Trade Flows Among CEEC and EU Countries: What are the Future Perspectives?

Flujos comerciales entre PECOs y países de la UE: ¿cuáles son las perspectivas futuras?

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Abstract

In this paper we analyse the characteristics and evolution of the EU-CEEC trade in the last decade, giving particular attention to trade relations among the CEEC. We study the determinants of both total and sectoral trade flows and investigate the potential bilateral trade among all the countries. The analysis is based on the gravity model approach using panel data from 1993 to 2001.
The results highlight the sectoral differences in the EU-CEEC trade developments. Furthermore, it is possible to conclude that there is still scope for growth on bilateral trade flows between some CEEC and some of the EU countries and especially among the new EU members.

Keywords: Trade; EU enlargement; Gravity models; Panel data.

Resumen

En este trabajo analizamos las características y evolución del comercio UE-PECOs en la última década, prestando especial atención a las relaciones comerciales entre los mismos PECOs. Estudiamos los determinantes tanto de los flujos comerciales totales como de los sectoriales e investigamos el comercio bilaterial potencial entre todos estos países. El análisis se basa en el enfoque de los modelos de gravedad, utilizando datos de panel de entre 1993 y 2001.

Los resultados subrayan las diferencias sectoriales entre los desarrollos comerciales de UE-PECOs. Es más, es posible concluir que aún hay margen para el crecimiento del comercio bilateral entre algunos PECOs y algunos países de la UE, especialmente los nuevos países miembros.

Palabras clave: Comercio; Ampliación de la UE; Modelos de gravedad; Datos de panel.

JEL classification: F14, F15, C23.

1. Introduction[1]

The process of enlargement has originated a vast literature trying to quantify its economic effects, particularly upon trade relations. Many analyses report changes in terms of volume, composition and nature of trade between EU countries and the CEEC during the process of transition. The enlargement to the East represents an opportunity for trade expansion for both the EU and the CEEC, and in effect trade relations between the EU and the CEEC grew considerably during the last decade.

In what concerns the impacts on trade, one key aspect is whether trade potential between the EU and the CEEC has already been exhausted. Studies on the effects of enlargement on trade have presented contradictory results about the overall trade effects of gradual integration of CEEC into international markets. While some papers conclude that actual EU-CEEC trade is either close to potential level or above potential (see for example Festoc,1997 or Nielson 2000) others claim that it is still possible for trade relations to expand (for example Buch and Paizolo,2000 or Jakab et al, 2001). Other authors have focused on the determinants of trade relations and on the evolution of the specialization patterns.

In this paper we analyse the characteristics of EU-CEEC trade relations during the transition period. In addition, we investigate the determinants of bilateral trade flows and analyse the potential trade between the EU countries and the CEEC[2], giving particular attention to the relations among the CEEC.

The evolution of intra-CEEC trade relations has not been receiving enough attention in the literature. The strong dynamics of intra-CEEC trade is not only a result of geographic proximity, but mostly a consequence of industrial location

[2] We consider in the analysis the following Eastern European countries: Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia that joined recently the EU and Bulgaria and Romania which are expected to join the EU in some years to come.

strategies from western companies, which led to the development of cross flows within sectors between countries of the same sub-region. On the one hand, multinationals firms try to take full advantage of geographic and economic proximity and establish strategic positions in these emergent markets. On the other hand, they intend to collect the benefits of economies of scale and technology spill over effects by organizing more competitive clusters which cross the CEEC national borders. In the context of the recent enlargement, one might expect the intra-regional flows among CEEC to increase faster than EU-CEEC trade.

One other feature that has not been receiving enough attention in the empirical literature is the sectoral dimension of trade. In this paper, an attempt is done to ascertain industry differences in the evolution of trade. In fact, most studies consider homogeneity of goods produced using the same proportions of factors. However, lately it has been recognised that the heterogeneity of factor endowments and technological contents draws from different determinants. Therefore, we adopt a classification of industries based on the factors that are considered decisive for the competitiveness of each sector[3] and try to identify the determinants of these trade flows.

The paper is organised as follows. Section 2 reports the global and sectoral trends of trade between CEEC and EU, giving particular attention to the relations among the CEEC. Section 3, examines the model specification and the results on the determinants for both total bilateral trade and sectoral trade flows. Section 4, gives a brief overview of earlier empirical studies on potential trade and investigates the potential trade flows among these countries. In section 5 some conclusions are presented.

2. The dynamics of EU-CEEC trade

2.1. Global trends during the transition period

The collapse of centrally planned economic regimes in the CEEC, and the subsequent process of economic liberalisation, brought along important transformations in economic terms and of course in external trade. The *European Agreements* were an additional determinant for these countries' reforms. More than 10 years have passed since the process of transition started and it is possible to identify some major tendencies in the CEEC-EU trade[4].

The CEEC' openness to world markets was rapid and generalised, with the degree of trade openness[5] evolving from 56% in 1993 to around 80% in 2001 in global terms. In some countries like Estonia, Slovakia, Czech Republic and Hungary, the degree of trade openness already exceeded 100%, which clearly underlines the importance of external trade in new EU members. One other

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[3] According to Boillot et. al. (2003) methodology, the following groups of industries are used: resource intensive; labour intensive; scale and capital intensive; specialised suppliers; R&D intensive.
[4] A detailed analysis on the EU-CEEC trade relations may be seen in Caetano et al. (2004).
[5] Defined as the percentage of external trade on GDP.

issue that is worth mention is the fact that the CEEC display high and increasing structural trade deficits (around 7,5% of GDP in 2001). In the Baltic countries and in Bulgaria the trade deficit was above 10% of GDP in 2001, resulting from the deterioration occurred during the last decade.

