration (Fidrmuc, 1999). Another limit of the out-of-sample approach is that the residuals of the estimation are not taken into account, which leads, when the obtained coefficients are applied to other data, to a potentially high margin of error (Brenton and Di Mauro, 1998). This margin of error is very high when the countries of interest are specialized in a limited range of products (ITC, 2003). A solution to this problem consists in using the sample and the specification that will reduce the residuals of the estimation to the minimum.

The second method, the in-sample one, consists in estimating the gravity equation on a sample including the studied countries. The residuals of the gravity equa-

tion are then interpreted as the difference between the potential and the actual trade flows. For this study it has the main advantage to allow estimating simultaneously the effects of the current liberalization process and an evaluation of the forthcoming changes. However this methodology is not adapted when the target country group represent a large part of the sample. In this case the counterfactual and potentials are biased.

One of the originalities of our study lies in the use of disaggregated data by sector. There are few works using such data for the calculation of trade potentials and most of them are concentrated on few sectors[16]. Several reasons justify this approach. First, it allows estimating different sectoral elasticities. National income and distance elasticities differs depending on the nature of the traded goods. One can expect higher distance elasticities for heavy or perishable goods. For what regards income elasticities one can expect low elasticities for exports of raw materials since its supply depends on the natural resources and not of the economic size of the supplier. Second, the estimation of a gravity equation on sectoral data allows evaluating the intensity of trade flows between two countries or two groups of countries on a sectoral basis. It improves the estimation of the effects of regional trade agreements, notably when they exclude some sectors. It was the case of sensitive products (agriculture, textile and chemicals) when the association agreements entered in force between the EU and Central and Eastern European countries in the 1990s[17]. It is also the case for trade liberalization in South-Eastern Europe.

Several articles have been devoted to the calculation of trade potentials of Central and Eastern European countries after their openness. These articles raise the question of the trade potential for sensitive products (Vittas and Mauro, 1997; Brenton and Mauro, 1998; Fidrmuc *et alii*, 2001) and on the effect of an enlargement of the EU on the excluded countries (Fidrmuc, 1999). These studies show that the elasticities differ according to the traded goods, and highlight the importance of sectoral studies. However Western Balkans are excluded from the study and they almost all cover the pre-transition period or the beginning of the 1990s.

The estimation of gravity equation on sectoral data has also been used to eval-

[16]The main references, the methodology and the results of articles using such a methodology are presented in Table (25) in appendix.

[17]On the question of trade liberalization in sensitive products, see Vittas and Mauro (1998) and Fritz and Hoen (2000).

uate trade diversion effects caused by the North American Free Trade Agreement (NAFTA) (Fukao et alii, 2003) or to identify the determinants of trade within an enlarged EU (Marques and Metcalf, 2005). To the exclusion of the latter, all articles use cross section data and the ordinary least square methodology. However, as highlighted by Egger (2002), this approach is inappropriate for the calculation of trade potentials, notably because it ignores countries heterogeneity and time dimension. Our empirical study lies on panel data and on the appropriate techniques. We use the in-sample methodology. It allows us estimating *ex post* the effects of preferential trade agreements in which SEE countries are included and to calculate *ex ante* the trade potentials. Moreover, this methodology does not give biased results since the trade flows of studied countries represent only a minor part of the sample.

## 3.2 Empirical model and data

In this section we estimate a gravity equation with the in-sample method in order to compare trade flows of SEE countries between themselves and with their main partners to a counterfactual, constituted of all the countries of the sample[18]. We estimate a simple and easy to interpret specification of the gravity equation. The volume of trade is explained by the national incomes and by the trade costs proxied by distance and variables controlling for specific bilateral trade relations. The equation is augmented with the volatility, particularly justified in the studies on sectoral data (Péridy, 2004). The estimated equation is the following:

$$\begin{aligned} Ln(Imports_{ijt}) &= \beta_0 + \beta_1 Ln(GDP_{it}) + \beta_2 Ln(GDP_{jt}) \\ &+ \beta_3 Ln(Distance_{ij}) + \beta_4 (Volatility_{ijt}) \\ &+ \Sigma_1^{18} \beta_5 (M_{ij}) + \nu_t + \gamma_{ij} + \varepsilon_{ijt}, \end{aligned} \quad (1)$$

The explained variable is the volume of imports in million dollars expressed at the purchasing parity power between a country $i$ and a country $j$. Imports can be preferred to exports since countries tend to better register goods that enter the national territory than goods that exit. Trade data come from the CHELEM-CEPII

[18]The list of the 59 countries of the sample is provided in the Table (28) in appendix.

database. The sample covers 1994-2002. We first estimate a gravity equation on aggregated data and then on sectoral data. $GDP_{it}$ and $GDP_{jt}$ are the national incomes of the importer and the exporter. They are measured in million dollars at purchasing power parity and come from the World Development Indicators of the World Bank. The incomes expressed in purchasing power parity are preferred because the national incomes of transition and development economies are often under-evaluated (Christie, 2002; Fontagné *et alii*, 2002). The calculated potentials are therefore long term potentials since the difference between national incomes expressed in purchasing power parity and in current exchange rates decreases in the long term (EBRD, 2004). $Distance_{ij}$ is expressed in kilometers as the distance between capital cities of the two trading partners[19]. Many studies have highlighted the impact of exchange rate volatility on trade flows[20]. The $Volatility_{ijt}$ variable is computed as follows: $Volatility_{ijt} = \sigma[(e_{ijm} - e_{ij\bar{m}})/e_{ij\bar{m}}]$ where $\sigma$ is the standard-error, $e_{ijm}$ the monthly mean of the daily exchange rate between $i$ and $j$ for the month $m$ and $e_{ij\bar{m}}$ is the annual mean of the exchange rate. Exchange rate data come from the International Financial Statistics of the International Monetary Fund (IMF) and from the Financial Statistics of the US Federal Reserve Board[21], excepting the data for Successor States of former Yugoslavia, which come from the National Bank of Czech Republic, the National Bank of Slovenia and the National Bank of Serbia. $\Sigma_1^{18} M_{ij}$ represents a set of dummy variables aimed at comparing the trade intensity of SEE countries to a counterfactual[22]. For example the variable $SEE7 - EU$ takes the value 1 when the importer or the exporter is a SEE country and the trading partner is a EU country. Variables should be correctly introduced in the equation so that they don't control for the same effects, which would introduce a bias in the estimations. For example, one can not introduce in the same estimation $SEE7 - EU$ and $SEE5 - EU$, SEE5 being included in

[19]It is calculated according to the grand circle methodology and available on John Haveman's website: www.macalester.edu/research/economics/PAGE/HAVEMAN/Trade.Resources /Data/Gravity/dist.txt.

[20]For an exhaustive survey of the literature on the impact of exchange rate volatility on trade see Baldwin *et alii* (2005).

[21]These data are available form the US Department of Agriculture: www.ers.usda.gov/Data/exchangerates/.

[22]Our sample is divided into six groups, the countries included in each region are presented in the Table 28 in appendix.

SEE7. The stability of the coefficients on several specifications is an indicator of the reliability of our results. $\gamma_{ij}$ represents the country fixed effects, $\nu_t$ the time fixed effects, $\gamma_{ij}$ the country-pairs fixed effects and $\varepsilon_{ijt}$ the usual error term.

## 3.3 Estimations on aggregated data

The first set of estimates is realized on aggregated data. The results obtained for the specification (4.1) with several estimators are presented in Table (3). As explained previously the ordinary least square method (column 1) can lead to biased estimates because it does not take into account the heterogeneity of countries nor the time dimension of the sample. Moreover it assumes that residuals are independent and identical for all country pairs (Matyas, 1997; Egger, 2002). Therefore we estimate the gravity equation with panel techniques in order to avoid these bias. The comparison of the fixed-effects method (FEM, column 2) with that of the random effect method (REM, column 3) leads us to reject the latter[23]. The within estimator is efficient and unbiased but it does not allow to estimate the coefficients of the time invariant variables. It raises a problem since in our specification we evaluate the trade potentials between country groups or country pairs through the introduction of dummy variables[24]. A solution is to use the Hausman-Taylor (1981) methodology. This methodology allows combining the advantages of the within estimator with those of the random effect estimator (Gardner, 1998). It consists in instrumenting the time invariant variables without using variables which are not in the model. The variables used as instruments are the exogenous variables of the model, i.e. which are not correlated with the fixed effects and with the endogenous transformed variables. In order to check whether the Hausman-Taylor estimator is unbiased we perform a Hausman test of over-identification (Hausman and Taylor, 1981). This test permits to determine which exogenous variables can be used as instruments. We follow this procedure. The variables which are correlated to the fixed effects are the national incomes and distance. The variables which are not correlated to the fixed effects are the volatility and the regional trade integration

[23]The Hausman statistic of non correlation of the variables of the model with the fixed effects is high (100,61) and it is significant at the 1% level (Prob>Chi2=0,0000).

[24]Dummy variables including the EU, for example SEE7-EU, are not time invariant since three countries entered later in the EU during the considered period: Austria, Finland and Sweden.

variables. The Hausman test of over-identification permits to reject the hypothesis that the results obtained with the fixed effect model are different from the results obtained with the Hausman-Taylor model[25]. The estimation (4) is therefore our preferred estimation.

Table 3: Estimates on aggregated data, estimations (1)-(4).

| Dep.var.: | OLS | FEM | REM | HTM |
|---|---|---|---|---|
| Ln(Imports) | (1) | (2) | (3) | (4) |
| Ln($GDP_{it}$) | $0.98^a$ | $1.51^a$ | $1.02^a$ | $1.46^a$ |
| | (0.01) | (0.09) | (0.02) | (0.09) |
| Ln($GDP_{jt}$) | $1.11^a$ | $0.93^a$ | $1.14^a$ | $1.04^a$ |
| | (0.01) | (0.09) | (0.02) | (0.08) |
| Ln($Distance_{ij}$) | $-1.08^a$ | - | $-1.21^a$ | $-1.68^a$ |
| | (0.01) | | (0.03) | (0.16) |
| $Volatility_{ijt}$ | $-0.16^b$ | $-0.15^a$ | $-0.15^a$ | $-0.15^a$ |
| | (0.07) | (0.02) | (0.02) | (0.02) |
| SEE7-EU | $0.84^a$ | $0.14^c$ | $0.31^a$ | $0.15^c$ |
| | (0.06) | (0.08) | (0.07) | (0.08) |
| SEE7-World | $-1.88^a$ | - | $-1.81^a$ | $-1.44^a$ |
| | (0.05) | | (0.09) | (0.14) |
| SEE7-SEE7 | $-0.58^a$ | - | $-0.82^a$ | $-1.03^b$ |
| | (0.13) | | (0.22) | (0.48) |
| SEE7-CEE8 | $0.48^a$ | - | 0.14 | -0.07 |
| | (0.08) | | (0.15) | (0.28) |
| Adjusted $R^2$ | 0.81 | 0.23 | - | - |
| Nb. of obs. | 13143 | 13143 | 13143 | 13143 |
| Hausman test | - | - | 100.61 | 0.67 |
| Prob>Chi2 | - | - | 0.0000 | 1.0000 |

Notes: $^a$, $^b$ and $^c$ represent respectively the 1%, 5% and 10% significance levels. Standard Errors (heteroskedasticity robust for OLS regressions) are presented between parenthesis. The coefficients of the fixed effects are not reported. Estimations (1), (2), (3) and (4) are realized respectively with the ordinary least square model (OLS), the fixed effect model (FEM), the random effect model (REM) and the Hausman-Taylor model (HTM). SEE7=South-Eastern Europe, EU=European Union, CEE8=Central Eastern Europe, World=rest of the world, the complete list of the countries included in each group is presented in table 28 in appendix.

The coefficients obtained with the Hausman-Taylor model for the national incomes do not differ significantly from those obtained with the fixed effects estimator. The estimated coefficients for national incomes ($GDP_{it}$ and $GDP_{jt}$) are

[25]The Hausman statistic is very low (0,67) and it is significant at the 1% level (Prob>Chi2=1,0000).

consistent with our expectations, they are positive and significant. The estimated coefficient for $Distance_{ij}$ is negative, which is also consistent with our expectations. The sign of the coefficient of $Volatility_{ijt}$ is negative and significant, confirming the negative impact of exchange rate volatility on trade flows. The estimated coefficients of the dummy variables of regional groupings ($SEE7-EU$, $SEE7-World$, $SEE7-SEE7$, $SEE7-CEE8$) indicates how trade volumes differ from the mean of the sample.

Since our specification is log-linear the ratio between the real and the potential trade can be calculated as the exponential of the estimated coefficient. The ratios calculated from the estimation (4) are presented in Table (4). A ratio higher than 100% indicates that the volume of trade is higher than its potential, relatively to the counterfactual. When the estimated coefficients are not significantly different from 0 the ratio is equal to 100% since the volume of trade is not significantly different from the level predicted by the gravity equation.

The column (4) of the Table (3) provides a first set results. First of all, three of the four coefficients measuring the trade integration of SEE countries are significantly different from 0, indicating that their trade is higher or lower than the gravity norm. On the other hand, trade flows between SEE countries and CEE8 does not differ significantly from their natural level.

Secondly, trade of SEE countries with the EU is higher to its natural level since it reaches 116% of its potential level (Table 4, estimation (4)). This result can be explained by the trade liberalization that occurred between the two groups of countries since the beginning of the nineties. Actually, Bulgaria and Romania have signed during the mid-nineties association agreements with the EU. As far as other SEE countries are concerned they benefited from the beginning of the year 2000 of asymmetric trade preferences from the EU (*cf.* section 2). This result would be a first estimate of the effects of such agreements. An explanation for the high trade intensity between the SEE7 and CEE8 is the persistence of intense trade flows between Slovenia, which is included in the group of CEE8 countries, and the other Successor States of former Yugoslavia. As a matter of fact, de Sousa and Lamotte (2005) have shown that trade flows between Successor States of a former Federation remain intense, several years after the political disintegration. These results will be refined later, by the division of SEE7 countries in two groups, the

Table 4: Ratio actual trade/potential trade on aggregated data, in %.

| Estimation (4) | | |
|---|---|---|
| | SEE7 | |
| EU | 116.18 | |
| World | 23.69 | |
| CEE8 | 100 | |
| SEE7 | 35.70 | |
| **Estimation (5)** | | |
| | SEE5 | SEE2 |
| EU | 100 | 116.18 |
| World | 20.18 | 34.30 |
| CEE8 | 100 | 100 |
| SEE5 | 100 | 100 |
| SEE2 | 100 | 11.41 |
| **Estimation (6)** | | |
| | SFRY4 | SEE2 |
| EU | 100 | 118.53 |
| World | 28.65 | 36.05 |
| CEE8 | 100 | 87.80 |
| SFRY4 | 294.46 | 100 |
| SEE2 | 100 | 13.94 |

Notes: The table indicates the ratio between the actual and the potential trade expressed as the anti-log of the estimated coefficient for the dummy variables controlling for the intensity of specific bilateral trade flows. SEE7=Southeast Europe, EU=European Union, CEE8=Central Eastern Europe, World=rest of the world, the complete list of the countries included in each group is presented in table 28 in appendix.

Western Balkans (Albania, Bosnia-Herzegovina, Croatia, Macedonia and Serbia-Montenegro) and the Eastern Balkans (Bulgaria and Romania).

Third, the results indicating an intensity lower than the norm for mutual trade flows of SEE countries. They are higher than 36% of the level predicted by the model (Table 4, estimation (4)). In the case of mutual trade flows of SEE countries this result can be surprising since we have shown that there is a high intensity of trade flows between Successor States of former Yugoslavia. This effect could actually be explained by the low trade intensity between Bulgaria and Romania and on the other hand, between countries of the Western part of the Balkan peninsula. Actually, the first were members of the Council for Mutual Economic Assistance and reoriented quickly their trade towards the EU after its dissolution.

Fourth, trade flows between SEE countries and the rest of the world represent only one fourth of their potential (Table 4, estimation (4)). This result can be compared to those of Babetskaia-Khukarchuk and Maurel (2004) who show that trade flows of CEE countries and Commonwealth of Independent States (CIS) countries reach only one third and one fifth of their potential. In the case of SEE countries the trade deficit with the rest of the world can be partly explained by the periods of conflicts and sanctions and by their late integration in the international institutions and notably in the WTO[26].

