Integration of CEECs into EU Markets: Structural Change and Convergence[1]

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Abstract: The Central and Eastern European Countries (CEECs) have gone through a dramatic process of industrial restructuring in which the Europe Agreements have played a major role. Using detailed statistics, we analyse the transformation of CEECs' export structures and whether it led to structural convergence with the remaining EU members. We also analyse structural transformation within sectors in terms of quality ranges. The results show that, in general terms, CEECs have converged both at inter and intra-sectoral levels towards pre-existing EU members. We discuss whether further restructuring and relocation of CEECs' industrial patterns are probable in the aftermath of EU membership.

Key words: Central and Eastern European Countries, Europe Agreements, Export Structure, Structural Change, Structural Convergence.

JEL Classification: F10, F15.

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1. Introduction

The integration of Central and Eastern European Countries (CEECs) into trade links with the European Union (EU) has been remarkable since the beginning of the transition, in 1989. The share of exports to the EU in the total exports of the CEEC10 - the eight CEECs that have joined the European Union in May 2004 (the Czech Republic, Hungary, Poland, Slovakia, Slovenia, Estonia, Latvia and Lithuania) plus the other two that are expected to accede in 2007 (Bulgaria and Romania) - was 54%, in 1993, increasing to 66%, in 2001, while the corresponding values for imports were 56% and 63%, respectively (Caetano and Vaz, 2003). This level of trade integration with the EU market is already similar to that of the majority of EU pre-existing members (old members).

This process of trade integration is a natural consequence of the dismantling of central planning, in the period 1989-1991, as previously these countries undertraded with the EU and overtraded with each other and other members of the former Council for Mutual Economic Assistance (CMEA). However, such integration was also directly promoted by the EU response to the collapse of communism in these countries, namely[2] with the Europe Agreements (EA) – a total of ten agreements signed between the EU and the CEECs in the period 1991-1996 – which led to total liberalisation of tariffs in

[2] Initially the EU upgraded the status of the CEECs to that of the least developed countries by granting them a generalised system of preferences (GSP).

the EU trade of manufactured products by January 2002.[3] This process was asymmetric, favouring the CEECs that had to liberalise market access for industrial goods over a (maximum) period of ten years, while in the case of the EU it was only five years. The EA also laid the foundations of the accession process by implying full convergence of the domestic system of the CEECs to the EU *acquis communautaire*, i.e., the comprehensive body of laws, rules and regulations that govern the Union.

Several studies have shown that these new trade links reflect, in most CEECs, a dramatic process of change in their productive structure.[4] However, few concentrated on whether the evolution of CEECs' trade pattern led to greater convergence to the pattern of EU old members.[5] However, this is a relevant topic as several advantages are associated to increased similarity: it requires smaller industry reallocations, facilitates monetary coordination and the definition of other common policies and accelerates convergence of factor prices (Deardorff, 1994), thus alleviating the pressure of migration flows from the CEECs to the old members.[6]

Using detailed statistics, we analyse, over the period 1995-2001, i.e. in the aftermath of the EA, the path of industrial restructuring of the CEEC10 as observed through the lens of their export performance to the EU market, and whether it led to increased

[3] In agriculture, trade restrictions remained in place during the period analysed. In fact, agriculture is one of the most problematic aspects of the Association Agreements, which can in some ways be explained by the fact that, without a profound reform of the Common Agriculture Policy, a trade liberalisation process would generate a significant production surplus with the consequent budgetary costs (Ahmad and Yang, 1998).

[4] See, for instance, Landesmann (2000) and Havlik (2004).

[5] See, for the CEECs, Landesmann (2000), Landesmann and Stehrer (2002) and De Benedictis and Tajoli (2004). Midelfart-Knarvik et al. (2000) is one of the pioneering studies on this subject, but it concerns only the EU old members.

[6] See, on this subject, De Benedictis and Tajoli (2004), section 2.1.

similarity with the export structure of EU old members. Evolution and comparison of export structures is first done as if sectors were homogeneous, but we also perform an analysis at the intra-sectoral level by considering differentiation in quality levels within sectors.

Besides, it is important to investigate if, with the accession to the EU, further restructuring of CEECs' export pattern may be expected, in spite of the high degree of trade integration of these countries in this area. We outline several arguments that give support to this hypothesis.

The remainder of the paper is organised as follows. Section 2 describes the data and presents the notation used in the following sections. Section 3 analyses the degree of structural transformation of CEEC exports to the EU and investigates the nature of this change with alternative typologies. Section 4 evaluates the degree of structural similarity and convergence of CEECs' export structure towards EU old members' pattern. Section 5 focuses intra-sectoral changes in terms of quality ranges. Section 6 outlines some considerations on the effectiveness of CEEC adjustment to trade liberalisation. Section 7 presents some final remarks.

2. Data and notation

The analysis developed in this paper covers the ten CEECs included in the EU enlargement process. Besides, since we address the evolution of CEEC exports to the EU, we also consider, as a reference term, the 14 old members.[7] Accordingly, the paper considers a total of 24 countries, in the period between 1995 and 2001. The space of the old members will be designated by EU(14).