In this period, there was a progressive orientation of the CEEC trade relations to the EU, which coincided with the decline in the relationships with old members of COMECON. In effect, in 2001, the weight of EU in the CEEC total exports was about 66% (while in 1993 was of 54%), which was close from the EU-15 average. Though, in spite of the intensification of the trade among the old and new members of the EU, the commercial unbalances have subsisted and the trade relationships with EU have been responsible for about 50% of those countries deficit in 2001. Yet, EU members' contribution for this deficit is not equal for all the countries. In fact, Italy, France and Finland have been responsible for around 74% of EU surplus, whereas Germany, Austria[6], Denmark, Greece and Portugal present a deficit in their trade with the CEEC.

TABLE 1: EU MEMBERS TRADE FLOWS WITH CEEC (% OF TOTAL)

	Weight of CEEC in EU trade				Share of each EU country in total EU-CEEC trade			
	1993		2001		1993		2001	
	Exp.	Imp.	Exp.	Imp.	Exp.	Imp.	Exp.	Imp.
Germany	4,6	4,5	8,4	8,6	52,1	56,2	42,4	45,2
Austria	-	-	12,6	9,5	-	-	7,0	6,3
Bel.-Lux.	1,1	0,7	2,5	2,5	3,9	3	4,3	4,3
Denmark	2,2	2,5	3,6	4,3	2,3	2,6	1,6	1,9
Spain	1	0,6	2,8	1,8	1,9	1,6	3,0	2,9
Finland	-	-	6,6	6,0	-	-	2,6	2,1
France	1,4	1,1	3,4	2,7	9,2	8,4	10,7	9,7
Greece	6,5	2,1	11,9	3,9	1,6	1,7	1,1	1,2
Netherlands	1,7	1,6	3,0	2,4	6,3	6,5	4,7	4,4
Ireland	0,4	0,4	1,0	1,4	0,4	0,3	0,8	0,7
Italy	3,2	2,5	6,5	4,6	15,9	12,9	13,9	11,2
Portugal	0,2	0,3	1,0	0,7	0,1	0,2	0,2	0,3
Uni. Kingdom	1,2	0,9	2,1	2,1	6,4	6,6	4,9	6,9
Sweden	-	-	4,7	4,6	-	-	2,8	2,9
EU	**2,5**	**2,1**	**5,0**	**4,3**	**100**	**100**	**100**	**100**

Source: Own Calculations based on CHELEM database - CEPII.

[6] The deficits for Germany and Austria could be considered as surprising. However, this situation is a consequence of the increasing subcontracting activities between firms in these countries and in CEEC, specially under the "Outward Processing Trade" regimes.

In spite of the expansion of the EU-CEEC trade relations, the weight of CEEC in the EU total trade continues to be small in global terms, contributing 5% and 4,3% to the exports and imports, respectively, in 2001 (see Table 1). However, the situation was not similar for distinct countries, with Austria, Greece and Germany displaying the highest values while in the EU peripheral countries, as Portugal and Spain, the weight of CEEC did not exceed 1% of total trade.

Trade intensity[7] is quite different across countries as well, being Hungary, the Czech Republic and Poland, amongst the new members, and Germany, Austria and Finland, on the part of the older EU members, those which are clearly more involved in reciprocal trade. The intensity of bilateral trade is also heterogeneous, being the relationships more intense in the following cases: Austria and Germany with Hungary, the Czech Republic, Slovenia and Slovakia; Greece with Bulgaria and Romania; and Finland and Sweden with the Baltic countries. On the contrary, the level of trade is low between the CEEC and the Iberian countries and Ireland, in spite of an increase in recent years. So, the intensity of bilateral trade is higher for neighbouring countries, which are therefore closer in economic, cultural and historical terms (see table 2 and 3).

TABLE 2: RELATIVE INTENSITY OF EXPORT INDEX IN BILATERAL TRADE

	CEEC			EU	
	1993	2001		1993	2001
France	0,73	1,14	Slovenia	1,64	1,67
Bel-Lux	0,6	0,84	Estonia	1,33	1,77
Germany	2,4	2,83	Latvia	1,48	1,66
Italy	1,63	2,19	Lithuania	0,92	1,44
Netherlands	0,77	1,02	Bulgaria	0,86	1,39
United Kingdom	0,65	0,71	Czech Republic	1,33	1,81
Ireland	0,21	0,34	Slovakia	0,84	1,56
Denmark	1,14	1,20	Hungary	1,54	1,84
Finland	2,23	2,20	Poland	1,77	1,82
Sweden	1,1	1,57	Romania	1,07	1,80
Austria	5,12	4,22			
Spain	0,51	0,96			
Greece	3,24	3,99			
Portugal	0,12	0,32			
European Union	1,41	1,68	CEEC	1,39	1,76

Source: Own Calculations based on CHELEM database - CEPII.

[7] The bilateral index "relative intensity of exports" has a three-dimensional nature, and therefore takes into account the evolution registered in the exports of the country of origin and the imports in the country of destiny, weighted by the flows of world trade during the period of analysis.

Table 3: Hierarchy of Relative Intensity of Export Index

	1993				2001		
Order	Exporter	Importer	Value	Order	Exporter	Importer	Value
1	Finland	Estonia	49,80	1	Greece	Bulgaria	44,30
2	Estonia	Finland	32,09	2	Estonia	Finland	41,87
3	Greece	Bulgaria	27,30	3	Finland	Estonia	25,91
4	Austria	Hungary	10,02	4	Greece	Romania	13,66
5	Estonia	Sweden	9,67	5	Bulgaria	Greece	13,60
6	Bulgaria	Greece	8,83	6	Estonia	Sweden	12,32
7	Austria	Slovenia	8,73	7	Austria	Slovenia	9,91
8	Sweden	Estonia	7,57	8	Latvia	Sweden	8,65
9	Hungary	Austria	7,11	9	Finland	Latvia	8,49
10	Latvia	Denmark	6,59	10	Sweden	Estonia	7,83
643	Portugal	Slovakia	0,05	643	Portugal	Estonia	0,15
644	Portugal	Poland	0,04	644	Estonia	Greece	0,15
645	Lithuania	Ireland	0,04	645	Slovenia	Ireland	0,15
646	Portugal	Latvia	0,02	646	Slovakia	Ireland	0,14
647	Estonia	Ireland	0,02	647	Portugal	Romania	0,14
648	Latvia	Greece	0,02	648	Slovakia	Portugal	0,11
649	Slovakia	U.K.	0,01	649	Latvia	Portugal	0,10
650	Slovakia	Ireland	0,01	650	Portugal	Slovakia	0,10
651	Portugal	Lithuania	0,01	651	Portugal	Slovenia	0,09
652	Ireland	Slovakia	0,00	652	Lithuania	Portugal	0,07

Source: Own Calculations based on CHELEM database - CEPII.