We then try to identify whether the results differ when we separate SEE countries in two groups, Bulgaria and Romania (Eastern Balkans, SEE2) on one side, and the four successor states of former Yugoslavia and Albania (Western Balkans, SEE5) on the other side (Table 5, column 5). The coefficients of the national incomes, of distance and exchange rate volatility are very close to those estimated previously. The results obtained for the dummy variables of regional integration are different from those obtained previously and they confirm the existence of two sub-regional trade area in SEE.

The results of estimation (5) (Table 5) indicates that the volume of trade of Western Balkans (SEE5) with the EU does not differ significantly of its predicted level. The positive and significant coefficient we obtained previously was therefore due to the intensity of trade between Eastern Balkans(Bulgaria and Romania)

[26]Subramanian and Wei (2003) show, contrary to Rose (2005), that the WTO had an important though uneven impact on trade.

Table 5: Results on aggregated data, estimations (5)-(6).

| Dependent variable: | HT | HT |
|---|---|---|
| Ln(Imports) | (5) | (6) |
| Ln($GDP_{it}$) | 1.47$^a$ | 1.48$^a$ |
| | (0.09) | (0.09) |
| Ln($GDP_{jt}$) | 1.05$^a$ | 1.00$^a$ |
| | (0.08) | (0.08) |
| Ln($Distance_{ij}$) | -1.69$^a$ | -1.64$^a$ |
| | (0.16) | (0.20) |
| $Volatility_{ijt}$ | -0.15$^a$ | -0.15$^a$ |
| | (0.02) | (0.02) |
| SEE5-EU | 0.15 | |
| | (0.10) | |
| SEE5-World | -1.60$^a$ | |
| | (0.18) | |
| CEE8-SEE5 | 0.01 | |
| | (0.31) | |
| SEE5-SEE5 | 0.02 | |
| | (0.59) | |
| SEE2-EU | 0.15$^c$ | 0.17$^c$ |
| | (0.09) | (0.09) |
| SEE2-World | -1.07$^a$ | -1.02$^a$ |
| | (0.18) | (0.18) |
| CEE8-SEE2 | -0.23 | -0.13 |
| | (0.39) | (0.41) |
| SEE2-SEE2 | -2.17$^c$ | -1.97$^c$ |
| | (1.22) | (1.29) |
| SEE5-SEE2 | 0.79 | |
| | (0.52) | |
| SFRY4-EU | | 0.05 |
| | | (0.12) |
| SFRY4-World | | -1.25$^a$ |
| | | (0.18) |
| CEE8-SFRY4 | | 0.04 |
| | | (0.35) |
| SFRY4-SFRY4 | | 1.08$^c$ |
| | | (0.70) |
| SFRY4-SEE2 | | 0.86 |
| | | (0.56) |
| Nb. of obs. | 13143 | 13143 |
| Hausman test | 7.79 | 2.19 |
| Prob>Chi2 | 0.8568 | 0,9997 |

Notes: $^a$, $^b$ and $^c$ represent respectively the 1%, 5% and 10% significance levels. Standard Errors are presented between parenthesis. The coefficients of the fixed effects are not reported. Estimations realized with the Hausman-Taylor model (HTM). SEE7=Southeast Europe, EU=European Union, CEE8=Central Eastern Europe, World=rest of the world, the complete list of the countries included in each group is presented in Table (28) in appendix.

and the EU. This is confirmed by the estimated coefficient of $SEE2-EU$ which shows that trade is between 15% and 20% over its potential level. The preferences granted by the EU to the Western Balkans did not lead, up to now, to trade levels higher to the norm. However, one can not conclude that they had not effect. One has to compare them before and after the granting of the preferences. Since the study covers 1994-2002, the period after the preferences is too short to get reliable results. However we can have an idea of the potential increase of trade flows Western Balkans with the EU on the base of the positive and significant coefficient of the variable $SEE2-EU$. The estimated coefficient indicates that trade flows between Bulgaria and Romania and the EU outreach the norm of 17%. It is therefore possible that the trade liberalization between the EU and the Western Balkans (SEE5) will have a similar impact.

The second result induced by this new specification concerns mutual trade between Western Balkans. It does not differ significantly from its potential, since the estimated coefficient of $SEE5-SEE5$ is not significantly different zero. One can therefore expect a limited impact of the free trade agreements signed at the beginning of the year 2000. This assumption is reinforced by the fact that mutual trade preferences of transition countries, like for example the CEFTA, have had limited effects on trade flows (Dangerfield, 2001). This is confirmed by the coefficient estimated for the variable indicating trade intensity of mutual trade between Bulgaria and Romania, which is largely inferior to its potential. This is probably explained by the important trade reorientation of trade flows towards the EU which reduced their mutual trade flows. The sectoral analysis of the next section will refine this result and determine whether trade diversion took place in some particular sectors.

The other results are not affected by the new specification: trade flows between SEE and CEE countries do not differ from the norm, and their trade with the rest of the world is below its potential (Table 5, column 5). However it is interesting to note that the Western Balkans have a higher trade deficit with the rest of the world than Bulgaria and Romania, since their trade flows with the rest of the world represent one fifth of their potential against one third for the two countries of the Eastern Balkans.

In a second estimation (Table 5, column 6), we exclude Albania from West-

ern Balkans, which is composed of the 4 Successor States of former Yugoslavia (SFRY4). The results are almost not affected except the coefficient of $SFRY4 - SFRY4$ which becomes positive and significant, indicating trade flows between Successor States higher than their potential.

Finally, the results reveal a high geographic concentration of SEE trade flows with the other European countries. We can expect a low impact of trade liberalization between SEE countries but an increase of trade flows between SEE countries and the EU15 countries on one hand and with the rest of the world on the other hand. Trade flows with the CEE8 have outreached their potential. A second step of our work will consist in evaluating the degree of trade integration of SEE countries, in order to identify if some particular sectors can explain the aggregated trade patterns.

## 3.4 Estimations on disaggregated data

The second set of estimates is realized on disaggregated data. We use the 10 sectors classification of the CHELEM-CEPII database[27]. The results are presented in Tables 6 and 7. The estimated equation is the same as in the previous section. It would have been possible to modify the specification so it could fit better the data of each sector, but it would not allow the comparison of the coefficients estimated for each sector. The empirical strategy is slightly different in this section. We showed that SEE is constituted of two sub-regions, the Western and the Eastern Balkans, which are different by their *de jure* and *de facto* trade integration with their main partners. We therefore evaluate directly the potentials of each region with its main partners (Table 6). We then exclude Albania of the group of Western Balkans (Table 7). The evaluations of the trade potentials are presented in Table (8).

The analysis of the estimated coefficients of the gravity variables is interesting for several reasons. The coefficients of national incomes of the importing countries are always significant. On the contrary, the estimated coefficients of national incomes of the exporting countries are not significant for steel and minerals, since trade does not depend of the economic size of these countries.

[27]The classification and the content of each sector are available in the appendix, in Tables 29 and 30.

Table 6: Estimates by sector, estimations (7)-(16).

| Dependent variable: | Agriculture | Basic metals | Chemicals | Construction | Energy | Metal products | Mining | Textiles | Wood paper | Food product |
|---|---|---|---|---|---|---|---|---|---|---|
| Ln(Imports) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) |
| $\text{Ln}(\text{GDP}_{it})$ | $1.33^{a}$ | $1.25^{a}$ | $1.05^{a}$ | $1.36^{a}$ | $1.10^{a}$ | $1.63^{a}$ | $0.97^{a}$ | $1.05^{a}$ | $1.15^{a}$ | $1.49^{a}$ |
| | (0.14) | (0.16) | (0.11) | (0.13) | (0.25) | (0.11) | (0.19) | (0.11) | (0.11) | (0.12) |
| $\text{Ln}(\text{GDP}_{jt})$ | $0.70^{a}$ | 0.19 | $1.33^{a}$ | $1.00^{a}$ | $0.59^{b}$ | $1.62^{a}$ | -0.20 | $0.71^{a}$ | $0.93^{a}$ | $0.60^{a}$ |
| | (0.12) | (0.15) | (0.09) | (0.12) | (0.23) | (0.10) | (0.17) | (0.10) | (0.10) | (0.11) |
| $\text{Ln}(\text{Distance}_{ij})$ | $-2.03^{a}$ | $-1.88^{a}$ | $-1.96^{a}$ | $-2.53^{a}$ | -0.39 | $-1.89^{a}$ | -0.94 | $-2.46^{a}$ | $-1.97^{a}$ | $-1.98^{a}$ |
| | (0.29) | (0.40) | (0.21) | (0.34) | (0.88) | (0.21) | (0.61) | (0.25) | (0.22) | (0.29) |
| $\text{Volatility}_{ijt}$ | -0.03 | -0.06 | $-0.06^{b}$ | $-0.09^{a}$ | -0.07 | $-0.22^{a}$ | $0.11^{b}$ | $-0.20^{a}$ | $-0.13^{a}$ | $-0.10^{a}$ |
| | (0.04) | (0.04) | (0.03) | (0.03) | (0.06) | (0.03) | (0.05) | (0.03) | (0.03) | (0.03) |
| SEE5-EU | -0.20 | -0.09 | -0.16 | $-0.50^{a}$ | 0.49 | -0.05 | -0.06 | -0.13 | 0.02 | $-0.27^{c}$ |
| | (0.18) | (0.21) | (0.14) | (0.17) | (0.37) | (0.13) | (0.29) | (0.14) | (0.13) | (0.16) |
| SEE5-World | $-1.23^{a}$ | $-1.93^{a}$ | $-1.78^{a}$ | $-1.28^{a}$ | -0.27 | $-1.12^{a}$ | $-2.06^{a}$ | $-1.86^{a}$ | $-2.11^{a}$ | $-0.92^{a}$ |
| | (0.27) | (0.34) | (0.20) | (0.29) | (0.77) | (0.22) | (0.51) | (0.23) | (0.21) | (0.27) |
| SEE5-CEE8 | -0.26 | -0.45 | -0.00 | -0.52 | 1.25 | 0.36 | -0.08 | $-1.82^{a}$ | -0.17 | -0.13 |
| | (0.51) | (0.65) | (0.38) | (0.55) | (0.97) | (0.40) | (0.85) | (0.45) | (0.39) | (0.51) |
| SEE5-SEE5 | -0.41 | $-1.96^{c}$ | -0.74 | -0.85 | 2.96 | 0.98 | -1.60 | $-3.90^{a}$ | $-2.18^{a}$ | -0.42 |
| | (0.93) | (1.17) | (0.69) | (1.01) | (2.13) | (0.75) | (1.56) | (0.82) | (0.73) | (0.94) |
| SEE2-EU | $-0.50^{a}$ | -0.09 | $0.56^{a}$ | -0.27 | 0.47 | $0.31^{c}$ | 0.36 | 0.11 | $0.29^{c}$ | -0.03 |
| | (0.19) | (0.21) | (0.15) | (0.17) | (0.36) | (0.16) | (0.29) | (0.16) | (0.15) | (0.17) |
| SEE2-World | $-1.00^{a}$ | $-0.81^{a}$ | $-1.53^{a}$ | $-0.94^{a}$ | -0.42 | $-1.33^{a}$ | $-0.95^{b}$ | $-0.75^{a}$ | $-1.45^{a}$ | $-1.04^{a}$ |
| | (0.26) | (0.31) | (0.20) | (0.27) | (0.49) | (0.22) | (0.38) | (0.24) | (0.21) | (0.28) |
| SEE2-CEE8 | $-1.06^{c}$ | $-1.54^{b}$ | 0.24 | -0.82 | 0.21 | 0.53 | -1.37 | $-2.04^{a}$ | $-0.94^{b}$ | -0.17 |
| | (0.58) | (0.71) | (0.44) | (0.62) | (1.06) | (0.49) | (0.93) | (0.54) | (0.47) | (0.62) |
| SEE2-SEE2 | -2.76 | -1.93 | -2.06 | $-3.86^{b}$ | 3.09 | $-2.66^{c}$ | 0.19 | $-5.04^{a}$ | $-3.66^{b}$ | -2.64 |
| | (1.78) | (2.15) | (1.34) | (1.89) | (3.08) | (1.52) | (2.58) | (1.68) | (1.45) | (1.94) |
| SEE5-SEE2 | -0.03 | -0.03 | $0.98^{c}$ | -0.35 | 2.10 | 0.63 | 0.96 | $-2.44^{a}$ | -0.05 | -0.49 |
| | (0.76) | (0.93) | (0.58) | (0.82) | (1.31) | (0.65) | (1.14) | (0.71) | (0.62) | (0.81) |
| Nb. of obs. | 11971 | 11357 | 12512 | 11443 | 9253 | 12854 | 9915 | 12578 | 12523 | 12271 |
| Hausman test | 6.94 | 29.94 | 7.56 | 4.55 | 3.10 | 6.12 | 6.75 | 21.13 | 4.36 | 7.46 |
| Prob>Chi2 | 0.8619 | 0.0000 | 0.8713 | 0.9840 | 0.9948 | 0.8812 | 0.8740 | 0.0000 | 0.9867 | 0.8768 |

Notes: $^{a}$, $^{b}$ and $^{c}$ represent respectively the 1%, 5% and 10% significance levels. Standard Errors are presented between parenthesis. The coefficients of the fixed effects are not reported. Estimations realized with the Hausman-Taylor model (HTM). SEE7=Southeast Europe, EU=European Union, CEE8=Central Eastern Europe, World=rest of the world, the complete list of the countries included in each group is presented in table 28 in appendix. The products included in each sector are presented in tables 29 and 30.

The results obtained for the distance variable, which in our specification is a proxy for trade costs, are also interesting. All the estimated coefficients are negative, which is consistent with our expectations, but the estimated coefficients for energy and minerals are not significant. It seems to indicate that distance is not a good proxy for trade costs in these sectors. For what concerns the other coefficients, it is surprising that the two highest coefficients in absolute terms are obtained for construction goods and textile products. Construction goods are heavier, which justifies higher transportation costs, but this explanation is not valid for textile. A plausible explanation is that distance does not only capture transportation costs but also other barriers to trade. Trade of textile goods is often regulated by special treatments[28].

The impact of exchange rate volatility varies according to the sectors, it is negative for all sectors except for minerals and it is almost always significant. These results are consistent with those of Peridy (2003), who shows that the relationship between trade and exchange rate volatility depends of the characteristics of particular firms or markets and that there is a sectoral and geographic bias in the estimations on aggregated data. The results indicate that the negative impact of the exchange rate volatility is higher on the trade of higher value added goods. Thus, the highest coefficients in absolute terms are observed for the mechanics and for textile. On the contrary it is not significantly different from 0 for agricultural goods, steel, energy and it is positive for minerals.

The analysis of the coefficients of the variables of regional trade integration by sector also lead to interesting results, which tend to confirm those obtained on aggregated data. The ratios are presented in Table (8). Thus the trade flows of SEE countries with the rest of the world differ significantly from their potentials for all sectors (**Tables ???** 10a. and b.). It is the trend we identified on aggregated data.

However, some sectors are somewhat different of the global trend. Thus it appears that the volume of trade in sectors such as construction and food products of SEE5 with the EU represent respectively two third and three quarters of their potential (**Table ???** 10a.). For all other products trade does not differ from the

[28]Imports of textile products of industrialized countries have been limited from 1974 to 2004 by the Multifiber Agreement.

norm. For trade flows with the rest of the world it is the sector of energy which is different from the general trend. For this sector almost all the ratios are equal to 100%. A plausible explanation is that proximity and formal regional integration have a rather limited explanatory power of the volume of trade.