[7] Belgium and Luxembourg are presented together due to limitations in the available data.

The data is considered at the 6-digit level of the Combined Nomenclature (CN) for the manufacturing industry. However, in order to apply some sectoral taxonomies, in section 3 of the paper, these sectors will be converted to the 3-digit level of NACE - Eurostat nomenclature. Thus, we will consider all sectors of the CN at the 6-digit level which, according to the CN-NACE conversion, are classified as manufacturing industry sectors. In total, we consider 4706 sectors.

The data used in the paper concerns EU imports (the information supplied by Eurostat), although these flows will be referred indistinctly as the EU imports from a certain country or the exports from that country to the EU.[8]

Let x be EU imports. Indices i (i=1,…, I), j (j=1,…, J) and t express, respectively, the country from which the trade flow originates, the sector and the period. In the case analysed, I = 24 and J = 4706. For the sake of simplicity, t = 0 refers to 1995 and t = 1 to 2001. The world is designated as p and, therefore, $x_p(t)$ represents EU total imports, at period t. The starting point for the analysis are the two matrices X(t), with the generic element $x_{ji}(t)$ representing the EU imports from country i, in sector j, in period t. It is also possible to obtain:

$$x_i(t) = \sum_{j=1}^{J} x_{ji}(t) \qquad (1)$$

$$x(t) = \sum_{i=1}^{I} \sum_{j=1}^{J} x_{ji}(t) \qquad (2)$$

[8] EU total imports correspond, of course, in the period analysed, to EU(14) imports.

where (1) represents EU total imports from country i, in t, while (2) expresses EU total imports, in t, from the 24 countries analysed. The weight of each sector j in total exports of country i to the EU is given by v_{ji}, where $v_{ji}(t) = x_{ji}(t) / x_i(t)$.

3. Structural change

To evaluate the degree of transformation of CEECs' export structure to the EU market, we use the Lawrence index which compares the export structure of a given country at two different moments and is expressed as follows:

$$T_i = \beta \sum_{j=1}^{J} | v_{ji}(1) - v_{ji}(0) | \ ; \ T_i \in [0 , 2\beta] \qquad (3)$$

It is assumed that $\beta=½$ and, therefore, T_i ranges between 0 and 1, increasing with structural transformation. In the present case, we compare the export structure of each CEE country to the EU at t = 0 and t = 1.

[Table 1]

The results reveal that the CEECs registered a more profound change in their export pattern to the EU than old members, as shown by the simple average of T_i for both groups of countries.[9] In fact, among the 24 countries, the CEECs, together with Greece, Portugal and Ireland, display the highest degrees of structural change, during the period analysed. More specifically, Latvia and Estonia are the economies with the highest

[9] Germany is the country with the most stable export structure between 1995 and 2001 ($T_i = 0.202$).

changes in their export structure to the EU, while Slovenia is the CEE country that changed least in this regard.

To explain the basis of the structural transformation identified above, we make use of a common procedure which consists in breaking down commodities into several groups according to pre-defined criteria and to evaluate the share of each category in the total exports of each CEE country. With this objective, three taxonomies are considered. Two of them, proposed by Peneder (2001), take into consideration the following sectoral characteristics: (i) a factor input criterion, which categorises the sectors as mainstream, labour-intensive industries, capital-intensive industries, marketing-driven industries and technology-driven industries; (ii) a labour skills criterion, which considers low-skill industries, medium-skill/blue-collar workers, medium-skill/white-collar workers and high-skill industries. A third taxonomy used in this paper breaks the sectors down according to the dynamism of EU demand, in the period 1995-2001; three groups were considered: slow growth sectors (annual average growth rate below 5%), medium growth sectors (annual average growth rate between 5% and 10%) and dynamic growth sectors (annual average growth rate above 10%).

In what follows, we stress the main conclusions of this exercise. Let us first consider the results concerning the factor input criterion. Table 2 shows, for each CEE country, the share of each category in total exports.

[Table 2]

According to the results of T_i, Latvia and Estonia are the economies with the most profound structural changes, during the period 1995-2001. Nevertheless, the factor input taxonomy allows to conclude that the respective determinants are of a different nature.

In both cases, there is a very sharp decrease in capital-intensive industries but, while Latvia predominantly registers an increase in labour-intensive industries, in the case of Estonia that decrease is compensated by an increase in technology-driven industries.

An additional feature to be stressed is the increase in the share of technology-driven industries in total exports in all CEECs, with special incidence in Hungary. In fact, in the case of this country, while this category displays a strong increase, all the remaining categories are reduced. This evolution confirms the gradual emergence, in the CEECs, of a specialisation that is no longer solely based on low value-added goods, but also on goods with greater technological content, as also shown by Henriot and Inotaï (1998).