Reflecting these asymmetries, new members that share a common border with the former EU members are responsible for 82% of CEEC trade with the EU[8], while the Balkan and Baltic countries present figures of around 10,5% and 7,5%, respectively (Caetano *et al.*, 2004). In what concerns EU member states, trade is also concentrated in frontier countries. Germany, Austria and Italy are responsible for more than 64% of trade with the CEEC. Portugal, Ireland and Greece, on the other hand, generated only 2,5% of such.

As a consequence of the geographical reorientation of the CEEC trade after the collapse of the economic regimes, the weight of the intra-CEEC trade in the total trade of these countries has registered a slight reduction, from 14,7% to 13,8% between 1993 and 2001. However, in terms of trade dynamics among these countries, there was a sharp decline of 35,8% in the relative intensity of the trade in this period, which was particularly noticeable between 1993 and 1997. After 1997, it was in the former-Czechoslovakia, Estonia and Hungary that the decline in the intensity of trade with other CEEC has occurred (see table 4).

[8] The so-called CEEC5: Hungary, Slovenia, the Czech Republic, Slovakia and Poland.

Table 4: Growth rate of Relative Intensity of Export to CEEC (%)

Exporters	1993-97	1997-01	1993-01
Estonia	-25,7	-13,6	-35,8
Latvia	-4,4	33,7	27,9
Lithuania	-42,8	63,8	-6,3
Slovenia	5,1	25,8	32,3
Czech Rep	-30,0	-29,2	-50,5
Slovakia	-45,7	-27,4	-60,6
Hungary	-26,6	-9,2	-33,4
Poland	15,8	20,8	39,9
Romania	-35,8	45,9	-6,3
Bulgaria	-39,4	23,1	-25,4
CEEC	-28,9	-9,6	-35,8

Source: Own Calculations based on CHELEM database – CEPII.

It has to be referred also that trade was particularly intense in the several sub-regions (CEEC-5, Baltic and Balkan countries- see table 5), which reinforces the conviction that geographical proximity has been a decisive factor of trade intensity and it will probably continue to be a central issue after the recent enlargement.

Table 5: Relative Intensity of Export Index among CEEC* (2001)

Imports / Exports	Baltic countries	CEEC-5	Balkan countries	CEEC-10
Baltic countries	66,5	1,1	0,2	4,9
CEEC-5	3,1	7,5	3,2	5,3
Balkan countries	0,9	1,8	7,8	1,9
CEEC-10	6,6	5,1	3,1	4,5

Source: Own Calculations based on CHELEM database – CEPII.
*We have considered the average of bilateral trade values.

2.2. Trade patterns by factor production

CEEC' economic liberalisation altered the relative costs of production factors, causing adjustments in productive structures and trade patterns which reflected the pattern of comparative advantages in the countries[9].

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[9] See Kaminski (2001) or Landesmann (2003).

The traditional approach of the comparative advantages pattern relies on the proposition that goods may be classified according to the factor intensities and proportions used in the productive process. Hence we can adopt this approach to explain the structure of trade among CEEC and EU. We employed in this work a classification of sectors according to the factors that are determinant for the competitiveness of each sector (following Boillot *et al.*, 2003). Accordingly, we have considered five groups of goods: Natural Resources, Labour, Scale and Capital, Specialised Suppliers (differentiated goods) and R&D.

In 1993, CEEC exports to the EU were fundamentally based on natural resources and labour intensive sectors, reaching about 64% of total exports to the European Union (see Table 6). Profound changes have occurred in the sectoral pattern of comparative advantages in these countries and in 2001 those sectors represented only about 42%. On the other hand, exports of capital and R&D intensive goods displayed a significant increase, from 13% to 28% of total exports to EU. The differentiated goods exhibited also a positive evolution.

TABLE 6: CEEC EXPORTS TO EU BY FACTORS OF PRODUCTION (% OF TOTAL)

	Natural Resources		Labour		Scale and Capital		Specialised Suppliers		R&D	
	1993	2001	1993	2001	1993	2001	1993	2001	1993	2001
Poland	44,0	30,5	25,3	17,7	20,3	25,6	9,5	25,0	0,8	1,3
Hungary	33,6	12,7	27,2	10,4	15,6	20,4	21,5	42,9	2,0	13,6
Slovakia	28,9	14,8	26,4	17,4	33,4	43,0	10,3	21,8	1,1	2,9
Slovenia	19,7	22,1	30,4	16,3	25,7	32,8	20,7	25,2	3,6	3,5
Czech Rep	29,9	15,3	23,9	14,7	27,4	32,6	16,4	32,4	2,3	5,1
Bulgaria	40,4	27,6	33,8	41,6	13,7	19,8	9,1	9,5	3,0	1,5
Romania	29,4	18,5	51,0	55,4	11,6	9,7	6,8	15,0	1,1	1,4
Lithuania	75,5	48,2	11,1	31,9	11,7	11,2	1,4	7,6	0,2	1,1
Latvia	85,7	74,8	6,9	16,2	6,3	5,5	0,9	2,7	0,1	0,9
Estonia	58,6	45,1	25,6	16,6	10,3	6,3	5,0	30,4	0,5	1,4
CEEC	37,0	22,3	27,1	19,5	20,6	24,9	13,6	28,2	1,7	5,0

Source: Own Calculations based on CHELEM database - CEPII.