If we look at the trade potential of the SEE5 countries with the CEE countries in the textile it appears clearly that it is not reached, since it represents only 16% of its potential (**Table ???** 10a.). For the other sector the potential is reached. Actually, this trend can be observed for the mutual trade flows of SEE countries and between them and the CEE. On the contrary, the volume of trade with the EU has reached its potential. A plausible explanation for this result is that trade in textile has been largely reoriented towards the EU, notably through outward trade process. Andreff *et alii* (2001) have shown that this kind of trade between CEE and the EU has been quite important in the textile during the 1990s. Moreover, this result is close to Fukao *et alii* (2003), who show that NAFTA has diverted more trade in the textile sector. The mutual trade flows between Western Balkan countries in the wood sector is also lower than its potential. Once again, trade diversion with EU countries can constitute a plausible explanation.

The analysis of the results for the Eastern Balkans countries (Bulgaria and Romania) first indicates that agriculture is the only sector in which trade flows with the EU are lower than their potential, they represent only 60% of it (**Table ???** 10b.). A possible explanation is that agricultural goods have been initially excluded from the association agreements. However, textile goods and chemicals have also been initially excluded and, in these sectors, trade with the EU have reached their potential. Moreover, the potential is reached with the Western Balkans. This result could therefore reflect the low productivity of this sector and/or the low quality of the products, which tend to reduce trade flows with the EU. In the sectors of mechanics, wood, and chemicals, the potential is outreached from 36% to 75% (**Table ???** 10b.), which can reflect the effect of preferential trade agreements. If we have a look at the trade flows of Eastern Balkans with the rest of the world we observe the sector of energy is the only one for which the real trade is higher than the norm. This is not surprising since, on one hand the determinants of trade in this sector differ from the other sectors and on the other hand Bulgaria has inherited from the Council of Mutual Economic Assistance a specialization in the

refining of the Russian oil. Finally an interesting result is that trade flows between Bulgaria and Romania are much lower than than their potential in all sectors, except energy, minerals and food products. Two complementary explanations are possible. First, there was a strong trade reorientation towards the EU in most of the sectors, and second, this result could reflect the heritage of the trade patterns within the CMEA[29].

The results obtained when we exclude Albania from the group of the Western Balkans are presented in Table 7. The ratios between the real and the potential trade flows are presented in Table 8c. These new results differ only slightly from the previous. We observe that trade potentials are not reached between the Successor States of former Yugoslavia (SFRY4) for steel (30% of the potential), and textile (7% of the potential). On the other hand, the potential is largely outreached in the sectors of mechanical goods since trade flows are 9 times higher to the norm. The potentials estimated for the Eastern Balkans (SEE2) differ only slightly with this new specification.

[29]In the CMEA (1949-1991), Romania and Bulgaria traded essentially with the USSR and very few between themselves. Trade patterns could be compared to a star, with USSR at the center (Graziani, 1981).

Table 7: Estimates by sector, estimations (17)-(26).

| Dependent variable: | Agriculture | Basic metals | Chemicals | Construction | Energy | Metal products | Mining | Textiles | Wood paper | Food product |
|---|---|---|---|---|---|---|---|---|---|---|
| Ln(Imports) | (17) | (18) | (19) | (20) | (21) | (22) | (23) | (24) | (25) | (26) |
| $\text{Ln}(\text{GDP}_{it})$ | $1.33^a$ | $1.26^a$ | $1.05^a$ | $1.35^a$ | $1.09^a$ | $1.64^a$ | $1.00^a$ | $1.06^a$ | $1.15^a$ | $1.48^a$ |
| | (0.14) | (0.16) | (0.10) | (0.12) | (0.25) | (0.11) | (0.19) | (0.11) | (0.11) | (0.12) |
| $\text{Ln}(\text{GDP}_{jt})$ | $0.68^a$ | 0.15 | $1.28^a$ | $0.98^a$ | $0.57^b$ | $1.58^a$ | -0.22 | $0.66^a$ | $0.89^a$ | $0.58^a$ |
| | (0.12) | (0.15) | (0.09) | (0.12) | (0.23) | (0.10) | (0.17) | (0.11) | (0.10) | (0.11) |
| $\text{Ln}(\text{Distance}_{ij})$ | $-1.92^a$ | $-2.03^a$ | $-2.09^a$ | $-2.77^a$ | 0.50 | $-1.70^a$ | -0.54 | $-2.74^a$ | $-2.10^a$ | $-2.12^a$ |
| | (0.37) | (0.55) | (0.27) | (0.48) | (1.54) | (0.26) | (0.88) | (0.34) | (0.28) | (0.38) |
| $\text{Volatility}_{ijt}$ | -0.03 | -0.06 | $-0.06^b$ | $-0.10^a$ | -0.08 | $-0.22^a$ | $0.11^b$ | $-0.20^a$ | $-0.13^a$ | $-0.10^a$ |
| | (0.04) | (0.04) | (0.03) | (0.03) | (0.06) | (0.03) | (0.05) | (0.03) | (0.03) | (0.03) |
| SFRY4-EU | -0.12 | 0.12 | -0.20 | $-0.55^a$ | 0.26 | 0.06 | 0.05 | -0.06 | 0.09 | $-0.43^b$ |
| | (0.20) | (0.23) | (0.15) | (0.19) | (0.39) | (0.15) | (0.30) | (0.16) | (0.15) | (0.17) |
| SFRY4-World | $-1.14^a$ | $-2.06^a$ | $-1.58^a$ | $-1.36^a$ | 0.66 | $-0.85^a$ | $-1.70^b$ | $-1.92^a$ | $-1.98^a$ | $-0.85^a$ |
| | (0.30) | (0.42) | (0.22) | (0.36) | (1.29) | (0.23) | (0.74) | (0.27) | (0.23) | (0.31) |
| SFRY4-CEE8 | -0.05 | -0.21 | -0.10 | -0.74 | 1.72 | 0.63 | 0.43 | $-1.76^a$ | -0.24 | -0.25 |
| | (0.59) | (0.82) | (0.45) | (0.70) | (1.28) | (0.45) | (1.02) | (0.57) | (0.48) | (0.60) |
| SFRY4-SFRY4 | 0.96 | -1.23 | 0.13 | -0.56 | 5.16 | $2.14^b$ | -0.11 | $-2.68^b$ | -1.18 | 0.43 |
| | (1.15) | (1.54) | (0.86) | (1.35) | (3.46) | (0.89) | (2.14) | (1.11) | (0.93) | (1.21) |
| SEE2-EU | $-0.47^b$ | -0.07 | $0.56^a$ | $-0.28^c$ | 0.51 | $0.35^b$ | 0.46 | 0.11 | $0.30^b$ | -0.03 |
| | (0.19) | (0.22) | (0.15) | (0.17) | (0.37) | (0.16) | (0.30) | (0.16) | (0.15) | (0.17) |
| SEE2-World | $-0.98^a$ | $-0.87^a$ | $-1.50^a$ | $-0.96^a$ | -0.07 | $-1.28^a$ | $-0.97^b$ | $-0.82^a$ | $-1.46^a$ | $-1.08^a$ |
| | (0.26) | (0.34) | (0.20) | (0.30) | (0.67) | (0.21) | (0.41) | (0.27) | (0.23) | (0.29) |
| SEE2-CEE8 | -0.93 | $-1.59^b$ | 0.15 | -1.04 | 0.67 | 0.73 | -0.86 | $-2.14^a$ | $-0.96^c$ | -0.25 |
| | (0.61) | (0.80) | (0.48) | (0.73) | (1.37) | (0.50) | (1.08) | (0.62) | (0.52) | (0.67) |
| SEE2-SEE2 | -2.46 | -2.22 | -2.27 | $-4.38^b$ | 4.97 | -2.17 | 1.15 | $-5.56^a$ | $-3.86^b$ | -2.93 |
| | (1.84) | (2.44) | (1.48) | (2.20) | (4.26) | (1.54) | (2.97) | (1.96) | (1.63) | (2.09) |
| SFRY4-SEE2 | 0.13 | 0.21 | 0.88 | -0.85 | 2.39 | 0.93 | 2.09 | $-2.48^a$ | -0.01 | -0.63 |
| | (0.85) | (1.10) | (0.69) | (1.00) | (1.64) | (0.71) | (1.30) | (0.89) | (0.74) | (0.94) |
| Nb. of obs. | 11971 | 11357 | 12512 | 11443 | 9253 | 12854 | 9915 | 12578 | 12523 | 12271 |
| Hausman test | 1.23 | 0.49 | 0.78 | 3.99 | 1.86 | 3.08 | 6.93 | 2.33 | 8.05 | 3.05 |
| Prob>Chi2 | 1.0000 | 1.0000 | 1.0000 | 0.9801 | 0.9996 | 0.9890 | 0.8072 | 0.9982 | 0.8512 | 0.9952 |

Notes: $^a$, $^b$ and $^c$ represent respectively the 1%, 5% and 10% significance levels. Standard Errors are presented between parenthesis. The coefficients of the fixed effects are not reported. Estimations realized with the Hausman-Taylor model (HTM). SEE7=Southeast Europe, EU=European Union, CEE8=Central Eastern Europe, World=rest of the world, the complete list of the countries included in each group is presented in Table (28) in appendix. The products included in each sector are presented in Tables 29 and 30.

Table 8: Actual/potential trade ratio by sector, in %.

| a. SEE5 with: | | | | | Estimations (7)-(16) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Agriculture | Basic metals | Chemicals | Construction | Energy | Metal products | Mining | Textile | Wood paper | Food products |
| EU | 100.00 | 100.00 | 100.00 | 60.65 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 76.34 |
| World | 29.23 | 14.51 | 16.86 | 27.80 | 76.34 | 32.63 | 12.75 | 15.57 | 12.12 | 39.85 |
| CEE8 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 16.20 | 100.00 | 100.00 |
| SEE2 | 100.00 | 100.00 | 266.45 | 100.00 | 100.00 | 100.00 | 100.00 | 8.72 | 100.00 | 100.00 |
| SEE5 | 100.00 | 14.09 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 2.02 | 11.30 | 100.00 |
| b. SEE2 with: | | | | | Estimations (7)-(16) | | | | | |
| | Agriculture | Basic metals | Chemicals | Construction | Energy | Metal products | Mining | Textile | Wood paper | Food products |
| EU | 60.65 | 100.00 | 175.07 | 100.00 | 100.00 | 136.34 | 100.00 | 100.00 | 147.70 | 100.00 |
| World | 36.79 | 44.49 | 21.65 | 39.06 | 100.00 | 26.45 | 38.67 | 47.24 | 23.46 | 35.35 |
| CEE8 | 34.65 | 21.44 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 13.00 | 39.06 | 100.00 |
| SEE5 | 100.00 | 100.00 | 266.45 | 100.00 | 100.00 | 100.00 | 100.00 | 8.72 | 100.00 | 100.00 |
| SEE2 | 6.33 | 14.51 | 12.75 | 2.11 | 100.00 | 6.99 | 100.00 | 0.65 | 2.57 | 100.00 |
| c. SFRY4 with: | | | | | Estimations (17)-(26) | | | | | |
| SFRY4 | Agriculture | Basic metals | Chemicals | Construction | Energy | Metal products | Mining | Textile | Wood paper | Food products |
| EU | 100.00 | 100.00 | 100.00 | 57.69 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 65.05 |
| World | 31.98 | 12.75 | 20.60 | 25.67 | 100.00 | 42.74 | 18.27 | 14.66 | 13.81 | 42.74 |
| CEE8 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 17.20 | 100.00 | 100.00 |
| SEE2 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 8.37 | 100.00 | 100.00 |
| SFRY4 | 100.00 | 29.23 | 100.00 | 100.00 | 100.00 | 849.94 | 100.00 | 6.86 | 100.00 | 100.00 |
| d. SEE2 with: | | | | | Estimations (17)-(26) | | | | | |
| SEE2 | Agriculture | Basic metals | Chemicals | Construction | Energy | Metal products | Mining | Textile | Wood paper | Food products |
| EU | 62.50 | 100.00 | 175.07 | 75.58 | 100.00 | 141.91 | 100.00 | 100.00 | 134.99 | 100.00 |
| World | 37.53 | 41.90 | 22.31 | 38.29 | 100.00 | 27.80 | 37.91 | 44.04 | 23.22 | 33.96 |
| CEE8 | 100.00 | 20.39 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 11.77 | 38.29 | 100.00 |
| SFRY4 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 8.37 | 100.00 | 100.00 |
| SEE2 | 100.00 | 100.00 | 100.00 | 1.25 | 100.00 | 100.00 | 100.00 | 0.38 | 2.11 | 100.00 |

Notes: the table indicates the ratio between the actual and the potential trade expressed as the anti-log of the estimated coefficient for the dummy variables controlling for the intensity of specific bilateral trade flows. SEE7=Southeast Europe, EU=European Union, CEE8=Central Eastern Europe, World=rest of the world, the complete list of the countries included in each group is presented in Table (28) in appendix.

# 4 The impact of trade liberalization on trade flows

In this section we evaluate the impact of trade liberalization on manufactured trade of Balkan countries. We analyze this question at the sectoral level and focus on exports flows of manufactured goods of Balkan countries all over the world[30]. We also use data on bilateral tariff barriers (TBs) and nontariff barriers (NTBs) to trade. Due to some data constraints, we focus on 7 manufactured sectors[31], on the period 1996-2000 and we retain 6 Balkan countries[32].

We find that exports are increasing in all sectors during the period, while bilateral tariffs are decreasing. However, this liberalization process exhibits small effects on trade. Actually, we find small but significant estimates of the impact of trade liberalization on Balkan countries' exports. Other things being equal, a one point decrease of bilateral tariffs increases exports from 2.2% to 8.6% according to the sector. These findings are mostly in line with the existing literature, pointing out that "effects on trade (...) are likely to be small" (Deardoff and Stern, 1986).

We find that, if tariffs are decreasing, nontariff barriers are *increasing* during the period. Trade liberalization should not be treated as a given (Trefler, 1993). Domestic firms, competiting with Balkan exporters, may have increased their lobbying activity for greater protection. As a result, NTBs increase and hurt exports from Balkan countries. In that respect, we find large estimates of NTBs on exports in 4 out of our 7 sectors (textile, wood and paper, construction and metal products)[33]. A one point decrease of NTBs increases exports from 67% to 227%.

The rest of this section is organized as follows. We first present some descriptive statistics. Then, we present our estimation strategy which is slightly different from the preceding sections. Finally, we report our results and present a summary of the estimates of TBs and NTBs on trade.

[30]We previously used imports at the sectoral level, but we face some data constraints. Our available information on bilateral tariff and nontariff variables is related to exports of Balkan countries

[31]Food, textile, wood and paper, chemical, construction, basic metal and metal products, see Tables (29) and (30) in appendix for details.

[32]Bosnia-Herzegovina, Bulgaria, Croatia, Macedonia, Romania and Slovenia.

[33]The estimates of NTBs in the other sectors are not significantly different from zero.

## 4.1 Basic statistics

### Exports

Sectoral exports of Balkan countries all over the world come from CEPII[34] . The sample covers 1996-2000. During this period, exports are increasing in almost all sectors such as textile (+3.3% in log terms between 1996 and 2000), metal products (+2.4%), basic metal (+2%), wood and Paper (+1.9%) and construction (+1,3%)]. Exports are rather stable in chemical industry (+0.5%) and decreasing in food industry (-1.7%) (see Figure 1). Interestingly, we observe that all sectors experienced a drop in 1999. This maybe explained by the upsurge of uncertainty in the region due to the bombing on Serbia.