In spite of this trend towards a more technologically sophisticated pattern of exports, in 2001, amongst the 24 countries considered, the seven countries with the highest share of labour-intensive sectors belong to the CEECs. Moreover, the category of labour-intensive industries is the only where the CEECs registered, on average terms, a share in total exports higher than that of the old members.[10] In this respect, it is possible to define two groups of countries: a first one which includes some less developed CEECs – Latvia, Bulgaria, Lithuania and Romania – more specialised in labour-intensive products and displaying an increase in the share of labour-intensive exports; and another group, made up of Hungary, Poland, the Czech Republic and Slovakia, where the labour-intensive category registers the largest decreases.

We consider now the labour skill taxonomy. Table 3 presents the results.

[Table 3]

[10] Portugal (24.01%) and Greece (21.05%) register the highest values in the context of the old members.

With regard to this taxonomy, the general trend shows a fall in the share of low-skill industries in the CEECs. However, in comparison with the old members, it is the lower-skill sectors that still predominate in these countries. Bulgaria is the only economy that has an evident increase in low-skill industries (and a decrease in the remaining categories). In fact, 70% of Bulgarian exports, in 2001, are still intensive in low-skill labour.

The most favourable evolution occurs again in Hungary, the Czech Republic, Poland and Slovakia. The Czech Republic is the CEE economy that, in 2001, displayed the highest share of high-skill industries (occupying 9th place in the context of the 24 countries considered).

Finally, let us consider a third taxonomy based on EU demand dynamism. The results are presented in Table 4.

[Table 4]

The evidence shows a trend towards an increasing specialisation in the most dynamic sectors, in terms of demand, in all CEECs, exception made to Latvia. Hungary deserves, once again, a special mention with an increase in the share of its most dynamic sectors from 33.46%, in 1995, to 57.96%, in 2001. This value is clearly the highest in the context of the CEECs and well above the simple average of the CEECs (35.05%) and even of the old members (40.10%). Romania and Bulgaria display the lowest values in the most dynamic category.

In short, in spite of the fact that most CEECs show a relevant structural change in their export pattern, there are important differences amongst them.[11] In fact, while in Romania, Bulgaria, Latvia and Lithuania the traditional industrial specialisation, based on labour-intensive industries, is still dominant, in most Central European countries there is a trend towards new industries, requiring greater labour skills and being technologically intensive. The star performer, in this respect, is Hungary, but these changes have also occurred in the Czech Republic and Slovakia. Poland, Slovenia and Estonia occupy an intermediate position. This differentiation points to a core-periphery structure across the CEECs, confirming the conclusions of Gligorov et al. (2003).

4. Structural similarity and convergence of the export structures

Have the above-mentioned changes in the CEECs' export pattern produced a convergence with the export structures of EU old members to the European market or, alternatively, a tendency towards divergence?

The relationship between trade integration and similarity of export structures is not obvious. There are, however, two arguments that support the possibility of divergence between export patterns, both related to increased specialization of the integrated economies. The first one is the comparative advantage mechanism. The standard drivers of comparative advantage are differences in endowments or technologies. Another mechanism that may promote specialisation is clustering, driven by labour market effects, linkages with customers and suppliers and knowledge spillovers, as emphasised by the new economic geography. As trade integration reduces the extent to which firms

[11] On this topic, see also Kaminski (2001), Brenton and Manzocchi (2002), Landesmann (2002) and Havlik (2004).

need to be close to final consumers, it enables production to move in line with the comparative advantage and/or the clustering mechanisms (Midelfart-Knarvik et al., 2003).

In this paper, we evaluate the degree of similarity of the EU imports from each CEE country vis-à-vis both EU total imports and, at the bilateral level, EU imports from the old members. For this purpose, we use the Krugman specialisation index and start by applying it to compare the structure of EU imports from each CEE country with EU total imports (the world exports to the EU(14)). The Krugman index is given by:

$$E_i(t) = \beta \sum_{j=1}^{J} | v_{ji}(t) - v_{jp}(t) | \; ; \; E_i(t) \in [0 \, , \, 2\beta] \qquad (4)$$

Structural similarity decreases with E_i. Once more, we assume that $\beta = ½$ and, therefore, E_i ranges between 0 and 1. Table 5 presents the results.

[Table 5]

Table 5 shows that the old EU members still have a greater similarity with EU total imports than the new ones. The ten countries with the highest structural similarity with EU total imports, expressed by a lower value for E_i, do not belong to the CEEC group. However, Table 5 also reveals that there is a tendency for CEEC exports to converge with EU total imports. In fact, only Bulgaria and Slovenia show a different evolution. The CEE country that converged most rapidly, in the period analysed, was Poland, while the Czech Republic and Hungary reveal, by the end of the period, the greatest

similarity with the EU total imports. This result corroborates the conclusion obtained by Landesmann and Stehrer (2002) for the period 1993-1998.[12]

In spite of this general tendency, there is still an important difference between the CEEC export structure and the EU global import structure. In 2001, for the whole of the 24 countries, the export structures that differed most from EU total imports were those of certain CEECs: Latvia, Lithuania, Bulgaria and Estonia.