However, there is strong heterogeneity among the countries, with the most significant progress occurring in the CEEC-5, where the weight of scale and capital-intensive industries in total exports was higher than in any other Eastern EU-members. These countries show a sharp decline in the labour intensive industries, as well as strong growth in capital-intensive sectors and differentiated goods. On the other hand, the CEEC imports present a similar evolution (Caetano *et al.*, 2004), suggesting a growing demand for sophisticated goods, from sectors technologically more advanced and that use more qualified labour.

Therefore, the pattern of *Revealed Comparative advantages*[10] of the CEEC-EU trade had undergone significant transformations. Nevertheless, in 2001 the CEEC comparative advantages were still in sectors intensive in natural resources and unskilled labour (see Table 7). In opposition, the comparative advantage of EU countries arises in sectors intensive in R&D, capital and specialised suppliers.

TABLE 7: RCA OF EU TRADE WITH CEEC BY FACTORS OF PRODUCTION

	Natural Resources		Labour		Scale and Capital		Specialised Suppliers		R&D	
	1993	2001	1993	2001	1993	2001	1993	2001	1993	2001
Poland	115,2	87,6	37,6	15,4	-51,8	-40,6	-66,3	-20,5	-34,7	-41,9
Hungary	100,8	21,3	32,4	-13,4	-73,9	-69,4	-27,7	47,7	-31,5	13,8
Slovakia	66,8	23,9	41,7	17,3	52,9	46,7	-120,4	-57,2	-41,0	-30,6
Slovenia	11,7	20,3	51,7	0,1	-57,5	-5,6	4,1	2,4	-10,1	-17,1
Czech Rep	74,6	13,6	40,1	14,0	5,0	3,2	-80,8	-12,1	-38,8	-18,7
Bulgaria	66,8	70,3	65,8	59,3	-54,4	-20,8	-52,4	-67,5	-25,9	-41,3
Romania	41,6	49,5	113,0	97,6	-43,7	-63,1	-87,0	-53,6	-23,7	-30,3
Lithuania	186,0	167,4	-17,8	55,8	-69,0	-95,9	-75,5	-86,9	-23,7	-40,3
Latvia	254,8	284,3	-46,4	0,3	-98,4	-118,5	-86,0	-118,4	-24,1	-47,8
Estonia	124,5	135,7	36,2	0,5	-64,6	-112,4	-69,3	6,9	-26,8	-30,7
CEEC	92,6	51,2	40,6	16,3	-41,7	-35,1	-60,1	-11,2	-31,4	-21,3

Source: Own Calculations based on CHELEM database - CEPII.

It is also important to refer that along the years there was an increase in the degree of heterogeneity for the several countries and it is possible to identify different tendencies in the specialization pattern.
First, those countries with higher level of GDP per capita (CEEC-5) became progressively less dependent on sectors intensive in natural resources and unskilled labour[11]. Second, the comparative advantage of the Baltic countries is still based on natural resources, with the industries of wood and its by-products, and oil refinery highly contributing to this situation. These countries major disadvantages are in sectors intensive in capital, R&D and specialised suppliers. Within the Baltic countries, Estonia presents a different evolution since it reveals advantages on differentiated goods[12], built on a few electrical and home-appliances components[13]. Finally, the Balkan countries are in an

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[10] The index used can be seen in appendix.
[11] In 2001, Hungary had already a clear comparative advantage in R&D and differentiated goods in the trade relations with the EU countries.
[12] This type of products represented about 5% of exports to EU and 31% in 2001.
[13] This may be associated with FDI flows from Finish firms, within the process of production reallocation (Kaitila, 2001).

intermediate situation, as advantages are based on sectors more intensive in labour and natural resources, while comparative disadvantages emerge on industries producing differentiated products or intensive in capital and R&D. Moreover, there were not significant changes in the trade structure in the Balkan countries.

Meanwhile, the composition and intensity of factors in the trade relations among the CEEC have not changed much (see table 8). While in the CEEC exports to the EU, differentiated goods and labour intensive products are more important, in the trade among CEEC products intensive in capital and scale and in natural resources are of greater magnitude. Nevertheless, in the CEEC exports to the EU there was a high dynamics of the differentiated goods and of the products intensive in R&D and capital and scale, while sectors intensive in natural resources and labour have lost weight in the CEEC exports.

TABLE 8: CEEEC Exports by Factors and Technology level (% of total)

	Intra-CEEC			UE		
	1993	2001	Var.(%)	1993	2001	Var.(%)
Factors of Production						
Natural Resources	33,4	33,1	-0,25	37,0	22,3	-14,70
Labour	11,5	10,4	-1,11	27,1	19,5	-7,60
Capital and Scale	34,4	36,0	1,56	20,6	24,9	4,30
Specialised Suppliers	14,7	15,8	1,14	13,6	28,2	14,60
R&D	6,0	4,7	-1,34	1,7	5,0	3,30
Total	100	100		100	100	
Technology Level						
Low Intensity	51,5	51,1	-0,39	39,3	30,0	-9,27
Medium Intensity	32,6	32,7	0,14	34,9	38,6	3,70
High Intensity	15,9	16,2	0,25	25,8	31,3	5,58
Total	100	100		100	100	

Source: Own Calculations based on CHELEM database - CEPII.

Analysing the level of technology employed during the production process allows us also to conclude that there are different tendencies among the countries. In the intra-CEEC trade, flows based on low technology continue to prevail (they are about 51% of the total intra-CEEC trade, whereas represent only 30% of the CEEC exports to the EU). Trade in goods of high technology represents only 16% of the intra-CEEC trade against 31% in the exports to the EU. The dynamics of the exports to EU countries in the period 1993-2001, was the main responsible for this situation as the average products and high technology products have increased more than 9pp.

In short, in the transition period there were several different trends in the CEEC trade partners. On the one hand, in the exports to the EU there was a rapid growth, in particular in R&D intensive sectors and in differentiated goods. On

the other hand, trade relations among CEEC were relatively sluggish, not only in terms of trade intensity but also on the sectoral pattern of trade among these countries. Also, there was an increasing divergence of trade patterns among CEEC which suggests different factor endowments, as well as distinct dynamics of integration into the international networks of production.