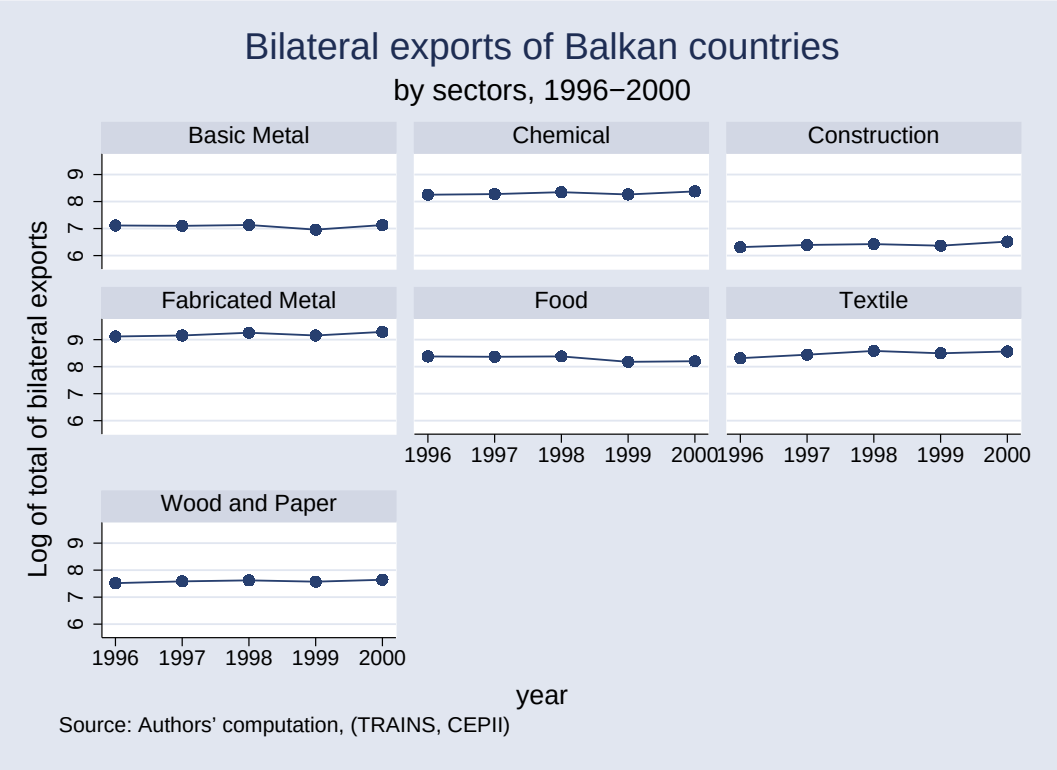


Figure 1: Bilateral exports of Balkan countries, by sector, 1996-2000.

[34] All the main importing partners are retained. See Table (28) in appendix for a list of countries. Mayer and Zignago (2005) and the CEPII website (http://www.cepii.fr) provide additional details.

**Bilateral tariff barriers on trade**

The TRAINS database developed by the UNCTAD offers the most complete data available on policy barriers to trade (Anderson and van Wincoop, 2004). TRAINS reports data on bilateral tariffs for roughly 5000 "products". Using this data, Jon Haveman computes weighted averages of bilateral tariffs[35], which are retreated and published on the CEPII website[36] (Mayer and Zignago, 2005).

Due to the substantial incompleteness of TRAINS[37] our measure of tariff is rather crude. We can however draw several lessons from it (see Figure 2). Tariffs are sharply increasing in 1997 and decreasing since there in all sectors.

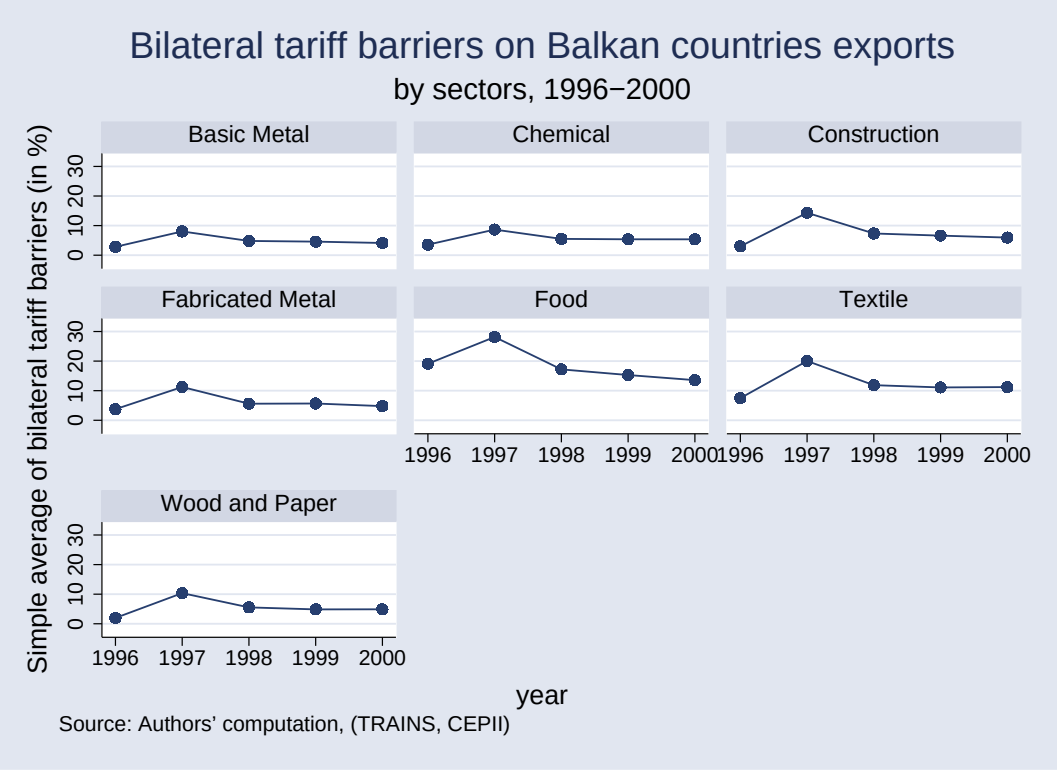


Figure 2: Bilateral tariff barriers on Balkan countries' exports, by sector, 1996-2000.

[35]See the Ultimate Trade Barrier Catalog at http://www.eiit.org/Protection.
[36]See http://www.cepii.fr.
[37]See Table (1) in Anderson and van Wincoop, 2004.

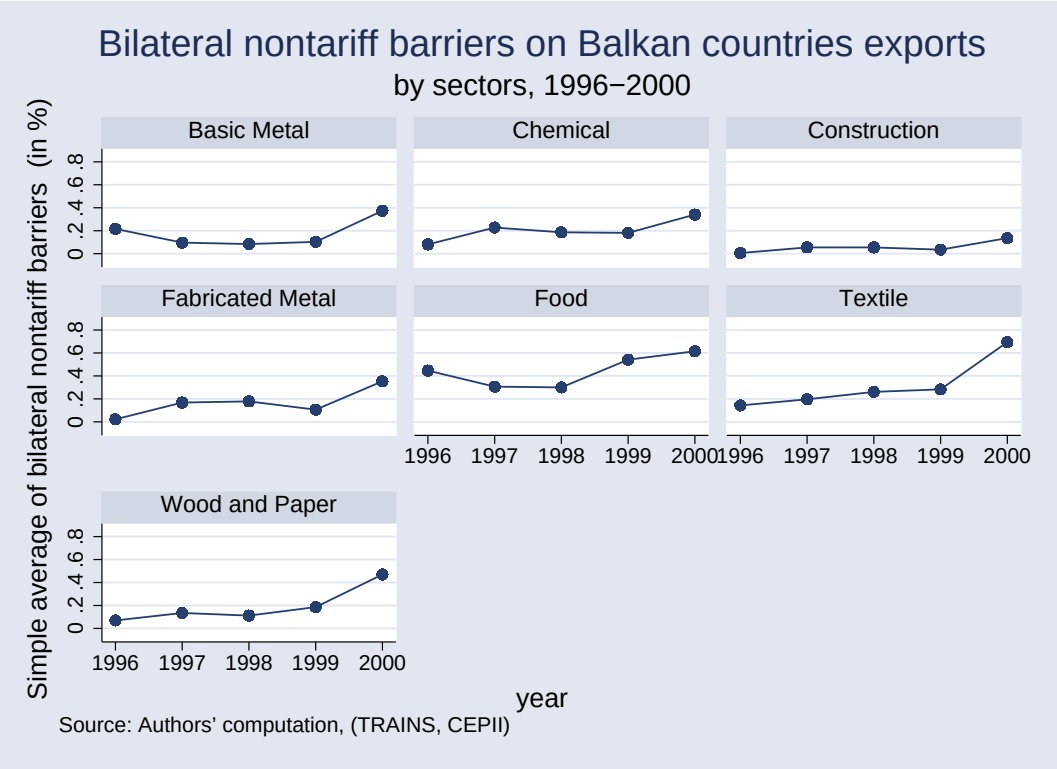


Figure 3: Bilateral nontariff barriers on Balkan countries' exports, by sector, 1996-2000.

**Bilateral nontariff barriers on trade**

Bilateral nontariff barriers on trade are also extracted from TRAINS and made public by the CEPII. These NTBs take different forms, "from traditional border formalities and administrative harassment to more sophisticated sanitary and physo-sanitary measures" (Mayer and Zignago, 2005). For a given sector, we use a frequency index of NTBs varying from 0 to 1 when all the tariff lines of the underlying sector is subject to a NTB.

This variable also represents an incomplete measure of protection, but offers some useful insights. During the period 1996-2000, NTBs are increasing in all sectors (see Figure 3). In some extent, the decrease of TB are compensated by an increase of NTBs.

## 4.2 Empirical model

We retain a gravity equation to investigate the impact of trade liberalization on exports. We use a slightly different equation compared to the preceding sections. We use the ordinary least squares (OLS) method[38] and estimate:

$$\begin{aligned} Ln(Exports_{ijt}) &= \beta_0 + \beta_1 Ln(GDP_i t) + \beta_2 Ln(GDP_j t) + \beta_3 Ln(Distance_{ijt}) \\ &\quad + \beta_4 Tariff_{ijt} + \beta_5 Ntb_{ijt} + \sum(\beta_l Z_{l_{ijt}}) \\ &\quad + \phi_t I_t + \varepsilon_{ijt}, \end{aligned} \tag{2}$$

where $i$ denotes the destination country and $j$ the source country. The variables are defined as follows:

- (Exports$_{ij}$) is the value of manufactured exports between $i$ and $j$;
- ($GDP$) is the Gross Domestic Product;
- (Distance$_{ij}$) denotes the distance between $i$ and $j$;
- (Tariff$_{ij}$) is the bilateral sector-level tariff barriers on exports from $i$ to $j$ (in percent);

[38] We depart from the Hausman-Taylor estimator since the simplest OLS method suits well our purposes.

- ($\text{Ntb}_{ij}$) is a frequency index of bilateral nontariff barriers on exports from $i$ to $j$;

- $Z_{l_{ij}}$ represents a set of dummy variables capturing various determinants of bilateral trade, such as:

  $contiguity_{ij}$, a dummy variable equals to one if $i$ and $j$ share a border;

  $samecountry_{ij}$, a dummy variable equals to one if $i$ and $j$ were or are part of the same country;

  $association_{ij}$, a dummy variable equals to one if $i$ and $j$ share an association agreement with the EU;

- ($I_t$) is a vector of year dummies that take a value of one in year $t$ for $t = 1, \ldots, T$;

- ($\varepsilon_{ij}$) is an error term, reflecting measurement error in trade.

## 4.3 Results

**Tariff barriers**

We first estimate a shorter version of equation (2), without NTBs and $Z$ variables. The results are reported in Table (9). It can be seen that our simple model has considerable explanatory power, except for the Food industry. As expected, the elasticities of exports with respect to own GDP and importing country-GDP are positive. Furthermore, the elasticities of distance are negative, indicating that, other things being equal, an increase of bilateral distance has a negative impact on trade.

We find small but significant estimates of the impact of trade liberalization on exports, except for food industry ($p<0.1$). The estimated coefficients of the tariff variable are negative, it means that, other things being equal, a one point *decrease* of bilateral tariffs *increases* exports from 2.2% (Construction) to 8.6% (Wood and Paper)[39].

[39] In a log-level model, the semi-elasticity is interpreted as $dy = (100 * beta_j)dx$ (see Woolridge, 2003, p.45).

Table 9: Tariff barriers estimates

| | Dependant variables: Ln(Exports$_{ij}$) | | | | | | |
|---|---|---|---|---|---|---|---|
| Sectors: | Food | Textile | Wood & Paper | Chemical | Construction | Basic Metal | Metal Products |
| Ln(GDP$_i$) | 0.727$^a$ | 0.831$^a$ | 0.824$^a$ | 1.020$^a$ | 0.565$^a$ | 0.903$^a$ | 0.972$^a$ |
| | (0.088) | (0.071) | (0.051) | (0.060) | (0.059) | (0.065) | (0.057) |
| Ln(GDP$_j$) | 0.641$^a$ | 1.009$^a$ | 0.807$^a$ | 1.047$^a$ | 0.710$^a$ | 0.716$^a$ | 1.200$^a$ |
| | (0.064) | (0.046) | (0.037) | (0.041) | (0.041) | (0.045) | (0.036) |
| Ln(Distance$_{ij}$) | -1.121$^a$ | -1.697$^a$ | -1.650$^a$ | -1.913$^a$ | -1.520$^a$ | -1.721$^a$ | -1.806$^a$ |
| | (0.071) | (0.060) | (0.041) | (0.050) | (0.050) | (0.054) | (0.049) |
| Tariff$_{ij}$ | -0.003$^c$ | -0.024$^a$ | -0.086$^a$ | -0.024$^b$ | -0.022$^a$ | -0.028$^b$ | -0.058$^a$ |
| | (0.001) | (0.007) | (0.007) | (0.011) | (0.006) | (0.012) | (0.010) |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| $R^2$ | 0.37 | 0.68 | 0.81 | 0.78 | 0.68 | 0.68 | 0.82 |
| # observations | 721 | 719 | 722 | 721 | 718 | 721 | 722 |

Notes: $^a$, $^b$ and $^c$ define 1%, 5% and 10% significance levels respectively. Heteroskedastic-consistent (White-robust) standard errors are in parentheses. Coefficients for year fixed effects and constant are not reported. Estimations of equation (2) without the *ntb* and $Z$ variables.

If we restrict the sample to the exports of Balkan countries to the European Union countries, we find larger estimates. They however maybe less reliable because the sample retains only 280 observations. In this case, other things being equal, a one point decrease of bilateral tariffs significantly increases exports by 56% in the wood and paper sector, 24% in the construction and 17% in the fabricated metal industry.

In the previous estimates, we used GDPs to get an approximation of the production sector elasticities. It seems more convenient to use directly production by sectors. We face however some data constraints on this variable which reduces the available information. Results are reported in Table (10).

Results are in line with the preceding estimates. Thus, coefficients for Wood and Paper, Chemical and Construction are not statistically different. Only the estimate for the Textile industry is statistically higher. The coefficients for the other sectors are not statistically significant, this may be due to the huge drop in the number of observations.

**Nontariff barriers**

We now introduce the role of NTBs variable. The results are reported in Table (11).

Table 10: Tariff barriers estimates including production by sectors

| | Dependant variables: Ln(Exports$_{ij}$) | | | | | | |
|---|---|---|---|---|---|---|---|
| Sectors: | Food | Textile | Wood & Paper | Chemical | Construction | Basic Metal | Metal Products |
| Ln(Production$_i$) | 0.447$^a$ | 0.508$^a$ | 0.969$^a$ | 0.469$^a$ | 0.603$^a$ | 0.923$^a$ | 1.184$^a$ |
| | (0.140) | (0.067) | (0.119) | (0.041) | (0.101) | (0.283) | (0.215) |
| Ln(Production$_j$) | 0.770$^a$ | 1.042$^a$ | 0.692$^a$ | 1.020$^a$ | 0.742$^a$ | 0.685$^a$ | 1.008$^a$ |
| | (0.102) | (0.046) | (0.042) | (0.045) | (0.051) | (0.097) | (0.037) |
| Ln(Distance$_{ij}$) | -1.175$^a$ | -1.775$^a$ | -1.668$^a$ | -2.013$^a$ | -1.534$^a$ | -1.850$^a$ | -1.788$^a$ |
| | (0.133) | (0.098) | (0.065) | (0.073) | (0.081) | (0.215) | (0.081) |
| Tariff$_{ij}$ | -0.003 | -0.054$^a$ | -0.073$^a$ | -0.032$^b$ | -0.024$^a$ | -0.034 | -0.025$^c$ |
| | (0.004) | (0.010) | (0.014) | (0.016) | (0.009) | (0.045) | (0.015) |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| $R^2$ | 0.35 | 0.73 | 0.78 | 0.90 | 0.69 | 0.68 | 0.85 |
| # observations | 260 | 338 | 337 | 342 | 333 | 80 | 255 |

Notes: $^a$, $^b$ and $^c$ define 1%, 5% and 10% significance levels respectively. Heteroskedastic-consistent (White-robust) standard errors are in parentheses. Coefficients for year fixed effects and constant are not reported. Estimations of equation (2) without the *ntb* and $Z$ variables.