The sectoral export shares ($v_j(t)$) for each country can be compared with the corresponding shares for the EU total imports, as in Table 5, or with the shares for other individual countries. Making this last comparison yields a full matrix of bilateral indices of structural similarity. Table 6 reports these bilateral measures, in 2001, for each new member with each old member. For each CEE country, we have highlighted in italics the most similar EU(14) country and in bold the most different.

[Table 6]

Element by element study of the matrix is laborious, but it is worth drawing attention to some important features. The Czech Republic and Hungary are the most similar to the old members, on average: the former being most similar to Germany, followed by Spain, Italy and France; the latter to Germany once again, followed by Austria, France, the UK and Spain. Other CEECs with relevant similarity with old members are Poland, Slovakia and Slovenia. Poland is fairly similar to Italy, followed by Spain, Germany, France, Austria and Portugal; Slovakia to Spain, followed by

[12] However, the procedure adopted by Landesmann and Stehrer (2002) consists in calculating the correlation coefficients between v_{jp} and v_{ji}.

Germany, Portugal, Belgium-Luxembourg and France; and Slovenia to Spain, followed by Italy, Germany and Austria.

Turning to the old members, Germany is the country that is, on average, most similar to the CEECs, although the similarity is higher with the more advanced CEECs: the Czech Republic and Hungary (followed by Slovakia, Poland and Slovenia). This fact may explain why this is the country with the highest decrease in its EU market share between 1995 and 2001. Ireland is the economy with the most different export structure from the CEECs, depicting the highest dissimilarity with eight CEECs.

Finally, Table 7 compares the similarity of the export structure to the EU of each CEE country with the corresponding structures of both the group of the old members and the group of the remaining CEECs. With this objective, it is calculated, for each group, the average of the bilateral indices.

The evolution of the index, between the two periods, is also interesting as it provides an indication of the degree of structural convergence. In this context, a negative sign for the difference between the indices in 2001 and 1995 means a process of structural convergence, at the bilateral level. On the contrary, a positive sign indicates a process of structural divergence. The last two columns of Table 7 show, respectively for EU(14) and CEECs, the number of countries in relation to which each CEE export structure has converged.

[Table 7]

The evidence presented in Table 7 reveals that, while in 1995 all CEEC export structures were more similar to the remaining CEECs than to the old members, in 2001, not only all of them, with the exception of Bulgaria, increased their similarity to the old

members but also, and this is a noticeable feature, that the Czech Republic and Hungary became more similar to the old members than to the remaining CEECs. As happened in the case of EU total imports, Poland shows the strongest convergence process. On the other hand, the CEECs predominantly diverged relatively to the remaining nine members of the CEEC group. As expected, the number of countries to which each CEE country converged is always higher in the case of the group of the 14 old members than in the case of the CEEC group.

Several factors may account for the fact that the EA free-trade orientation has produced greater convergence with the specialisation pattern of the old members.

First, it may be argued that structural convergence was driven by CEEC-bound FDI. Since the political changes occurring at the beginning of the 1990s, there has been a continuous increase in FDI in the region. In fact, the FDI inward stock increased from a value of 32,607 million USD, in 1995, to 146,920 million USD, in 2002, in part stimulated by the EA, as they provided market access facilities as well as a favourable business climate for the development of the private sector. The three CEECs with the largest stock of FDI are, in decreasing order, Poland, Hungary and the Czech Republic (UNCTAD, 2003). As shown above, Poland is the CEE country that converged most towards the old members, in the period analysed, while the other two countries became even more similar to the old members than to the group to which they belong. In fact, it seems that the significant shift from unskilled labour to skilled labour-intensive and technology-based products (at least in Hungary, the Czech Republic, Poland and Slovakia) were largely due to FDI activity (Kaminski, 1999, 2001; Hunya, 2000).

Second, convergence in terms of industrial structure has been associated with convergence in terms of income per head (Wacziarg, 2001, Barrios et al., 2002). In spite of the fact, pointed out by Barrios et al. (2002), that the direction of causality between

income convergence and structural convergence may not be clear-cut - one can argue that the nature of a country's industrial specialisation can be, simultaneously, an outcome and a determinant factor of income per head (for instance, specialisation in high-tech sectors is likely to generate higher income than specialisation in traditional industries) - CEEC incomes rapidly converged towards the old members' level, in the period analysed.