3. Empirical methodology and results

In order to study bilateral trade relations between the EU countries and the CEEC, and to predict the trade adjustments associated with the removal of trade barriers, we estimate a gravity model for the period 1993- 2001, considering data not only on EU countries but also on the CEEC. Besides analysing total bilateral exports we also take a sectoral approach. This later aspect is important as the countries and sectors involved in enlargement display different characteristics and therefore they are expected to have different determinants. As a consequence, one of the aims of this paper is to analyse the relative importance of the determinants of trade for several sectors, which has not been common in the literature. One of the exceptions is Marques and Metcalf (2005), which have concluded that in fact the determinants of trade differ across sectors. Yet, these authors use a different sectoral classification and a different methodology.

In this paper, following previous studies (like Egger, 2000 or Fontagné *et al.*, 1999), bilateral trade flows are modelled as a function of the sum of GDP of both countries (GDT), the degree of similarity between the two countries (SIM) and the economic distance between the two countries (ED)[14]. We also included the geographic distance between the countries, the existence of a common border and two other dummies: EU (indicating whether both countries belong to the European Union or not) and CEFTA[15] (that equals one if the two trading partners were members of CEFTA).

There are several specifications that may be adopted to estimate a gravity model. In this study we try to use appropriated econometric procedures to obtain more accurate results. More specifically a panel data approach is employed in order to take into account unobserved country heterogeneity. We consider a panel data model with both time and individual specific effects. Also we consider a general specification using trading pair-specific or bilateral common effects as it was proposed by Fontagné *et al.* (1999), Egger and Pfaffermayer (2003) and Cheng and Wall (2005), which claimed that it is the best specification. Furthermore, it is argued that this general model, considering common bilateral effects, gives better in sample predictions. This type of model assumes that there are systematic differences across pairs of countries captured by country-pair constants. These effects control for all time

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[14] More detailed information on the data and variables used may be seen in the Appendix .
[15] Central European Free Trade Association, involving Hungary, Slovenia, the Czech Republic, Slovakia, Romania and Poland.

invariant factors that are specific to each of the trading pairs. Mores specifically the model is:

$$Exports_{ijt} = \alpha_0 + \delta_j + \gamma_t + \beta_1 GDT_{ijt} + \beta_2 SIM_{ijt} + \beta_3 Ð_{ijt} + \beta_5 dist_j + \beta_6 Frontier_j + \beta_7 EU_j + \beta_8 CEFTA_j + \varepsilon_{ijt}$$

where δ_{ij} represents the unobservable country pair effect, γ_t the unobservable time effect and ε_{ijt} is the remainder stochastic disturbance term. The time dummies were included to capture the effects of any variables affecting bilateral exports that vary over time and that are constant across country pairs. Note also that in this specification we have allowed the country-pair effects (δ_{ij}) to differ according to the direction of the trade, which means that is δ_{ij} is not equal to δ_{ij}. Both dependent variable and explanatory variables included in the model are in logarithms to the exception of dummies.

If δ_{ij} and γ_t are assumed to be fixed parameters to be estimated and the explanatory variables are considered independent of $\varepsilon_{...}$, then we have a fixed effects error component model. On the other hand, if δ_{ij} and γ_t are treated as random variables then we have a random effects model. In the random effects model, the explanatory variables are assumed to be independent of δ_{ij}, ε_{ijt} and γ_t. The Hausman test can be used to compare the Within estimator from the fixed-effects model and the random effects GLS estimator, testing the null hypothesis of no correlation between the individual and time effects and the regressors.

In the present case, the tests performed did reject the existence of no correlation. Hence, in order to obtain consistent estimators, we estimate a fixed effects model employing the Within estimator. In addition, in all regressions we calculate heteroscedastic consistent standard errors in order to correct for heteroscedasticity problems.

However, the inclusion of country-pair fixed effects does not allow the estimation of the coefficients of the variables which are time-invariant like geographic distance, the existence of frontier, EU or CEFTA. Therefore, we use a two-step procedure proposed by Arellano and Bover (1990) in order to obtain these coefficients. This procedure consists on a regression of the country-pair effects obtained in the within estimation on the time-invariant explanatory variables.

The results for the several sectors and for the total exports can be seen in Table 9. In general the results are in accordance with those usually obtained in the empirical literature on trade. The estimates support the idea that the size of the economy has a statistically positive influence on bilateral trade relations. On the other hand, countries' economic distance, measuring the relative factor endowments, seems to have a negative impact on bilateral trade flows, which is according to new trade theories. Moreover, according to Linder (1961) the higher the economic distance between countries the bigger the differences in their demand structures. Therefore, trade between countries with similar demand structures is more of intra-industry trade nature and less of inter-industry nature. The results seem to be according to this hypothesis and we

may conclude that, for total trade and for most sectors, intra-industry trade dominates. It is reasonable to expect that the Linder effect does not occur in all the sectors. In fact, the impact of economic distance seems to be not significant for natural resources and labour intensive sectors. This is not surprising as in natural resources and labour intensive sectors the nature of trade in mainly of inter-industry type, as predicted by HOS models.