Table 11: Nontariff and tariff barriers estimates

| | Dependant variables: Ln(Exports$_{ij}$) | | | | | | |
|---|---|---|---|---|---|---|---|
| Sectors: | Food | Textile | Wood & Paper | Chemical | Construction | Basic Metal | Metal Products |
| Ln(GDP$_i$) | 0.695$^a$ | 0.787$^a$ | 0.791$^a$ | 1.005$^a$ | 0.517$^a$ | 0.879$^a$ | 0.905$^a$ |
| | (0.128) | (0.100) | (0.077) | (0.088) | (0.086) | (0.094) | (0.087) |
| Ln(GDP$_j$) | 0.678$^a$ | 1.078$^a$ | 0.865$^a$ | 1.007$^a$ | 0.741$^a$ | 0.749$^a$ | 1.215$^a$ |
| | (0.102) | (0.062) | (0.055) | (0.061) | (0.058) | (0.067) | (0.055) |
| Ln(Distance$_{ij}$) | -0.982$^a$ | -1.487$^a$ | -1.622$^a$ | -1.871$^a$ | -1.522$^a$ | -1.768$^a$ | -1.762$^a$ |
| | (0.114) | (0.105) | (0.073) | (0.086) | (0.086) | (0.090) | (0.088) |
| Tariff$_{ij}$ | -0.017$^b$ | -0.059$^a$ | -0.084$^a$ | 0.005 | -0.031$^b$ | -0.015 | -0.026 |
| | (0.004) | (0.013) | (0.015) | (0.021) | (0.015) | (0.045) | (0.018) |
| Nontariff$_{ij}$ | 0.886$^c$ | -0.667$^b$ | -0.496 | -0.026 | -0.793 | 0.784 | -1.490$^a$ |
| | (0.496) | (0.313) | (0.343) | (0.433) | (0.963) | (0.500) | (0.439) |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| $R^2$ | 0.36 | 0.73 | 0.81 | 0.79 | 0.69 | 0.70 | 0.83 |
| # observations | 346 | 347 | 347 | 346 | 345 | 347 | 347 |

Notes: $^a$, $^b$ and $^c$ define 1%, 5% and 10% significance levels respectively. Heteroskedastic-consistent (White-robust) standard errors are in parentheses. Coefficients for year fixed effects and constant are not reported. Estimations of equation (2) without the $Z$ variables.

The results are quite disappointing due to some sample problems. Introducing the NTB variable leads to a decrease of the number of observations and to a multicollinearity problem. The correlation between TB and NTB causes the model to become unsatisfactory. In Chemical, Construction and Fabricated Metal the pairwise correlation coefficients are significant and respectively equal to 0.34, 0.50 and 0.44. This simple correlation is even higher for some specific years. Consequently, compared to our first estimates [Table (9)], the standard errors are larger when we introduce the NTBs and some semi-elasticities of the tariff variable become insignificant.

Estimates in the Textile and the Fabricated Metal industries are however informative. It seems that the effect of NTBs on trade are larger than the impact of TBs. Other things being equal, a one point *decrease* of NTBs *increases* exports respectively by 67% and 149%.

We now drop the $tariff_{ij}$ variable to avoid any multicollinearity problem. The results are reported in Table (12).

Table 12: Nontariff barriers estimates

| | Dependant variables: Ln(Exports$_{ij}$) | | | | | | |
|---|---|---|---|---|---|---|---|
| Sectors: | Food | Textile | Wood & Paper | Chemical | Construction | Basic Metal | Metal Products |
| Ln(GDP$_i$) | 0.731$^a$ | 0.845$^a$ | 0.471$^a$ | 1.044$^a$ | 0.514$^a$ | 0.839$^a$ | 0.903$^a$ |
| | (0.119) | (0.092) | (0.080) | (0.084) | (0.080) | (0.087) | (0.085) |
| Ln(GDP$_j$) | 0.844$^a$ | 1.127$^a$ | 1.059$^a$ | 1.138$^a$ | 0.806$^a$ | 0.806$^a$ | 1.356$^a$ |
| | (0.069) | (0.053) | (0.046) | (0.050) | (0.046) | (0.054) | (0.049) |
| Ln(Distance$_{ij}$) | -0.963$^a$ | -1.631$^a$ | -1.719$^a$ | -1.849$^a$ | -1.508$^a$ | -1.738$^a$ | -1.709$^a$ |
| | (0.105) | (0.082) | (0.066) | (0.074) | (0.074) | (0.074) | (0.077) |
| Nontariff$_{ij}$ | 0.769$^c$ | -0.669$^a$ | -1.041$^a$ | 0.173 | -1.604$^b$ | 0.725 | -2.272$^a$ |
| | (0.435) | (0.290) | (0.412) | (0.397) | (0.693) | (0.467) | (0.418) |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| $R^2$ | 0.38 | 0.70 | 0.75 | 0.76 | 0.66 | 0.68 | 0.79 |
| # observations | 411 | 411 | 411 | 411 | 411 | 411 | 411 |

Notes: $^a$, $^b$ and $^c$ define 1%, 5% and 10% significance levels respectively. Heteroskedastic-consistent (White-robust) standard errors are in parentheses. Coefficients for year fixed effects and constant are not reported. Estimations of equation (2) without the $tariff$ and $Z$ variables.

They confirm the strong impact of the nontariff barriers on exports of Textile and Fabricated Metal. Interestingly, we also find large effects in Wood and Paper and Construction sectors. Other things being equal, a one point decrease of NTBs

increases exports of Balkan countries by 67% to 227%, depending on the sector.

## 4.4 Robustness checks

We now estimate equation (2) and take account of some factors that influence the pattern of trade between two partners, such as the share of a border, the signature of an association agreement with the EU or if they were or are part of the same country. However, to avoid any problem of multicolinearity we do not include simultaneously the effects of NTBs and TBs on trade. Thus, we estimate equation (2), first without the NTBs variable, then without the TBs variable.

**Tariff barriers**

Results concerning tariff barriers are reported in Table (13).

Table 13: Tariff barriers estimates - Robustness checks

| | Dependant variables: Ln(Exports$_{ij}$) | | | | | | |
|---|---|---|---|---|---|---|---|
| Sectors: | Food | Textile | Wood & Paper | Chemical | Construction | Basic Metal | Metal Products |
| Ln(GDP$_i$) | 0.681$^a$ | 0.717$^a$ | 0.751$^a$ | 0.967$^a$ | 0.481$^a$ | 0.828$^a$ | 0.911$^a$ |
| | (0.100) | (0.075) | (0.057) | (0.068) | (0.059) | (0.068) | (0.065) |
| Ln(GDP$_j$) | 0.674$^a$ | 1.023$^a$ | 0.820$^a$ | 1.057$^a$ | 0.741$^a$ | 0.741$^a$ | 1.203$^a$ |
| | (0.065) | (0.046) | (0.036) | (0.041) | (0.040) | (0.045) | (0.036) |
| Ln(Distance$_{ij}$) | -0.942$^a$ | -1.604$^a$ | -1.553$^a$ | -1.829$^a$ | -1.347$^a$ | -1.563$^a$ | -1.735$^a$ |
| | (0.076) | (0.065) | (0.045) | (0.056) | (0.054) | (0.060) | (0.053) |
| Tariff$_{ij}$ | -0.002 | -0.019$^a$ | -0.083$^a$ | -0.024$^b$ | -0.019$^a$ | -0.025$^b$ | -0.056$^a$ |
| | (0.001) | (0.007) | (0.007) | (0.397) | (0.006) | (0.482) | (0.010) |
| Contiguity$_{ij}$ | 2.156$^a$ | 1.570$^a$ | 0.918$^a$ | 0.921$^a$ | 1.875$^a$ | 1.526$^a$ | 0.323 |
| | (0.301) | (0.382) | (0.286) | (0.273) | (0.406) | (0.490) | (0.275) |
| Samecountry$_{ij}$ | 1.840$^a$ | 0.370 | 0.945$^a$ | 0.709$^b$ | 1.819$^a$ | 1.764$^a$ | 0.840$^a$ |
| | (0.300) | (0.390) | (0.315) | (0.354) | (0.260) | (0.382) | (0.312) |
| Association$_{ij}$ | 0.455$^c$ | 0.968$^a$ | 0.651$^a$ | 0.465$^a$ | 0.768$^a$ | 0.684$^a$ | 0.456$^a$ |
| | (0.238) | (0.276) | (0.150) | (0.183) | (0.255) | (0.253) | (0.139) |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| $R^2$ | 0.39 | 0.69 | 0.82 | 0.78 | 0.71 | 0.70 | 0.82 |
| # observations | 721 | 719 | 722 | 721 | 718 | 721 | 722 |

Notes: $^a$, $^b$ and $^c$ define 1%, 5% and 10% significance levels respectively. Heteroskedastic-consistent (White-robust) standard errors are in parentheses. Coefficients for year fixed effects and constant are not reported. Estimations of equation (2) without the *ntb* and $Z$ variables.

As expected, the three additional variables positively affect trade since they reduce trade frictions. Their introduction do not change much the estimates.

Table 14: Nontariff barriers estimates - Robustness checks

| | Dependant variables: Ln(Exports$_{ij}$) | | | | | | |
|---|---|---|---|---|---|---|---|
| Sectors: | Food | Textile | Wood & Paper | Chemical | Construction | Basic Metal | Metal Products |
| Ln(GDP$_i$) | 0.678$^a$ | 0.754$^a$ | 0.628$^a$ | 0.994$^a$ | 0.418$^a$ | 0.780$^a$ | 0.836$^a$ |
| | (0.130) | (0.096) | (0.084) | (0.092) | (0.080) | (0.092) | (0.096) |
| Ln(GDP$_j$) | 0.852$^a$ | 1.121$^a$ | 1.048$^a$ | 1.137$^a$ | 0.803$^a$ | 0.811$^a$ | 1.350$^a$ |
| | (0.068) | (0.053) | (0.043) | (0.048) | (0.046) | (0.054) | (0.047) |
| Ln(Distance$_{ij}$) | -0.704$^a$ | -1.483$^a$ | -1.525$^a$ | -1.692$^a$ | -1.265$^a$ | -1.553$^a$ | -1.568$^a$ |
| | (0.110) | (0.090) | (0.070) | (0.083) | (0.076) | (0.081) | (0.086) |
| Nontariff$_{ij}$ | 0.815$^c$ | -1.052$^a$ | -1.190$^a$ | -0.006 | -1.984$^a$ | 0.461 | -2.352$^a$ |
| | (0.418) | (0.282) | (0.375) | (0.397) | (0.742) | (0.482) | (0.419) |
| Contiguity$_{ij}$ | 2.377$^a$ | 1.306$^a$ | 1.303$^a$ | 1.099$^a$ | 1.892$^a$ | 1.350$^a$ | 0.737$^c$ |
| | (0.425) | (0.497) | (0.431) | (0.386) | (0.527) | (0.490) | (0.390) |
| Samecountry$_{ij}$ | 2.362$^a$ | 0.945 | 1.574$^a$ | 1.394$^a$ | 2.102$^a$ | 2.872$^a$ | 1.435$^a$ |
| | (0.407) | (0.600) | (0.502) | (0.520) | (0.358) | (0.485) | (0.484) |
| Association$_{ij}$ | 0.493 | 0.825$^b$ | 1.150$^a$ | 0.501$^b$ | 0.915$^b$ | 0.630$^c$ | 0.686$^a$ |
| | (0.358) | (0.383) | (0.223) | (0.249) | (0.366) | (0.379) | (0.207) |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| $R^2$ | 0.43 | 0.71 | 0.77 | 0.77 | 0.70 | 0.70 | 0.80 |
| # observations | 411 | 411 | 411 | 411 | 411 | 411 | 411 |

Notes: $^a$, $^b$ and $^c$ define 1%, 5% and 10% significance levels respectively. Heteroskedastic-consistent (White-robust) standard errors are in parentheses. Coefficients for year fixed effects and constant are not reported. Estimations of equation (2) without the $tariff$ and $Z$ variables.

Controlling for the additional factors slightly decreases their magnitude, except in Chemical where the coefficient is unchanged.

**Nontariff barriers**

The introduction of the $Z$ elements has larger effects concerning the semi-elasticity of NTBs [Table (14)]. It is worth noting that controlling for these new factors *increases* the magnitude of the estimate of the NTBs in all the sectors where the effect was statistically significant from zero. It means that NTBs variable is negatively correlated with at least one of the additional factors (*Contiguity*, *Samecountry* or *Association*).

## 4.5 Summary estimates

We summarize our results in computing the range of estimates of NTBs and TBs on trade. Table (15) reports the the lower and upper bonds of their 95% confi-

Table 15: Range of estimates of TBs and NTBs on trade (in percent).

| | A one point decrease of TB or NTB increases trade by: | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sectors: | Food | | Textile | | Wood & Paper | | Chemical | | Construction | | Basic Metal | | Metal Products | |
| 95% C.I.[a] | Low | Up | Low | Up | Low | Up | Low | Up | Low | Up | Low | Up | Low | Up |
| TBs[b] | 0 | 0 | 1 | 3.9 | 7.2 | 10 | 0.2 | 4.7 | 1 | 3.4 | 0.5 | 5 | 3.9 | 7.6 |
| TBs[c] | 0 | 0 | 0.5 | 3.4 | 6.9 | 9.7 | 0.1 | 4.5 | 3 | 0.8 | 0.3 | 4.7 | 3.9 | 7.6 |
| NTBs[d] | 0 | 0 | 40 | 154 | 23 | 185 | 0 | 0 | 24 | 297 | 0 | 0 | 145 | 227 |
| NTBs[e] | 0 | 0 | 50 | 162 | 45 | 193 | 0 | 0 | 53 | 344 | 0 | 0 | 153 | 318 |

Notes:

[a] : The table reports the lower (low) and upper (up) bonds of the 95% confidence interval.

[b] : TB estimates from equation (2) without NTBs and $Z$ variables;

[c] : TB estimates from equation (2) without the NTBs variable;

[d] : NTB estimates from equation (2) without TBs and $Z$ variables;

[e] : TB estimates from equation (2) without the TBs variable.

dence interval. They confirm the *decrease* of estimates of TBs and the *increase* of estimates of NTBs, when controlling for the $Z$ elements. The results also exhibit large differences in magnitude between TBs and NTBs effects. The latter are quite larger.

# 5 The impact of trade liberalization on firm performance

In this section we investigate the impact of trade liberalization on performance of firms in the countries of South-East Europe. In particular, we are interested in what extent foreign trade in addition to foreign direct investment (FDI) contributed to improvements in firm performance over the period 1995-2002. We measure firm performance with total factor productivity (TFP) obtained after regressing capital and labor inputs on value added as our output variable. We make use of firm level data for Bosnia and Herzegovina (BIH), Croatia (HRV), Macedonia (MKD), Slovenia (SVN), Bulgaria (BGR) and Romania (ROM). 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[40]. 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).

## 5.1 Descriptive statistics

**Foreign ownership**

In this analysis we take into account different sources of potential outward knowledge spillovers that may be important determinant of productivity growth of individual firms. One of the most obvious determinants 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. 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 16 reveal productivity and wage superiority of foreign owned firms in Bosnia, Croatia and Slovenia, while in Bulgaria and Romania the opposite might be true.

**Trade flows**

Another channel of technology transfer is through international trade, in particular imports of intermediate products and capital equipment (see Markusen,

[40]See table (28) in appendix for a list of countries. Mayer and Zignago (2005) and the CEPII website (http://www.cepii.fr) provide additional details.