Finally, economic geography helps to explain why the industrial structure of the more advanced CEECs is converging towards the richer countries of EU(14). Economic centrality (associated to pecuniary externalities) can trigger FDI (and other investment) to increasing returns to scale sectors with high-to-medium levels of technology, thus making specialisation and trade patterns in the recipient countries more in line with the "core" of the integrated space. Schürmann and Talaat (2000) used a measure of economic centrality (travel costs between points within the overall regions weighted by the purchasing power that each point represents) and concluded that the most peripheral regions at present are the Baltic states, Northern Sweden and Finland, Bulgaria and Romania, while Hungary, Slovenia, the Czech Republic, Slovakia and the Southwest of Poland are already no more peripheral than Ireland, Spain or Portugal, and less peripheral than Greece. It is interesting to note that it is, precisely, this latter group of CEECs that, simultaneously, has received the highest stock of FDI, shifted more rapidly its specialisation away from the low-skill, labour-intensive sectors towards the technologically more demanding and skill-based sectors, and display a higher structural similarity to rich Germany.

5. Quality ranges analysis

The analysis developed so far ignored the fact that goods are not homogeneous. However, specialization may also occur at the intra-sectoral level, if goods are differentiated by quality. Thus, even for similar export patterns in terms of the previous analysis, it is possible to observe significant differences in terms of R&D intensity, skills and specific factor content between high and low quality products within the same sector.

In this section we complement the previous analysis with an evaluation in terms of quality ranges within the sectors. To this purpose, we use a methodology, common in international economics, namely in the context of the intra-industry trade literature, in which product quality is evaluated by its unit value.[13] This procedure is based on the fact that, in a perfect information context, there is a positive relationship between the price and the quality of a product's variety. However, even in a context of imperfect information, quality will be reflected in price (Stiglitz, 1987).

Quality is evaluated by the unit value of exports to the EU, being the unit value of EU total imports of that product taken as term of comparison. It is, therefore, a matter of obtaining:

$$\varphi_{ji}(t) = UV(x_{ji}(t)) / UV(x_{jp}(t)) \qquad (5)$$

where UV is the unit value. We consider five quality ranges. Thus, for instance, if $\varphi_{ji} > 1.30$, x_{ji} is assigned to HH_i. The remaining ranges considered are H_i if $\varphi_{ji} \in]1.15, 1.30]$, M_i if $\varphi_{ji} \in [1/1.15, 1.15]$, L_i if $\varphi_{ji} \in [1/1.30, 1/1.15[$ and LL_i if $\varphi_{ji} < 1/1.30$. Table 8 shows the share of each category in total exports.

[13] See Nielsen and Tüthje (2002).

[Table 8]

In 2001, Hungary is the economy with the highest share in category HH_i and the lowest in LL_i. All CEECs show a positive evolution towards a reduction of LL_i[14] and an increase of HH_i. The ratio between the weight of the two higher categories and the two lower ones - λ_i - reflects this fact. Only Slovenia shows a decrease in the period under consideration. It is also worthwhile pointing out that while in 1995 the ratio was lower than 1 in all CEECs, in 2001, Hungary had already widely surpassed that threshold and Estonia was significantly close.

However, it is possible that some countries have a higher quality in sectors where they are strongly specialised. Being so, it is important to complement Table 8 with an evaluation in terms of the number of products.[15] Table 9 reports the results.

[Table 9]

The ratio between the weight of the two higher categories and the two lower ones is now depicted by λ'_i. Comparing λ'_i with λ_i, the most interesting result is the fact that, in Hungary, λ_i is higher than one, whilst λ'_i is lower than one. One may then conclude that, in this country, exports of a higher quality correspond to sectors with a high weight on trade, i.e. where the country is specialised. In terms of evolution, CEECs show an increase of λ'_i and HH'_i and a decrease of $LL'_{i,}$, in the line of the results for λ_i.

[14] Only Slovenia maintains the share of LL_i in total exports unchanged.

[15] In this case, instead of the value of x_j being assigned to each category, it is assigned the value 1 and the weight of each category is obtained relatively to the total number of sectors (J).

In short, in spite of the strong heterogeneity among CEECs, two main conclusions may be retained from the evidence presented in this section. First, there is a visible increase in the relative quality level of their exports to the EU, during the period considered. That catching-up process confirms the results of Landesmann (2002), Landesmann and Stehrer (2002) and Caetano and Vaz (2003) and shows that besides the inter-sectoral structural convergence process identified in the previous section, for the generality of the CEEC, there is an intra-sectoral structural transformation towards goods of higher quality level. Second, in spite of this tendency, the average quality level of CEEC exports is still, in general, inferior to the one of the EU(14) space.

6. Is adjustment to trade liberalisation concluded?

As Europe Agreements have provided for the dismantling of formal EU trade barriers on industrial products (both tariff and quantitative restrictions) for imports from the CEECs prior to enlargement, a key issue is whether most of the direct economic benefits of EU membership in terms of enhanced trade and industrial restructuring have already been reaped. If this is the case, future trade developments will be determined by the natural evolution of income, endowments and preferences in market economies, and no dramatic increase in trade is expected.

The several empirical studies on this subject do not allow a consensual answer to this question. One common approach consists in using a gravity model.[16] With this methodology, Nilsson (2000) defends that the trade adjustment is almost complete. On the contrary, Paas (2003) concludes that what he designates as East-West trade is still only 0.7 times as large as other flows under *ceteris paribus* conditions. Therefore, an

[16] For a review of several studies on this subject, see Brenton and Manzocci (2002).

increase in trade can be expected. Also with this type of modelling, European Integration Consortium (2000) concludes that EU imports from the CEECs are only 60 per cent of that of "normal" market economies and 40 per cent of the "normal" level amongst EU members.