TABLE 9: ESTIMATES OF THE GRAVITY MODEL ON EU/CEEC TRADE FLOWS

Variable	Natural Resources	Labour	Capital and Scale	Specialised Suppliers	R&D	All Sectors
	Fixed Effects Estimates					
	Coeffic. (Robust SE.)	Coeffic. (Robust SE.)	Coeffic. (Robust SE)	Coeffic. (Robust SE.)	Coeffic. (Robust SE.)	Coeffic. (Robust SE)
GDT	0.589* (0.070)	0.652* (0.076)	0.431* (0.088)	1.001* (0.124)	0.125 (0.124)	0.658* (0.062)
SIM	0.022*** (0.012)	0.056* (0.012)	0.037* (0.011)	0.030** (0.016)	-0.008 (0.018)	0.033* (0.008)
ED	-0.073 (0.047)	0.037 (0.052)	-0.285* (0.056)	-0.305* (0.068)	-0.267* (0.068)	-0.222* (0.038)
n	4965	4964	4937	4933	4885	4968
Std.Dev. Residual	0.445	0.475	0.531	0.619	0.699	0.360
F test (all coef.=0, except constant)	69.91*	175.91*	148.23*	230.20*	144.31*	282.40*
Hausman Test	277.81*	327.88*	459.34*	185.65*	301.95*	226.15*
	Auxiliary Regression					
EU	2.363* (0.034)	2.471* (0.034)	2.803* (0.047)	2.024* (0.041)	3.732* (0.058)	2.354* (0.031)
CEFTA	0.202* (0.058)	-0.119** (0.060)	0.200* (0.063)	0.370* (0.059)	-1.121* (0.129)	0.159* (0.051)
Dist	-1.314* (0.032)	-1.276* (0.033)	-1.356* (0.048)	-1.364* (0.041)	-1.509* (0.057)	-1.281* (0.031)
Frontier	0.800* (0.049)	0.633* (0.055)	0.656* (0.076)	0.420* (0.061)	0.299* (0.097)	0.513* (0.051)

All variables are in logs, except for dummies. Time dummies were included but not reported. Variables definition, countries used in regression and data sources can be seen in Appendix.

(*) , (**) and (***) denote values significant at 1% , 5% and 10% level, respectively .

In addition, the results provide evidence in support of economic geography models which state the importance of geography (Krugman, 1991). Indeed, *distance,* as well as *frontier,* exert a significant influence on the determination of trade flows, both total and sectoral. In fact, the results suggest that R&D sectors seem to be more negatively affected by distance than any others. Also, the existence of common border although with a positive effect in all cases, displays a smaller magnitude in the case of R&D. The distance coefficient is always negative. If distance can be seen as a proxy of all possible trade costs sources we may conclude that an improvement in physical infrastructures will certainly have a positive effect on decreasing the market access gap between the centre and the periphery of Europe.

In this model economic integration is proxied by two dummies, EU and CEFTA. The EU dummy shows the expected result, with the EU integration increasing trade flows among countries on total trade and in all sectors considered. On the other hand, CEFTA is in general positive and significant, with the exceptions of the natural resources and the R&D sectors. For R&D sectors the CEFTA variable is significant and negative, implying that this economic agreement did not benefited trade in the sectors intensive in technology. Also, the EU integration seems to be special important for trade in R&D sectors.

4. ANALYSIS OF POTENTIAL TRADE FLOWS

Different theoretical and empirical approaches have analysed the levels of "potential trade" between the CEEC and the EU. Gravity models have been the most widely adopted in assessing the impact of the enlargement on trade potential. The results of these studies have been contradictory, as some (like Hamilton and Winter, 1992; Baldwin,1994; Buch and Piazolo, 2000; Jakab et al, 2001 or Ferragina *et al.*, 2005), concluded that there is still scope for growth on the EU-CEEC trade and others refer that trade potential is either close to the potential level or even above potential (for example Gros and Gonciarz,1996; Festoc ,1997 and Nilsson, 2000).

The distinct results are mainly due to two reasons. On the one hand, it must be noted that the integration process of the CEEC into international markets was very rapid and, as a result, there was a fast expansion of trade flows between the EU and the CEEC. On the other hand, there are some issues concerning data and econometric procedures employed in empirical analyses that raise doubts on the estimates of some of these studies.

First, many studies use cross-section instead of panel data. Previous papers (Breuss and Egger, 1999; Egger, 2000 and Matyas, 1997, 1998) conclude that the use of cross-section data turns the potential trade estimates unbiased. Second, when applying panel data methods there is the issue of deciding whether to apply a random effects or a fixed effects model. Usually the fixed effects model reveals itself as the best and, as a consequence, other aspects have to be considered. Many studies use only data on Western countries, performing out of sample predictions to forecast the results for the CEEC, whereas the fixed effects refer only to the countries in the sample. Most of the recent studies, like Nilsson (2000), Buch and Piazolo (2000) or Jakab *et*

al. (2001), although applying different methodologies, base their estimates on data on both the CEEC and the Western countries. The other issue to take into account is the option between the use of country specific fixed effects and country-pair specific effects. The latter specification is more general and it has been referred recently as the most appropriated [16], but it has not been usually applied on the analysis of trade relations between the CEEC and the EU countries.

Few studies have analysed trade among CEEC in particular after the collapse of the central planned regimes. Fidrmuc and Fidrmuc (2003) and Boillot *et al.* (2003) are exceptions. The first found a decline on bilateral trade intensity among these countries following the collapse of COMECON. Also, they concluded that trade between EU15 and the CEEC were close to the potential level at the end of the 1990s. The latter have confirmed that trade among the CEEC is particularly intense inside the several sub-regions like the Baltic and Balkan areas.

In line with previous literature, the estimates from the gravity model presented before were used to analyse whether the potential trade between the EU and the CEEC is above or below the actual level. We computed in-sample predictions of trade between the EU and the CEEC countries in 1993, 1997 and 2001 and compare them with the current values. Furthermore, we have performed the same procedure for the intra-CEEC trade relations for the all period from 1993 and 2001. However, the ratio of the predicted values over the actual ones is also an indication of the goodness of fit of the model. Indeed, large differences between actual and predicted values may indicate misspecification of the model. Therefore, one should be careful on the analysis of this ratio. Instead of analysing the level of the ratio between predicted and actual values we focus on the evolution over time, as that will provide some information on the trade potential of the countries considered.

The results on the potential versus actual exports from each EU15 country to the total CEEC and from each CEEC to the total EU15 may be seen in table 10. These show the deepening of the process of trade liberalisation between the CEEC and the EU. There are, however, some differences between EU exports to the CEEC and the CEEC' exports. The results suggest that in global terms the CEEC exports have converged more quickly than the EU exports[17]. In particular, there are some indications of the existence of a gap between actual and potential exports to the Czech Republic, Estonia and Romania.