Table 16: 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 | Nb. Foreign | | | | | | 36 | 35 | 36 | 36 |
| | Nb. 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 |
| BGR | Nb. Foreign | 321 | 506 | 709 | 781 | 1,301 | 1,511 | 1,647 | 1,568 | |
| | Nb. 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 | |
| HRV | Nb. Foreign | | 18 | 38 | 54 | 102 | 111 | 113 | 125 | 130 |
| | Nb. 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 |
| MKD | Nb. Foreign | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Nb. Domestic | | 2 | 2 | 3 | 5 | 7 | 132 | 130 | 2 |
| | rWage f | | | | | | | | | |
| | rVAe f | | | | | | | | | |
| ROM | Nb. Foreign | | 5159 | 6010 | 6497 | 7,05 | 7,558 | 7,96 | 7,633 | 7,271 |
| | Nb. 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 |
| SVN | Nb. Foreign | 109 | 122 | 201 | 222 | 235 | 242 | 255 | 272 | 270 |
| | Nb. 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 |
| SCG | Nb. Foreign | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Nb. Domestic | | | 1 | 129 | 113 | 1,467 | 1,48 | 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. Sources: Amadeus, AJPES, authors' calculations.

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 17 and 18 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%.

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 17 and 18 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 17: Regional export shares, 1994 - 2002, in %.

| | Variables | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|---|
| BIH | sh YUG | | | | | 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 |
| BGR | sh YUG | 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 |
| HRV | sh YUG | 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 |
| MKD | sh YUG | 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 |
| ROM | sh YUG | 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 |
| SVN | sh YUG | 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 |

Notes: 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 YUG is share of exports to countries of former Yugoslavia (SVN, HRV, BIH, SCG, MKD), 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.

Table 18: Regional import shares, 1994 - 2002, in %.

| | Variables | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|
| BGR | 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 | |
| HRV | 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 |
| MKD | 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 | |
| ROM | 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 |
| SVN | 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 (SVN, HRV, BIH, SCG, MKD), 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.

## 5.2 Empirical model and methodology

### 5.2.1 Modelling impact of FDI and trade 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 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:

$$Y_{it} = H^i(K_{it}^{\alpha}, L_{it}^{\beta}, T_{it}^{\gamma}), \tag{3}$$

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 (3) with respect to time, we get:

$$y_{it} = \alpha k_{it} + \beta l_{it} + \gamma t_{it}, \tag{4}$$

where the small letter variable indicates its logarithmic growth rate of $K$, $L$, and $T$, and $\alpha$, $\beta$, and $\gamma$ represent the elasticity of output with respect to $k$, $l$ and $t$. The basic idea underlying equation (4) 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 $Z_{jt}$:

$$t_{it} = f^i(F_i, Z_{jt}), \tag{5}$$

Where the set $Z_{jt}$ includes the potential home market spillovers $ES_{jt}$ (external economies of scale at the NACE 2-digit industry $j$ level), knowledge spillovers from exporting $X_{jt}$ 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:

$$y_{it} = \alpha k_{it} + \beta l_{it} + \delta F_i + \kappa \ln Secsize_{jt} + \mu X_{jt} + \sigma M_{jt} + \phi_t + u_{it}, \qquad (6)$$

where $\phi_t$ indicates time effects which capture time specific economic shocks typical for each of the countries under investigation, $\varepsilon_{it}$ 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.

## 5.3 Econometric issues

Estimating (6) pose at least two econometric problems that can potentially lead to seriously biased estimations of the estimated coefficients. 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 (6):

$$y_{it} = \alpha k_{it} + \beta l_{it} + t_{it} + \phi_t + (\eta_i + \nu_{it} + m_{it}), \qquad (7)$$

with $\nu_{it} = \rho\nu_{i,t-1} + \epsilon_{it}, |\rho| < 1, \epsilon_{it}, m_{it} \sim MA(0)$, where $t_{it}$ is a productivity shock that depends on various knowledge spillovers factors described above. Of the error components, $\eta_i$ is an unobserved firm-specific effect, $\nu_{it}$ 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 ($\eta_i$) as well as with both productivity shocks ($\epsilon_{it}$) 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 (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 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 (7) can then be written as:

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

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 $\eta_i$ in (7), and then $y_{i,t-1}$ is also a function of $\eta_i$. As a consequence, $y_{i,t-1}$ is correlated with the error term, which renders the OLS estimator biased and inconsistent, even if the $\nu_{it}$ and $m_{it}$ in (7) 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 (6) in order to eliminate $\eta_i$, 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 choice of 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 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 ($\Delta x_{i3}$) are ($x_{i1}$) and ($\Delta x_{i1}$) (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)[41]. In the first step a probit model of structural characteristics of firms with respect to foreign investment choices is estimated (see table 19 for results). Results 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 an 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 ratios, $\lambda_i$ , for all observations (for non-zero as well as zero observations regarding foreign investment choices) are calculated. A vector of $\lambda_i$ is then included in the estimations of model (6) as an additional independent variable which controls for the unobserved impact of foreign investment decisions.

Table 19: Heckman probit estimates

| | BIH | BGR | HRV | ROM | SVN |
|---|---|---|---|---|---|
| Size (emp) | -0.0159$^a$ | -2.8E-05 | 0.0003 | -0.0003$^b$ | -0.0015$^b$ |
| | *-4.42* | *-0.52* | *1.32* | *-1.91* | *-2.15* |
| K/L-ratio | -0.0023 | 2.6E-06 | -0.0003$^a$ | -0.0012$^c$ | -3.6E-06 |
| | *-0.73* | *0.40* | *-2.60* | *-1.73* | *-0.76* |
| VA/emp | 0.0510 | -4.4E-05 | -0.0206$^a$ | 0.0271$^a$ | -8.3E-05$^a$ |
| | *1.06* | *-1.31* | *-2.53* | *3.70* | *-2.86* |
| Skill int. | 0.1019 | -2.9E-05 | -0.0705$^a$ | -0.1113$^a$ | -3.2E-04$^a$ |
| | *0.48* | *-0.29* | *-3.47* | *-3.81* | *-7.37* |
| Secsize | 0.0000 | -5.1E-10 | -1.3E-06$^a$ | 4.8E-07$^a$ | -2.2E-09$^a$ |
| | *0.87* | *-1.24* | *-7.21* | *17.69* | *-7.70* |
| Nb. 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. $^a$, $^b$, and $^c$ indicate statistical significance of coefficients at 1, 5 and 10 per cent, respectively.

[41]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).

## 5.4 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 20 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 (6) 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 ($\eta_i$) , 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.

### 5.4.1 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.

Results presented in table 21 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

Table 20: 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 | dVA | | | | | | | -45.5 | 120.4 | 6.8 |
| | dL | | | | | | | 4.1 | -32.3 | -2.3 |
| | dVAe | | | | | | | -49.7 | 153.9 | 9.5 |
| | dVAe f | | | | | | | -8.2 | 17.2 | 5.2 |
| BGR | dVA | -74.8 | -516.7 | -108.7 | 65.7 | 34.4 | -5.2 | 6.2 | 7.9 | 4.9 |
| | dL | -7.1 | 0.6 | 0.9 | 1.7 | 0.4 | -3.2 | -4.0 | -6.2 | 5.8 |
| | dVAe | -23.9 | -592.1 | -108.3 | 67.9 | 37.1 | -8.0 | 14.7 | 5.8 | -0.1 |
| | dVAe f | -9.6 | -234.4 | -48.2 | 30.4 | 16.3 | -3.1 | 7.6 | 3.9 | -0.2 |
| HRV | dVA | | | 6.9 | -0.5 | -7.1 | 7.4 | 11.0 | 12.7 | 1.0 |
| | dL | | | -1.4 | -3.5 | -2.5 | 5.7 | 3.1 | 5.2 | 4.6 |
| | dVAe | | | 5.6 | 12.4 | -5.6 | 0.4 | 7.7 | 7.0 | -4.3 |
| | dVAe f | | | 6.4 | 16.5 | -1.0 | 0.4 | 0.5 | 0.1 | 0.3 |
| MKD | dVA | | | | | | | | -7.4 | |
| | dL | | | | | | | -1.3 | -2.6 | -14.8 |
| | dVAe | | | | | | | | -4.6 | |
| | dVAe f | | | | | | | | | |
| ROM | dVA | | | 10.1 | 1.3 | -4.4 | -0.8 | 8.2 | 25.0 | -3.5 |
| | dL | | | 6.4 | 19.4 | 15.4 | 8.6 | 11.5 | 2.7 | -5.7 |
| | dVAe | | | 7.0 | -13.8 | -13.8 | -4.4 | 0.9 | 18.0 | -4.5 |
| | dVAe f | | | 5.8 | -11.9 | -10.3 | -5.0 | -0.7 | 13.4 | -4.0 |
| SVN | dVA | | 25.2 | 22.6 | 21.2 | 11.6 | 14.2 | 10.7 | 12.2 | 9.9 |
| | dL | | 7.6 | 3.7 | 5.1 | 4.4 | 3.9 | 4.0 | 3.5 | 0.6 |
| | dVAe | | 17.6 | 19.0 | 16.1 | 7.2 | 10.3 | 6.6 | 8.8 | 9.3 |
| | dVAe f | | -0.4 | 17.9 | 3.7 | 1.0 | 1.4 | 3.1 | 5.8 | -1.4 |

Sources: Amadeus, AJPES, authors' calculations.

Table 21: Impact of FDI and export propensity on productivity growth in SEE firms, period 1995 - 2002 (first differences specification).

| | BIH | BGR | HRV | ROM | SVN | MKD |
|---|---|---|---|---|---|---|
| dK | 0.137 | 0.796[a] | 0.067[a] | 0.539[a] | 0.339[a] | 0.357[c] |
| | 0.56 | 48.61 | 12.32 | 68.96 | 34.11 | 1.98 |
| dL | 0.067 | 0.294[a] | 0.424[a] | 0.319[a] | 0.540[a] | 0.080 |
| | 0.47 | 11.82 | 44.12 | 45.26 | 44.59 | 0.29 |
| Foreign | 0.441[a] | 0.016 | 0.066[b] | -0.064[a] | 0.048[a] | |
| | 4.40 | 0.79 | 2.16 | -7.32 | 2.49 | |
| log Secsize | 0.008 | -0.001 | -0.126[a] | -0.079[a] | -0.057[a] | 0.038 |
| | 0.18 | -0.10 | -18.63 | -8.90 | -7.71 | 1.22 |
| EXsh EU15 | -0.611 | 0.062 | 0.036 | 0.248[a] | 0.146[c] | 0.489 |
| | -0.85 | 0.77 | 0.25 | 4.78 | 1.72 | 0.38 |
| EXsh OECDoth | -0.197 | -0.040 | 0.014 | 0.304[a] | *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[a] | 0.006 | -0.756 |
| | -0.54 | -1.38 | 0.40 | 2.87 | 0.06 | -0.25 |
| lambda | 0.017 | -0.466 | -1.662[a] | 0.185[a] | -1.167[a] | |
| | 0.25 | -0.98 | -28.43 | 10.37 | -20.70 | |
| Year dummies | Yes | Yes | Yes | Yes | Yes | Yes |
| Nb. Obs | 181 | 4461 | 21368 | 33366 | 23464 | 106 |
| Adj R2 | 0.135 | 0.807 | 0.113 | 0.248 | 0.186 | 0.149 |
| $Prob > chi_2$ | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| Nb. BS Replications | | | | | | 500 |

Notes: Dependent variable dVA (value added, specified in log first differences). t-statistics in italics. [a], [b], and [c] indicate statistical significance of coefficients at 1, 5 and 10 per cent, respectively.

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 22). 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, only in some of the countries liberalization of bilateral trade within the SEE region might be an important engine of firms' growth.

### 5.4.2 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 23 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

Table 22: Impact of FDI, export and import propensity on productivity growth in SEE firms, period 1995 - 2002.

| | BGR | HRV | ROM | SVN | MKD |
|---|---|---|---|---|---|
| dK | 0.464[a] | 0.086[a] | 0.533[a] | 0.365[a] | 0.374[c] |
| | 15.46 | 8.71 | 57.65 | 27.49 | 1.67 |
| dL | 0.340[a] | 0.458[a] | 0.319[a] | 0.525[a] | 0.045 |
| | 11.75 | 27.35 | 38.36 | 33.39 | 0.14 |
| Foreign | 0.021 | 0.037 | -0.087[a] | 0.035 | |
| | 0.84 | 1.15 | -8.24 | 1.46 | |
| log Secsize | -0.013 | -0.074[a] | -0.137[a] | -0.080[a] | -0.027 |
| | -0.83 | -5.97 | -10.10 | -8.35 | -0.45 |
| EXsh EU15 | 0.156 | 0.370[c] | 0.056 | *0.173 | 0.665 |
| | 1.57 | 1.75 | 0.88 | 1.70 | 0.42 |
| EXsh OECDoth | 0.056 | 0.315 | 0.238[a] | 0.390[a] | 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[a] | 0.251 | 1.895 |
| | -0.56 | -1.14 | 8.51 | 1.31 | 1.52 |
| IMsh OECDoth | -0.110 | -0.276 | 1.329[a] | 0.177 | 0.649 |
| | -0.44 | -0.91 | 8.29 | 0.92 | 0.18 |
| IMsh YU | 0.086 | -0.606 | 1.647[a] | -0.144 | 5.990[c] |
| | 0.14 | -1.08 | 3.28 | -0.75 | 1.66 |
| $\lambda$ | 0.779 | -1.123[a] | 0.384[a] | -1.548[a] | |
| | 1.00 | -10.70 | 13.49 | -19.42 | |
| Year dummies | Yes | Yes | Yes | Yes | Yes |
| Nb. 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 | |
| Nb. BS Replications | | | | | 500 |

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

Table 23: Impact of FDI, export and import propensity on productivity growth in SEE firms, period 1995 - 2002, system GMM estimations.

| | BGR | SVN | HRV | ROM |
|---|---|---|---|---|
| dVA 1 | 0.138$^{c}$ | 0.138$^{b}$ | 0.303$^{a}$ | 0.220$^{a}$ |
| | 1.92 | 2.29 | 4.73 | 5.12 |
| dK | 0.562$^{a}$ | 0.302$^{a}$ | 0.047$^{c}$ | 0.506$^{a}$ |
| | 5.43 | 5.05 | 1.90 | 12.16 |
| dL | 0.359$^{a}$ | 0.317$^{a}$ | 0.634$^{a}$ | 0.413$^{a}$ |
| | 3.14 | 3.67 | 8.87 | 8.77 |
| Foreign | 0.225 | 0.028$^{a}$ | 0.011$^{c}$ | 0.061 |
| | 0.76 | 5.23 | 1.84 | 0.51 |
| log Secsize | -0.053 | -0.229$^{c}$ | -0.146 | -1.216$^{a}$ |
| | -0.47 | -1.92 | -0.75 | -4.79 |
| EXsh EU15 | 0.825 | 0.163 | -1.225 | -0.721$^{b}$ |
| | 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$^{a}$ |
| | 1.09 | 0.35 | -1.17 | 4.50 |
| IMsh EU15 | -0.539 | -2.717 | 0.550 | 3.142$^{a}$ |
| | -0.56 | -0.96 | 0.30 | 5.15 |
| IMsh OECDoth | -0.198 | -2.921 | 0.495 | 5.461$^{a}$ |
| | -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$^{a}$ | -5.185$^{a}$ | 2.655$^{a}$ |
| | -0.89 | -6.11 | -2.70 | 8.07 |
| Year dummies | Yes | Yes | Yes | Yes |
| Nb. 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 dVA (value added, specified in log first differences). t-statistics in italics. $^{a}$, $^{b}$, and $^{c}$ indicate statistical significance of coefficients at 1, 5 and 10 per cent, respectively.

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.

# 6 Concluding remarks

In this study, we first estimate, on aggregated and sectoral data, the degree of trade intensity of SEE countries. Then we evaluate their trade potentials in the context of trade liberalization between themselves and with the EU. Second, we estimate the impact of tariff and nontariff barriers on manufactured exports. To these ends, we use a gravity equation. Finally, we investigate the impact of trade liberalization on performance of firms.

We find that determinants of trade volumes and the explanatory power of the gravity equation differ according to the sector. Trade in sectors intensive in natural resources is less explained by the gravity equation. Moreover, our sectoral study shows that trade volumes in some sectors are lower than their potential. Examples are trade of wood and textile products between SEE countries and trade of agricultural products between SEE countries and the EU.