However, Breton and Manzocchi (2002) suggest that predictions which point to an incomplete adjustment to trade liberalisation may be overestimated due to two fundamental reasons. First, because the standard error associated with the gravity model tends to be high and predictions will then have a high associated margin of error. Second, because such estimates are based on levels of GDP in terms of purchasing power parities (GDP-PPP) whilst estimates of a country's trade potential should be made on the basis of the international value of the goods and services it produces (i.e., GDP at market exchange rates), not on how well off its inhabitants are. Iversen (1998, p. 273), however, argues that the proper measure of the transition economies' incomes lies somewhere between the two measures and it is impossible to settle this matter on a purely theoretical basis. Paas (2003) shows that statistical estimates are better with GDP-PPP in his case study for the Baltic Sea Region. An additional problem of the gravity models, recently highlighted by Silva and Tenreyro (2003), concerns the fact that, in the presence of heteroskedasticity, log-linearising a gravity equation and estimating the parameters by ordinary least squares, as is usually done, will lead to inconsistent estimates. To sum up, the results based on this methodology are inconclusive.

Nevertheless, there are valid reasons to consider that trade adjustment is still incomplete amongst the new members.

The incorporation of the CEECs into the EU involves access to the Single Market. The likely effects of the impact of the Single Market on CEEC trade flows are difficult

to assess - as it was in the case of EU(12) - particularly because of the need to have an accurate measure for non-tariff barriers to trade, to take into account dynamic effects and scale effects, and because the timetable for the expansion of the Single Market is uncertain, as there are likely to be transitional periods and derogations for some measures. Besides, the level of compliance of CEE companies with existing EU legislation appears to be, in general, low (Eurochambres, 2003).

However, in terms of a direct influence on trade flows, the main issue of the Single Market will be the removal of the technical barriers to trade (TBT). It is estimated that more than 70% of CEEC exports are subjected to barriers to trade that arise from differences in national technical rules and regulations and the need for multiple testing and conformity assessment for firms selling in different markets (Brenton and Manzocchi, 2002; Landesmann and Stehrer, 2002). Removing these barriers will have structural implications that will depend upon the importance of technical regulations across sectors and countries. In their survey, at the firm level, on the expected impact of the removal of TBT in four CEECs – Bulgaria, Hungary, Poland and Slovakia – Čaplánová and Dezséri (2002) conclude that it is high in most cases.

Another element that may impact on trade in the future is related with FDI. It is broadly accepted that FDI has been a decisive factor in the change of the specialisation and export patterns of the CEECs. The question that arises is, therefore, to know to what extent FDI flows to the CEECs have already attained their limit or if, on the contrary, significant FDI inflows are still to be expected in the near future.

The ratios between FDI inflows in the CEECs in 1998, 2000 and 2002 and the average for the period 1991-1996 are, respectively, 2.68, 3.27 and 3.57, showing that those flows continue to increase. Besides, it is to be expected that membership of the EU will stimulate further flows. First, because EU membership serves as a guarantee of

transparency in the legal and business environment as a result of the *acquis communautaire* and increases the confidence of foreign investors, given the possibility of appeal to the EU courts in the case of legal disputes. Second, entry to the Single Market will fully remove customs frontiers and trade barriers associated with technical standards and will allow full access to government procurement contracts throughout the EU. In any case, the *acquis* compliance of the CEECs will open up new opportunities for investment and cost-optimising strategies. These reasons are enough to expect a dramatic change in the CEE climate for foreign investors (Barry, 2003).

Another important point concerns the relevant factors for FDI attraction. In fact, at least Hungary, the Czech Republic and Poland have a privileged position relative to all cohesion countries but Ireland, as shown by Crespo et al. (2004); as such, it is possible that the East gets what would otherwise flow to these southern countries.

A well-recognised CEEC weakness concerns the quality of the physical infrastructures, mainly those that connect to the EU centre. However, the Cohesion Fund – for environment and infrastructure projects in countries with a per capita income of less than 90% of the EU average – and, specifically, the implementation of the TINA transport infrastructures plans for CEECs – can be decisive in this respect. This is particularly relevant for the countries with a less favourable position in terms of centrality – the Baltic States, Bulgaria and Romania (Schürmann and Talaat, 2000). The improvement of economic centrality is not only an important stimulus for increased trade (Reeding and Venables, 2004) but an additional factor for FDI attraction as well.