In the long run, given the permanent transformation in CEEC economic structure, it is difficult to predict with confidence the future trade potential. Yet, in spite of the great expansion in the EU-CEEC trade relations, it is expected that the volume of trade will continue to increase due to the expansion of real incomes and to the progress in market reforms in the new members and candidate countries[18]. Most studies also suggest that this tendency will not be equal in

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[16] See Egger and Pfaffermayer (2003), Fontagné *et al.* (1999) and Cheng and Wall (2005)
[17] Bertolini and Montanari (2202) and Fontoura *et al.* (2005) have reached the same conclusion although applying different methodologies.
[18] See Fontagné et al. (1999) and Auxilioux and Pajot (2001).

all countries. The accession of the CEEC to the EU will have in itself a positive effect on bilateral trade flows.

Table 10: Potential versus Current Exports between EU and CEEC [a] (Potential/Current)

EU Exports				CEEC Exports			
Origin Country				**Origin Country**			
	1993	1997	2001		1993	1997	2001
Austria	0.794	0.775	1.247	Bulgaria	1.100	0.980	1.005
Benelux	1.047	0.832	0.993	Czech Republic	0.685	0.619	0.378
Denmark	0.880	0.859	1.273	Estonia	2.749	1.232	1.400
Finland	1.515	1.015	1.926	Hungary	0.981	0.767	0.600
France	1.080	0.870	0.825	Latvia	1.038	0.925	1.151
Germany	0.921	0.821	1.029	Lithuania	0.978	0.995	0.757
Greece	0.676	0.921	0.881	Poland	0.568	0.652	0.478
Ireland	1.768	0.801	1.048	Romania	1.306	0.966	0.708
Italy	1.088	0.959	1.205	Slovakia	1.287	0.875	0.725
Netherlands	0.820	0.809	1.078	Slovenia	0.822	1.046	1.020
Portugal	1.532	0.577	0.747				
Spain	1.467	0.880	0.939				
Sweden	1.364	0.894	1.617				
United Kingdom	0.940	0.722	1.135				
Destination Country				**Destination Country**			
	1993	1997	2001		1993	1997	2001
Bulgaria	1.088	0.979	0.985	Austria	0.750	1.011	0.759
Czech Republic	0.761	1.119	1.046	Benelux	1.116	0.442	0.494
Estonia	0.986	0.842	1.268	Denmark	0.760	0.883	0.671
Hungary	1.835	0.873	1.268	Finland	0.916	0.936	0.857
Latvia	0.967	0.875	1.030	France	0.895	0.561	0.503
Lithuania	1.575	0.815	0.969	Germany	0.798	0.763	0.609
Poland	1.520	0.700	0.869	Greece	0.879	0.988	0.868
Romania	0.909	0.785	1.261	Ireland	0.805	0.468	0.377
Slovakia	1.046	0.971	0.867	Italy	0.933	0.744	0.695
Slovenia	1.255	0.803	0.931	Netherlands	0.713	1.080	0.771
				Portugal	1.041	0.638	0.664
				Spain	1.227	0.384	0.471
				Sweden	1.144	0.765	0.875
				United Kingdom	0.876	0.759	0.665

(a) These results were obtained using the estimates from the specification considering total exports.
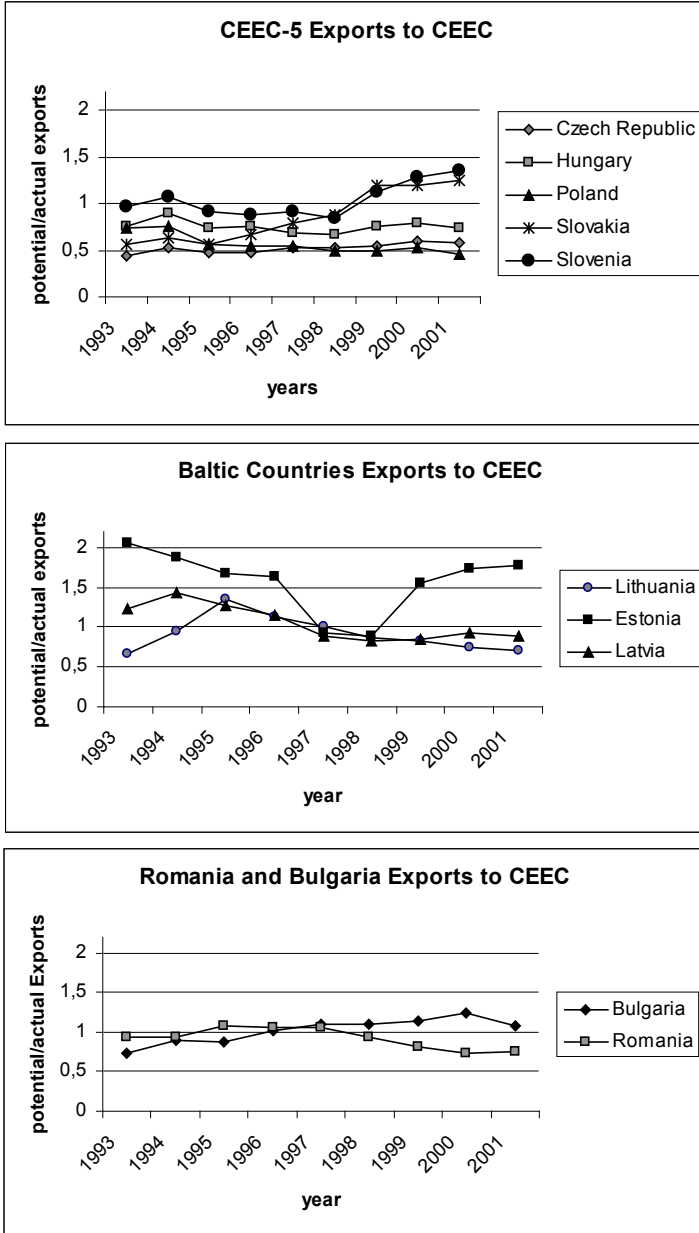
As we are particularly interested in the relations among the CEEC we present several graphics (see figure 1) with the evolution of the predicted trade flows from each CEEC to the total CEEC over the actual values. The analysis of the results allows us to conclude that not all the countries reveal the same evolution along the time period. While some seem to be getting closer from the potential values of trade along the time for others, particularly after 1997, the gap between potential and actual trade flows is getting bigger (especially in the case of Slovakia, Slovenia and Estonia). In the case of Estonia and Slovakia this is not surprising giving the reduction in trade intensity between these countries and the total CEEC after 1997, which we have analysed in section 2. On the other hand, the fact that most countries seem to be getting closer from potential trade is also according to the developments on trade intensity among these countries.