One can also draw some interesting conclusions about the potential effects of preferential trade agreements signed by the SEE countries between themselves and with the EU. First, trade potentials of SEE countries with the EU are reached in almost all the sectors. However, this average result hides a huge difference between Eastern Balkans and Western Balkans. The former have outreached their potential and the latter have not. One can therefore expect that trade preferences granted by the EU to Western Balkans, at the beginning of the years 2000, will enhance trade. On the other hand trade flows between SEE countries and between them and CEE countries have outreached their potential for almost all sectors. However, the experiences of Bulgaria and Romania showed that one can expect limited gains from East-East type preferential trade agreements, even for manufactured goods. Finally, an important result is the very low integration of these countries to the world economy. This result confirm the necessity for SEE countries to continue trade openness.

We find significant effects of policy measures on manufactured exports of Balkan

countries. Results display however significant differences between TBs and NTBs estimates on trade. The latter exhibit larger effects on trade. Since NTBs are increasing, probably to replace the decrease of TBs, this result is worrying. A one point increase of NTBs sharply decreases exports.

However, one has to be cautious interpreting results since the tariff and nontariff barriers variables are quite crude measures of protection. Furthermore, the trend of each variable is computed with incomplete information concerning some products and years. Nonetheless, results are quite intuitive. The difference between both estimates is robust to different specifications and maybe explained by the domestic firms behavior. They may push to replace TBs by NTBs. In this case, protection is endogenous not exogenous. In response to increased import penetration, Balkans' partners intensify their lobbying activity for greater protection. Trefler (1993) finds that when trade protection is modeled endogenously, its restrictive impact on trade is large, 10 times the size obtained from treating protection exogenously. However, implementing such an estimation strategy is data demanding, since we should estimate simultaneously both exports and TBs (or NTBs) equations. Concerning other data requirements, results may be improved if we control for additional sector characteristics, such as size of firms or capital stocks.

Finally, we investigate effects of trade liberalization on firm performance. We do not find a general pattern of uniformly significant impact of extensive trade flows on individual firm's TFP growth. Specifically, only in Romania and Slovenia, higher propensity to export to advanced markets has a larger impact on TFP growth than exporting to less advanced markets such as new EU members and countries of former Yugoslavia. In other words, in these two countries exporting to advanced countries provide much larger learning effects for a typical firm than exporting to less advanced markets. The role of imports follows a similar path as exporting. Importing from the advanced 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. Thus, one cannot imply that liberalization of bilateral trade within the region of SEE or with the other regions will have uniformly significant impact on individual firm's performance, but in

some of the countries analysed trade liberalization might be an important engine of firms' productivity growth.

Our results also indicate some selection process in FDI decisions by parent foreign companies. Foreign parent companies seem to select smaller firms in SEE as well as least productive, less capital and skill intensive firms. However, we find contrasting results on the impact on foreign ownership on TFP growth. Three countries (Bosnia, Croatia and Slovenia) experience faster TFP growth in foreign owned firms. In Romania, in contrast we find faster TFP growth in domestic owned firms, while in Bulgaria no significant differences have been found. However, one can expect that after restructuring these firms would improve their TFP at a much faster rate than purely domestic owned firms.

Of course, one has again to be cautious interpreting results. Although we make use of the best available data, in most of the SEE countries we face a problem of lacking persistency of datasets, which prevents from getting very clear and conclusive results. We therefore make a request for better information collection and for its ready provision to researchers.

# References


Abraham F. and Van Hove J. (2005), "The rise of China: prospects of regional trade policy", *Review of World Economics*, 141(3).

Adam A., Kosma T.S. and McHugh J. (2003), "Trade- liberalisation strategies, what could South-Eastern Europe learn from CEFTA and BEFTA?", *IMF Working Paper*, 03/239, Washington.

Amemiya T. (1984), "Tobit models. A Survey", *Journal of Econometrics*, 24: 3-61.

Anderson J.E. and Van Wincoop E. (2003), "Gravity with gravitas: a solution to the border effect puzzle", *American Economic Review*, 93(1), 170-192.

Anderson J.E. and Van Wincoop E. (2004), "Trade cost", *Journal of Economic Literature*, 42, 691-751.

Andreff M., Andreff W. and Boudier-Bensebaa F. (2001), "Sous-traitance internationale de façonnage et trafic de perfectionnement passif entre les pays de l'Union européenne et de l'Europe de l'Est", *Revue d'Etudes Comparatives Est-Ouest*, 32(2), 5-34.

Arellano M. and S.R. Bond (1991), "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations", *Review of Economic Studies*, 58: 277-297.

Arellano, M. and O. Bover. (1995), "Another Look at the Instrumental-variable Estimation of Error-components Model", *Journal of Econometrics*, 68: 29-52.

Arellano, M. and S.R. Bond. (1998), "Dynamic Panel Data Estimation using DPD98 for GAUSS", Mimeo, Institute for Fiscal Studies, London.

Arnon A., Spivak A. and Weinblatt J. (1996), "Potential for trade between Israel, the Palestinians and Jordan", *World Economy*, 19, 113-14.

Babetskaia-Kukharchuk O. and Maurel M. (2004), "Russia's accession to the WTO: the potential for trade increase", *Journal of Comparative Economics*, 32, 680-99.

Baier S.L. and Bergstrand J. (2003), "Endogeneous free-trade agreements and the gravity equation", mimeo.

Baier S.L. and Bergstrand J. (2004), "Economic determinants of free-trade agreements", *Journal of International Economics*, 64(1), 29-63.

Baldwin R. (1993), "The potential for trade between the countries of EFTA and Central and Eastern Europe", *CEPR Discussion Paper*, 853, Center for Economic Policy Research, London.

Baldwin R. (1994), *Towards an integrated Europe*, CEPR, Londres.

Baldwin R., Skudelny F. and Taglioni D. (2005), "Trade effects of the Euro: Evidence from sectoral data", *European Central Bank Working Paper*, 446.

Baltagi, H.B. (1995), *Econometric Analysis of Panel Data*, Chichester: John Wiley & Sons.

Basu, S. and J. Fernald. (1995), "Aggregate Productivity and the Productivity of Aggregates", *NBER Working Paper* 5382.

Batra A. (2004), "India's global trade potential: the gravity model approach", *ICRIER Working Paper*, 151, Indian Council for Research on International Economic Relations, New Delhi.

Bergstrand J.H. (1989), "The generalized gravity equation, monopolistic competition, and the factor-proportions theory in international trade", *Review of Economics and Statistics*, 71(1), 143-53.

Bjelić P. (2005), "Trade policy of the EU as a factor of regional trade integration in South-Eastern Europe", *Discussion Paper - Center for the Study of Global Governance*, 36, London School of Economics.

Blundell, R.W. and S.R. Bond. (1998), "Initial Conditions and Moment Restrictions in Dynamic Panel Data Models", *Journal of Econometrics*, 87: 115-143.

Blundell, R.W. and S.R. Bond. (1999), "GMM Estimation with Persistent Panel Data: An Application to Production Functions", Institute for Fiscal Studies, London, WP No. W99/4.

Boillot J.-J, Lefilleur J. and Lepape Y. (2003), "Quel avenir au commerce intra-CEEC ? Une analyse actuelle et prévisionnelle des échanges en Europe centrale et orientale", mimeo, DREE-MINEFI, Paris.

Borensztein, E., J. De Gregorio, and J.W. Lee. (1998), "How Does Foreign Direct Investment Affect Economic Growth?", *Journal of International Economics*, 45: 115-135.

Brenton P. and Di Mauro F. (1998), "Is there any potential in trade in sensitive industrial products between the CEECs and the EU?", *World Economy*, 21(3), 285-304.

Brulhart M. and Kelly M.J. (1999), "Ireland's trading potential with Central and Eastern European countries: a gravity study", *The Economic and Social Review*, 30(2), 159-74.

Buch C. and Piazolo D. (2001), "Capital and trade flows in Europe and the impact of enlargement", *Economic Systems*, 25(3), 183-214.

Bussiere M., Fidrmuc J. and Schnatz B. (2004), "Trade integration of the new EU member and selected South Eastern European countries: Lessons from a gravity model", *Oesterreichische Nationalbank Conference on European Economic Integration*, 28-30 novembre.

Caétano J. and Galego A. (2003), "An analysis of actual and potential trade between the EU countries and the Eastern European countries", *Documento de Trabalho*, 3, University of Evora.

Christie E. (2002), "Potential trade in South-Eastern Europe: A gravity model approach", *WIIW Working Paper*, 21.

Clerides, S., S. Lach, and J. Tybout (1998), "Is Learning-by-Exporting Important? Micro-Dynamic Evidence from Colombia, Mexico and Morocco", *Quarterly Journal of Economics*, 113: 903-947.

Coe, D. and E. Helpman (1995), "International R&D Spillovers", *European Economic Review*, 39: 859-887.

Coe, D., E. Helpman, and A. Hoffmaister. (1997), "North-South R&D Spillovers", *Economic Journal*, 107: 134-149.

Commission of the European Communities (2003), "Le processus de stabilisation et d'association en faveur de l'Europe du Sud-Est", Deuxieme Rapport annuel, COM(2003)139, Final.

Daianu D. and Veremis T. (2001), "Balkan reconstruction: introduction", *Journal of Southeast European and Black Sea Studies*, 1(1), 1-11.

Damijan, J.P., M. Knell. (2005), "How Important is Trade and Foreign Ownership in Closing the Technology Gap: Evidence from Estonia and Slovenia", *Review of World Economics (Weltwirtschaftliches Archiv)*, 141: 271-295.

Damijan, J.P., M. Knell, B. Majcen, and M. Rojec. (2003), "The Role of FDI, R&D Accumulation and Trade in Transferring Technology to Transition Countries: Evidence from Firm Panel Data for Eight Transition Countries", *Economic Systems*, 27: 189-204.

Damijan, P.J, M. Knell, B. Majcen, M. Rojec. (2003), "Technology Transfer through FDI in Top-10 Transition Countries: How Important are Direct Effects, Horizontal and Vertical Spillovers?", *William Davidson Institute Working paper*, no.549.

Dangerfield M. (2001), *Subregional economic cooperation in Central and Eastern Europe: the political economy of CEFTA*, Edward Elgar, Cheltenham.

Deardoff A. and Stern R. (1986) *The Michigan model of world production and trade: theory and applications*, Cambridge, Mass.: MIT Press.

De Benedictis L. and Vicarelli C. (2004), "Trade potentials in gravity panel data models", *ISAE Working Paper*, 44, University of Macerata.

De Sousa J. and Lamotte O. (2005), "Does transition lead to trade disintegration ? Evidence from former Yugoslavia", working paper, Université de Paris I.

Dimelis S. and Gatsios K. (1994), "Trade with CEE: the case of Greece", *CEPR Discussion Paper*, 1005, Center for Economic Policy Research, London.

Duc C., Granger C., Lavallée E. and Siroën J.-M. (2004), "Does *deep integration* foster trade? Empirical evidence and simulations for the EU democratic and anti-corruption criteria", *Cahier de recherche EURIsCO*, 2004-15, Université de Paris Dauphine.

EBRD (European Bank of Reconstruction and Development) (2004), *Transition Report*, London.

Eaton, J. and S. Kortum. (1996), "Trade in Ideas: Patenting and Productivity in the OECD", *Journal of International Economics*, 40: 251-271.

Egger P. (2002), "An econometric view of the estimation of gravity models and the calculation of trade potentials", *World Economy*, 25(2), 297-312.

Ekholm K., Torstensson J. and Torstensson R. (1996), "The economics of the Middle East peace process: Are there prospects for trade and growth?", *World Economy*, 19, 555-74.

Feenstra, R., J. Markusen, and W. Zeile. (1992), "Accounting for Growth with New Inputs: Theory and Evidence", *American Economic Review*, 82: 415-421.

Festoc F. (1997), "Le potentiel de croissance du commerce des pays d'Europe centrale et orientale avec la France et ses principaux partenaires", *Economie et Prévision*, (128), 161-81.

Fidrmuc J. (1999), "Trade diversion in *left-outs* in eastward enlargement of the European Union: the case of Slovakia", *Europe-Asia Studies*, 51(4), 633-45.

Fidrmuc J., Huber P. and Michalek J.J. (2001), "Poland's accession to the European Union: demand for protection of selected sensitive products", *MOCT-MOST*, 11(1), 45-67.

Fidrmuc J. (2004), "The core and the periphery of the world economy", *Journal of International Trade and Economic Development*, 13(1), 89-106.

Fontagné L., Freudenberg M. and Pajot M. (1999) "Le potentiel d'échange entre l'Union européenne et les CEEC : un réexamen", *Revue économique*, 50(6), 1139-68.

Fontagné L., Pajot M. and Pasteels, J.-M. (2002), "Potentiels de commerce entre économies hétérogenes: un petit mode d'emploi des modeles de gravité", *Economie et Prévision*, 152-53(1-2), 115-40.

Fritz H. and Hoen H.W. (2000), "The European Union's trade policy towards Central and Eastern Europe: still a 'sensitive' argument for joining the Union ?", *Economic Systems*, 24(1), 25-50.

Fukao K., Okubo T. and Stern R. (2003), "An econometric analysis of trade diversion under NAFTA", *The North American Journal of Economics and Finance*, 14, 3-24.

Greene, W.H. (1997), *Econometric Analysis*, 3rd edition, New Jersey: Prentice-Hall International.

Greenaway D. and Milner C. (2002), "Regionalism and Gravity", *Scottich Journal of Political Economy*, 49(5), 574-585.

Griliches, Z. (1979), "Issues in Assessing the Contribution of Research and Development to Productivity Growth", *The Bell Journal of Economics*, 10: 92-116.

Griliches, Z. and J. Mairesse. (1995), "Production Functions: the Search for Identification", *NBER Working Paper* 5067.

Gros D. and Gonciarz A. (1996), "A note on the trade potential of Central and Eastern Europe", *European Journal of Political Economy*, 12(4), 709-21.

Hamilton C.B. and Winters L.A. (1992), "Opening up international trade with Eastern Europe", *Economic Policy*, 14(4), 77-116.

Hausman, A.J. (1978), "Specification Tests in Econometrics", *Econometrica*, 46: 1251-1271.

Hausman J. and Taylor W. (1981), "Panel data and unobservable individual effects", *Econometrica*, 49, 1377-98.

Havrylyshyn O. and Pritchett L. (1991), "European trade patterns after the transitions", *World Bank Working Paper*, 748.

Havrylyshyn O. and Al-Atrash H. (1998), "Opening up and geographic diversification of trade in transition economies ", *IMF Working Paper*, 22.

Heckman, J.J. (1979), "Sample Selection Bias as a Specification Error", *Econometrica*, 47: 153-161.

Hsiao, C. (1986), *Analysis of Panel Data*, Cambridge, MA: Cambridge University Press.

International Trade Center (ITC) (2003), "TradeSim, A gravity model for the calculation of trade potentials for developing countries and economies in transition", UNCTAD/WTO, Geneva.

Jakab Z.M., Kovács M.A. and Oszlay A. (2001), "How far has trade integration advanced?: An analysis of the actual and potential trade of three Central and Eastern European countries ", *Journal of Comparative Economics*, 29 (2), 276-92.

Kaminski B. and de la Rocha M. (2003), "Stabilization and association process in the Balkans: integration options and their assessment", *World Bank Policy Research Working Paper*, 3108.

Kovac O. (1998), "Trade flows among Balkan countries and opportunities with SECI", American Association for the Advancement of Slavic Studies (AAASS) Conference, Boca Raton.

Lamotte O. (2003), "Une zone de libre-échange en Europe du Sud-Est: pertinence et limites", *Le Courrier des Pays de l'Est*, 1039, 4-17.

Lopandić D. (1999), "Multilateral cooperation in South-Eastern Europe", 67-84, *in* Minić J., *South Eastern Europe 2000, A view from Serbia*, Stubovi Kulture, Belgrade.

Lopandić D. (2001), *Regional initiatives in South Eastern Europe*, European Movement in Serbia, Belgrade.

Marques H. and Metcalf H. (2005), "What determines sectoral trade in the enlarged EU?", *Review of Development Economics*, 9(2), 197-231.