7. Final remarks

This paper has evaluated the adjustment in CEEC exports to the EU market, in the aftermath of the Europe Agreements. In the period 1995-2001, the CEECs showed a notable transformation of their export structure. The analysis of the composition of CEEC exports to the EU in terms of factor inputs reveals that the share of unskilled labour-intensive products declined over the period analysed. On the contrary, there was a growth in technology and skilled labour-intensive products and, as a consequence, the aggregate share of these products in EU-oriented exports increased. Nevertheless, this evolution has been uneven among CEECs. Hungary is the most dynamic economy in this respect, expressed in a significant and increasing share in high-technology and high-skill industries, followed by the Czech Republic and Slovakia. Another group of countries that followed this path, albeit to a lesser extent, is made up of Poland, Estonia and Slovenia. However, in spite of these changes, a large part of CEEC exports is still labour-intensive and concentrated in low-skill sectors, mainly in the case of Bulgaria and Romania.

Moreover, there is evidence that CEEC trade specialisation is evolving quickly towards the western partners, mainly in the more advanced CEECs. Some reasons were proposed for this occurrence, namely convergence in terms of income per head and inward FDI. Smaller differences in industrial structures may contribute to more rapid adherence to the monetary union as vulnerability to sectoral shocks is reduced. In spite of this convergence, CEEC exports are still more similar to each other than to the EU(14). The exceptions, in this context, are the Czech Republic and Hungary, in 2001.

Concerning intra-sectoral structural transformation, there was also a catching-up process expressed in a quality upgrading of CEECs exports, even if the average quality level is still higher in the case of EU(14) countries.

To sum up, the evidence presented in this paper allows to conclude that the deep transformation of CEECs' export structures led to a convergence movement both at inter and intra-sectoral levels: on the one hand, CEECs' export structures converged towards the corresponding structures of the old members; on the other hand, relevant transformations were also observed within the sectors, expressed in a quality upgrading of exports from CEECs to the EU market.

Finally, we argue that there are valid reasons to assume that the trade adjustment process is not concluded and that, with the accession to the EU, further industrial restructuring and relocation in the CEECs will occur.

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Table 1 - Degree of structural change

	T_i
Bulgaria	0.498
Czech Republic	0.411
Estonia	0.535
Hungary	0.467
Latvia	0.557
Lithuania	0.457
Poland	0.415
Slovakia	0.463
Slovenia	0.343
Romania	0.395
CEEC - average	0.454
EU(14) – average	0.300
EU total imports	0.206

Source: Own calculations based on Eurostat-Comext

Table 2 -Exports to EU by "factor inputs" (% of total exports)

	1995					2001				
	1	2	3	4	5	1	2	3	4	5
Bulgaria	12.61	25.86	41.87	16.12	3.54	12.43	36.42	34.13	12.75	4.26
Czech Republic	29.42	26.71	22.43	9.70	11.74	30.03	18.91	18.10	7.17	25.78
Estonia	9.60	38.05	33.98	7.32	11.05	10.66	35.95	16.31	6.43	30.65
Hungary	21.80	24.05	20.41	12.41	21.33	17.30	12.82	12.98	6.79	50.12
Latvia	4.52	30.57	60.42	3.76	0.73	7.32	61.90	23.58	5.36	1.84
Lithuania	6.09	33.62	47.13	9.03	4.12	8.06	42.14	36.14	8.58	5.08
Poland	17.63	38.30	24.26	9.92	9.90	21.65	30.20	18.80	9.32	20.03
Slovakia	20.87	27.19	33.94	7.78	10.21	23.32	20.43	23.56	7.05	25.63
Slovenia	28.16	28.67	18.12	7.67	17.38	29.69	24.28	20.31	6.44	19.28
Romania	15.33	47.67	21.93	13.57	1.50	16.23	48.31	13.40	16.23	5.83
CEEC – average	16.60	32.07	32.45	9.73	9.15	17.67	33.14	21.73	8.61	18.85
EU(14) – average	20.46	13.08	25.95	17.73	22.78	18.19	10.66	23.71	14.72	32.73

Note: 1 – mainstream, 2 – labour-intensive industries, 3 – capital-intensive industries, 4 – marketing-driven industries, 5 - technology-driven industries.
Source: Own calculations based on Eurostat-Comext

Table 3 - Exports to EU by "labour skills" (% of total exports)

	1995				2001			
	1	2	3	4	1	2	3	4
Bulgaria	61.23	7.26	24.07	7.45	70.49	6.66	15.63	7.22
Czech Republic	33.95	28.08	25.41	12.56	22.41	34.62	25.84	17.13
Estonia	44.69	21.00	23.53	10.78	25.63	26.07	44.47	3.83
Hungary	36.81	24.81	29.85	8.52	18.05	30.27	37.96	13.72
Latvia	35.70	21.00	42.13	1.16	33.68	48.24	15.52	2.56
Lithuania	49.71	14.09	35.67	0.53	46.35	17.03	34.74	1.88
Poland	45.36	31.60	18.11	4.93	30.35	40.36	22.74	6.54
Slovakia	36.75	27.59	29.04	6.62	28.31	35.39	26.16	10.14
Slovenia	33.40	32.14	25.54	8.92	27.29	36.85	26.00	9.86
Romania	64.72	17.00	13.71	4.57	64.83	14.18	15.81	5.18
CEEC - average	44.23	22.46	26.71	6.60	36.74	28.97	26.49	7.81
EU(14) - average	35.24	20.27	30.32	14.17	28.55	20.03	32.25	19.18