In the near future, it is expected that trade relations among CEEC will reveal high dynamics and will continue to increase, not only inside each sub-group of countries (CEEC-5, Baltic and Balkans) but also involving all the others. Other authors, like Boillot *et al.* (2003), have present similar predictions. This is likely to occur due to the recent evolution on these countries trade relations and to the expected decrease in trade costs among these countries. Furthermore, most CEEC already joined EU and it is probable that intra-CEEC trade relations will evolve in similar way to what happened in the previous EU enlargement. In fact, after Spain and Portugal joined the EU bilateral trade relations between the two countries have significantly increased.

5. CONCLUDING REMARKS

EU membership has been promoting a broader market liberalisation and a higher level of economic and monetary stability in the recent members. During the transition process, the dynamics of trade and FDI flows was crucial for the restructuring and modernisation of new members' economies, thus contributing to sustain growth and convergence in the incoming CEEC.

Concerning trade, profound changes in terms of intensity, composition and nature of flows have been taking place. Trade liberalization between the EU and the CEEC has promoted the intensification of bilateral relationships. However, this phenomenon did not affected equally all the partners, as the Central European countries have experienced the major gains. The progressive orientation of CEEC trade relations to the EU coincided with a sharp decline in the intensity of trade among CEEC. Furthermore, CEEC' economic liberalisation has originated significant changes in the productive structures and trade patterns, causing an increasing divergence in the specialization patterns of these countries.

In this paper we used a gravity model to investigate the determinants of total and sectoral trade flows and predict trade potentials among CEEC and

EU countries. The estimation results imply that geographical and economic factors have to be taken into account when anticipating the trade impacts of enlargement. Moreover, it is possible to infer that the recent accession of the Eastern countries to the EU will have a positive impact on trade between countries.

The results also highlight distinct determinants of trade for the different sectors and suggest that EU integration and an improvement in physical and technological infrastructures are especially important for the development of trade in R&D sectors.

Another conclusion is that, although potential trade between EU and CEEC is exhausted for most countries in the short-term, there are still some possibilities of trade expansion in other cases. In the long run, in spite of the reinforcement of the EU-CEEC trade relations, the empirical analysis suggests room for further improvement, mainly due to economic development in the new member countries.

A significant issue to consider in the study of potential trade is the relations among the new EU members. Following the abolishment of tariff barriers amongst these countries, changes in intra-CEEC trade dynamics and structures are likely to continue to occur, in line with the developments of previous enlargement processes. In fact, it is possible to conclude that trade within the CEEC will continue to grow faster than that between the EU and new members. This can be seen mostly as a consequence of industrial location strategies of western multinational firms, which have been leading to the emergence of flows between countries of this sub-region.

It is reasonable to believe that an increase in trade intensity will not happen in all sectors. According to previous developments in economic integration experiences, it is possible to anticipate that the increase in trade relations will be higher in industries where the presence of multinationals is more significant and where economies of scale and technology spillover effects prevail. Trade flows will tend to increase as income levels converge, demand structures get more similar and international production networks expand. As a consequence, it is expected that significant changes continue to occur in the comparative advantages patterns, which will depend on the countries position in the European labour division and on their competitiveness performance.

In sum, the enlargement triggers trade intensity, reviving old economic partnerships among neighbouring countries which will affect welfare levels, according to their technological knowledge and factor endowments. Even though, in the short and medium term, some countries may experience some negative effects, in the long-term impacts are expected to be positive. In fact, the favourable environment resulting from the economic and monetary stability in the CEEC emerging markets, will generate significant business opportunities, promoting trade expansion for all the countries.

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Appendix

1. Trade Indexes

1. Relative Intensity of Export Index   2. Revealed Comparative Advantage Index

$$RIE = \frac{X_{ij}^k * (X_w)^2}{X_i * M_j * X_w^k} = \frac{\left(\dfrac{X_{ij}^k}{X_i * M_j}\right)}{\left(\dfrac{X_w^k}{X_w * X_w}\right)}$$

$$RCA = \left(\frac{X_i^k - M_i^k}{X_i + M_i} - \frac{X_i - M_i}{X_i + M_i} \times \frac{X_i^k + M_i^k}{X_i + M_i}\right) * 1000$$

2. Countries Included in the analysis

The EU countries (14 individual countries as Belgium and Luxemburg were considered as one) and 10 CEEC countries), over the period of 1993-2001.

3. Definitions of Variables

Dependent variables:
Real Bilateral total Exports from country i to country j.
Real bilateral sectoral exports from country i to country j.

Regressors:
GDT – Sum of real GDP from both countries
ED – Economic Distance measured by the absolute value of the difference between the real GDP per capita, between country i and j.
SIM - similarity in country size in terms of GDP, measured using the Balassa and Bauwens (1987) indicator. *The variables are in constant values and in US dollars.*
Source: Data on GDP, Population and Exports were taken from CHELEM Database.
Dist- geographic distance expressed in kilometres.
(Source:http://www.indo.com/distance/)
Frontier - dummy variable equal to one if the two trading partners share a common border.
EU - dummy variable equal to one when the both trading partners are presently members of the European Union.
CEFTA - dummy variable equal to one when both trading partners are members of CEFTA