Martinez-Zarzoso I. and Nowak-Lehmann F. (2003), "Augmented gravity model: An empirical application to Mercosur-European Union trade flows", *Journal of Applied Economics*, 6(2), 291-316.

Matyas L. (1997), "Proper econometric specification of the gravity model", *World Economy*, 21(3), 363-368.

Mayer T. and Zignago S. (2005), "Market Access in Global and Regional Trade", Cepii Working paper, 2.

Mansfield, E. and M. Romeo. (1980), "Technology Transfer to Overseas Subsidiaries by U.S. Based Firms"„ *Quarterly Journal of Economics*, 95, 737-750.

McPherson M. and Trumbull W. (2003), "What if US-Cuban trade were based on fundamentals instead of political policy? Estimating potential trade with Cuba, Cuba in Transition", *Papers and Proceedings of the 13th annual meeting of the ASCE*, Coral Gables, 7-9 août.

Messerlin P.A. and Miroudot S. (2004), "Trade liberalisation in South-Eastern Europe. Review of conformity of 23 FTA with the MoU", GEM, Sciences Po, Paris.

Nilsson L. (2000), "Trade integration and the EU economic membership criteria", *European Journal of Political Economy*, 16(4), 807-27.

Olley, S.G. and A. Pakes. (1996), "The Dynamics of Productivity in the Telecommunications Equipment Industry", *Econometrica*, 64, 1263-1297.

Wooldridge, J. (2002), *Econometric Analysis of Cross Section and Panel Data*, Cambridge, Mass.: MIT Press.

Paas T. (2002), "Gravity approach for exploring Baltic Sea regional integration in the field of international trade", *HWWA Discussion Paper*, 180.

Péridy N. (2003), "Exchange rate volatility, sectoral trade, and the aggregation bias", *Review of World Economics*, 139(3), 389-418.

Péridy N. (2004), "The new US trans-ocean free trade initiatives: Estimating export and FDI potentials from dynamic panel data models", *Economic Bulletin*, 6(9), 1-12.

Péridy N. (2005a), "Towards a new trade policy between the USA and Middle-East countries: Estimating trade resistance and export potential", *World Economy*, 28(4), 491-518.

Péridy N. (2005b), "Trade prospects of the new EU neighborhood policy: Evidence from Hausman and Taylor's models", *Global Economy Journal*, 5(1).

Puga D. and Venables A.J. (1998), "Trading arrangements and industrial development", *The World Bank Economic Review*, 12(2), 221-49.

Rose A.K. (2005), " Do we really know that the WTO increases trade?", *American Economic Review*, 94(1), 98-114.

Subramanian A. and Wei S.J. (2003), "The WTO promotes trade, strongly but unevenly", *NBER Working Paper*, 10024.

Trefler D (1993), "Trade liberalization and the theory of endogenous protection: an econometric study of U.S. import policy, *Journal of Political Economy*, 101, 138-160.

Uvalić M. (2001), "Regional cooperation in Southeast Europe", in Veremis Th. and Daianu D., (éd.) *Balkan reconstruction*, Franck Cass Publishers, London, 55-75.

Van Bergeijk P.A.G. and Oldersma H. (1990), "Détente, market-oriented reform and German unification: Potential consequences for the world trade system", *Kyklos*, 43(4), 599-609.

Van Brabant J. (2001), "South-Eastern Europe, transitions and the EU - Is ever widening desirable?", *MOCT-MOST*, 11, 295-325.

Vittas H. and Mauro P. (1997), "Potential trade with core and periphery: industry differences in trade patterns", *in* Black S. (éd.), *Europe's economy looks East*, Cambridge University Press, Cambridge.

Wang Z.K. and Winters A. (1992), "The trading potential of Eastern Europe", *Journal of Economic Integration*, 7, 113-36.

Welfens P.J.J. (2001), *Stabilizing and integrating the Balkans*, Springer Verlag, Berlin.

World Bank (2000), *The road to stability and prosperity in South Eastern Europe: a regional strategy paper*, World Bank, Washington.

Woolridge, J (2003), *Introductory econometrics*, second edition, South-Western College.

# 7 Appendix

Table 24: Free trade agreements between SEE countries

| | Albania | Bosnia-H. | Bulgaria | Croatia | Macedonia | Moldova | Romania | Serbia-M. |
|---|---|---|---|---|---|---|---|---|
| Albania | - | 12/04 | 09/03 | 06/03 | 07/02 | 11/04 | 01/04 | 08/04 |
| Bosnia-H. | 12/04 | | 12/04 | 01/05 | 07/02 | 05/04 | 12/04 | 06/02 |
| Bulgaria | 09/03 | 12/04 | | 03/03* | 01/00 | 11/04 | 07/97* | 06/04 |
| Croatia | 06/03 | 01/05 | 03/03* | | 06/97 | 10/04 | 03/03* | 07/04 |
| Macedonia | 07/02 | 07/02 | 01/00 | 06/97 | | 01/05 | 01/04 | 05/05 |
| Moldova | 11/04 | 05/04 | 11/04 | 10/04 | 01/05 | | 11/94 | 09/04 |
| Romania | 01/04 | 12/04 | 07/97* | 03/03* | 01/04 | 11/94 | - | 01/07/04 |
| Serbia-M. | 08/04 | 06/02 | 06/04 | 07/04 | 05/05 | 09/04 | 07/04 | - |

Notes: Table realized from www.stabilitypact.org, as of the 9th of June 2005. Dates refer to the entry in force of the agreements (dd/mm/yy). *Indicates that trade liberalization took place in the framework of the CEFTA (Central European Free Trade Agreement). The entry in the CEFTA ends *de facto* bilateral agreements signed with CEFTA country members.

Table 25: Review of the literature using sectoral estimations of the gravity equation

| **References** | **Sample (country, sectors, period)** | **Method** | **Main results** |
|---|---|---|---|
| Bergstrand (1989) | 16 OECD countries, 9 sectors, 1965-66-75-76 | OLS | Supply and demand elasticities differ according to the sector. |
| Vittas and Mauro (1997) | OECD countries, 5 sensitive sectors, 1993 | OLS | Calculation of the trade potential of the CEEC; CEEC-EU trade of sensitive products is lower than its potential. |
| Brenton and Mauro (1998) | 45 countries (OECD + CEEC), 9 sectors, 1995 | OLS | Calculation of the trade potential of the CEEC; there is no potential for an increase of CEEC exports towards the EU. |
| Fidrmuc (1999) | OECD countries, 7 sectors, 1989 | OLS | Calculation of the trade potential of Slovakia; there is a potential with all countries except the Czech Republic. |
| Fidrmuc *et alii* (2001) | 22 OECD countries, 26 products, 1994 | OLS | Calculation of the trade potential of Poland; the effects of EU enlargement on trade differ according to the sectors. |
| Fontagné *et alii* (2002) | 53 exporters, 75 importers (DC+OECD), 14 sectors, 1995-96 | OLS | Calculation of the trade potential of Turkey; share of textile in the exports is higher to its potential. |
| Fukao *et alii* (2003) | US imports, 70 products, 1992-98 | OLS, country and time fixed effects | NAFTA has diverted trade, especially in the textile. |
| Subramanian and Wei (2003) | Imports of 172 countries, sensitive/non sensitive products, 1950-2000 | OLS, country fixed effects | The GATT/WTO has a positive impact on the imports of industrialized countries, except in the sensitive sectors. |
| Fidrmuc (2004) | 23 OECD countries, 3 sectors, 2002 | OLS | Peripheral countries have a trade deficit, residuals of the estimation are not normally distributed. |
| Marques and Metcalf (2005) | 23 EU countries, 8 sectors aggregated in 4 groups, 1990-99 | Prais-Winsten PCES | Determinants of trade differs according to the sectors and the groups of countries. |

Note: OLS means Ordinary Least Squares, PCES means Panel-Corrected Standard Errors, DC means developing countries, CEEC means Central and Eastern European Countries.

Table 26: SEE countries and the WTO

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

Notes: Serbia and Montenegro have submitted accession separately and each country negotiate independently. Source: WTO's website, www.wto.org.

Table 27: Initiatives of regional cooperation in South-Eastern Europe

| Name and date of creation | Participants | Status | Initial project |
|---|---|---|---|
| Central European Initiative (CEI) 22/11/1989 | Italy, Austria, Slovenia, Croatia, Bosnia-Herzegovina, Macedonia, Bulgaria, Romania, Hungary, Czech Republic, Slovakia, Poland, Ukraine, Moldova, Albania, Belarus | Regional association without any legal status | Created on the initiative of Italy and aimed at creating a new form of cooperation between the member States of the EEC and Eastern Europe countries. |
| Black Sea Economic Cooperation (BSEC) 25/06/1992 | Albania, Greece, Turkey, Bulgaria, Romania, Russia, Ukraine, Moldova, Azerbaidjan, Armenia, Georgia | International organization | Created on the initiative of Turkey and Russia in order to develop a non hegemonic cooperation. |
| Central European Free Trade Agreement (CEFTA) 21/12/1992* | Hungary, Czech Republic, Slovakia, Poland, Slovenia, Bulgaria, Romania, Croatia | Multilateral trade agreement | Created by the Visegrad group (Hungary, Poland, Cechoslovakia), in order to maintain mutual trade links after the dissolution of the CMEA. |
| Royaumont Process (PR) 13/12/1995 | Slovenia, Croatia, Bosnia-Herzegovina, Macedonia, Bulgaria, Romania, Hungary, Albania, Turkey, FRY, EU, United States, Russia | Political forum | Created on the initiative of France after the Dayton peace process. Only in the fields of cultural cooperation and civil society. |
| Southeast Europe Cooperation Process (SEECP) 6/07/1996 | Albania, Bosnia-Herzegovina, Bulgaria, Greece, Romania, Serbia-Montenegro, Turkey | Political forum | Created on the initiative of Greece in order to develop regional cooperation in all fields: political, economical, social, cultural, security etc. |
| Quadrilateral initiative (QI) 23/11/1996 | Croatia, Hungary, Italy, Slovenia | Forum politique | Created on the initiative of Italy to facilitate the realization of the transborder road corridor Trieste-Ljubljana-Budapest, favor integration of Slovenia and Hungary in the euro-atlantic structures and consolidate the regional stabilization. |

Note: Table realized from Lopandić (2001) and several other sources. Slovenia entered the CEFTA in 1996, Bulgaria and Romania in 1997, Croatia in 2003.

TAB.27 - Initiatives of regional cooperation in South-Eastern Europe (continued).

| Name and date of creation | Participants | Status | Initial project |
|---|---|---|---|
| Southeast European Cooperation Initiative (SECI) 06/12/1996 | Albania, Bosnia-Herzegovina, Bulgaria, Croatia, Greece, Hungary, Macedonia, Moldova, Romania, Serbia-Montenegro, Slovenia, Turkey | Cooperation forum in the fields of transportation, environment and security | Created on the initiative of the United States in order too enhance cooperation between the countries of South-Eastern Europe. |
| Stability Pact for South-Eastern Europe 10/06/1999 | Beneficiary countries: Albania, Bosnia-Herzegovina, Bulgaria, Croatia, Romania, Macedonia, FRY, Moldova | Forum organized around three working tables : democratization and Human Rights, economic reconstruction, defense and security | Created at the initiative of Germany after the Kosovo conflict to insure peace, good neighbourhood, democracy, Human and minority rights, return of the refugees and economic prosperity. |
| Adriatic and Ionian Initiative (AII) 20/05/2000 | Albania, Bosnia-Herzegovina, Croatia, Greece, Italy, Slovenia, Serbia-Montenegro | Political forum | Created at the initiative of Italy to strengthen regional cooperation in the fields of economics, engineering, transportation, environment, culture, education, tourism and fight against organized crime. |
| Trans-adriatic cooperation initiative (TIC) 28/03/2003 | Italy, Albania, Bosnia-Herzegovina, Croatia, Serbia-Montenegro | Political forum | Aimed at supporting the development of SME, improve the public administration, strengthen institutions and services. Integrated into the European initiative Intereg III. |

Note: Table realized from Lopandić (2001) and several other sources.

Table 28: List of the countries of the sample

| Rest of the world (World) | European Union (EU) | Central and Eastern European countries (CEE8) | South-Eastern Europe (SEE7) |
|---|---|---|---|
| Algeria | Austria* | Czech Republic | *SEE5:* |
| Argentina | Belgium and Luxembourg | Hungary | Albania |
| Australia | Denmark | Poland | Bosnia-Herzegovina |
| Brazil | Finland* | Slovakia | Croatia |
| Canada | France | Slovenia | Macedonia |
| China | Germany | Estonia | Serbia-Montenegro |
| Colombia | Greece | Latvia | *SEE2:* |
| Egypt | Ireland | Lithuania | Bulgaria |
| Ecuador | Italy | | Romania |
| Hong Kong | Netherlands | | |
| Indonesia | Portugal | | |
| Israel | Sweden* | | |
| Japan | Spain | | |
| Morocco | United Kingdom | | |
| Malaysia | | | |
| Mexico | | | |
| Norway | | | |
| New-Zealand | | | |
| Peru | | | |
| Philippines | | | |
| Russia | | | |
| Singapore | | | |
| South Korea | | | |
| Switzerland | | | |
| Thailand | | | |
| Tunisia | | | |
| Turkey | | | |
| United States | | | |
| Venezuela | | | |

Notes: * denotes countries which entered the EU in 1995. The 8 CEE countries are not included in EU group because they were not members during the time span of this study.

Table 29: CHELEM-CEPII sectoral classification of international trade, 10 sectors.

| Code | Secteur | Included products |
|---|---|---|
| B | Construction Products | BA + BB + BC |
| C | Basic Metals | CA+ CB + CC |
| D | Textiles | DA + ... + DE |
| E | Wood Paper | EA + ... + EE |
| F | Metal Products | FA + ... + FW |
| G | Chemicals | GA + ... + GI |
| H | Mining | HA + HB + HC |
| I | Energy | IA + IB + IC + IG + IH + II |
| J | Agriculture | JA + JB + JC |
| K | Food Products | KA + ... + KI |

Table 30: CHELEM-CEPII sectoral classification of international trade, 69 products.

| Codes | Products | Codes | Products |
|---|---|---|---|
| BA | Cement | FT | Cars and cycles |
| BB | Ceramics | FU | Commercial vehicles |
| BC | Glass | FV | Ships |
| CA | Iron Steel | FW | Aeronautics |
| CB | Tubes | GA | Basic inorganic chemicals |
| CC | Non ferrous metals | GB | Fertilizers |
| DA | Yarns fabrics | GC | Basic organic chemicals |
| DB | Clothing | GD | Paints |
| DC | Knitwear | GE | Toiletries |
| DD | Carpets | GF | Pharmaceuticals |
| DE | Leather | GG | Plastics |
| EA | Wood articles | GH | Plastic articles |
| EB | Furniture | GI | Rubber articles (incl. tyres) |
| EC | Paper | HA | Iron ores |
| ED | Printing | HB | Non ferrous ores |
| EE | Miscellaneous manuf. articles | HC | Unprocessed minerals n.e.s. |
| FA | Metallic structures | IA | Coals |
| FB | Miscellaneous hardware | IB | Crude oil |
| FC | Engines | IC | Natural gas |
| FD | Agricultural equipment | IG | Coke |
| FE | Machine tools | IH | Refined petroleum products |
| FF | Construction equipment | II | Electricity |
| FG | Specialized machines | JA | Cereals |
| FH | Arms | JB | Other edible agricultural prod |
| FI | Precision instruments | JC | Non-edible agricultural prod. |
| FJ | Clockmaking | KA | Cereal products |
| FK | Optics | KB | Fats |
| FL | Electronic components | KC | Meat |
| FM | Consumer electronics | KD | Preserved meat/fish |
| FN | Telecommunications equipment | KE | Preserved fruits |
| FO | Computer equipment | KF | Sugar |
| FP | Domestic electrical appliances | KG | Animal food |
| FQ | Electrical equipment | KH | Beverages |
| FR | Electrical apparatus | KI | Manufactured tobaccos |
| FS | Vehicles components | NA | Jewellery, works of art |
| | | NB | Non-monetary gold |