Note: 1 – low-skill industries, 2 – medium-skill/blue-collar workers, 3 – medium-skill/white-collar workers, 4 – high-skill industries.
Source: Own calculations based on Eurostat-Comext

Table 4 - EU Exports to EU by Demand Dynamics (% of total exports)

	1995			2001		
	1	2	3	1	2	3
Bulgaria	11.41	79.02	9.58	7.35	70.75	21.90
Czech Republic	14.31	61.01	24.69	7.17	55.60	37.23
Estonia	14.05	52.49	33.46	12.01	39.23	48.77
Hungary	7.04	59.5	33.46	3.48	38.56	57.96
Latvia	20.28	36.32	43.40	33.97	40.54	25.49
Lithuania	15.47	55.77	28.76	9.82	57.01	33.16
Poland	11.22	68.19	20.59	7.69	59.46	32.85
Slovakia	16.52	57.39	26.09	7.11	48.26	44.63
Slovenia	9.04	64.98	25.99	7.01	63.51	29.48
Romania	7.49	80.94	11.57	4.98	75.99	19.02
CEEC - average	12.68	61.56	25.76	10.06	54.89	35.05
EU(14) - average	14.36	56.72	28.92	10.31	49.59	40.10

Note: 1 – annual average growth rate < 5%, 2 - 5% ≤ annual average growth rate < 10%, 3 – annual average growth rate ≥ 10%

Source: Own calculations based on Eurostat-Comext

Table 5 - Structural Similarity with EU Total Imports (Krugman index)

	1995	2001
Bulgaria	0.739	0.761
Czech Republic	0.583	0.568
Estonia	0.769	0.758
Hungary	0.594	0.573
Latvia	0.858	0.838
Lithuania	0.838	0.822
Poland	0.664	0.620
Slovakia	0.658	0.636
Slovenia	0.648	0.657
Romania	0.765	0.734
CEEC – average	0.712	0.697
EU(14) – average	0.495	0.488

Source: Own calculations based on Eurostat-Comext

Table 6 - Krugman index at bilateral level (2001)

	Bulgaria	Czech Republic	Estonia	Hungary	Latvia	Lithuania	Poland	Slovakia	Slovenia	Romania
Austria	0.816	0.607	0.767	0.598	0.864	0.859	0.670	0.697	0.655	0.791
Belg-Lux.	0.786	0.649	0.812	0.665	0.860	0.847	0.695	0.625	0.719	0.805
Denmark	0.808	0.696	*0.742*	0.711	*0.818*	0.806	0.694	0.759	0.732	0.780
Finland	0.847	0.791	0.656	0.771	0.832	0.859	0.802	0.795	0.825	0.850
France	0.825	0.577	0.827	0.620	0.890	0.880	0.646	0.633	0.672	0.799
Germany	0.827	*0.542*	0.806	*0.589*	0.882	0.877	0.642	0.622	0.643	0.795
Greece	0.775	**0.855**	0.835	**0.827**	0.838	0.813	0.822	0.821	0.829	0.820
Ireland	**0.923**	0.833	**0.905**	0.808	**0.934**	**0.934**	**0.880**	**0.894**	**0.895**	**0.903**
Italy	*0.742*	0.577	0.791	0.649	0.851	0.830	*0.617*	0.646	0.614	0.724
Netherlands	0.814	0.709	0.772	0.664	0.824	0.819	0.743	0.742	0.776	0.808
Portugal	0.748	0.644	0.801	0.685	0.838	*0.800*	0.685	0.624	0.724	*0.672*
Spain	0.809	0.552	0.836	0.631	0.894	0.878	0.620	*0.593*	*0.599*	0.804
Sweden	0.823	0.668	0.756	0.668	0.842	0.845	0.694	0.691	0.733	0.805
U K	0.839	0.654	0.791	0.628	0.883	0.873	0.721	0.721	0.745	0.818

Source: Own calculations based on Eurostat-Comext

Table 7 - Average Levels of Structural Similarity (Krugman index)

	1995		2001		Number of converging structures	
	With EU(14)	With CEECs	With EU(14)	With CEECs	With EU (14) (0-14)	With CEECs (0-9)
Bulgaria	0.806	0.717	0.813	0.738	6	3
Czech Republic	0.693	0.678	0.668	0.691	10	3
Estonia	0.820	0.685	0.793	0.722	12	0
Hungary	0.698	0.686	0.680	0.726	10	2
Latvia	0.889	0.769	0.861	0.755	13	5
Lithuania	0.867	0.709	0.851	0.718	10	4
Poland	0.751	0.654	0.709	0.657	12	6
Slovakia	0.733	0.688	0.705	0.679	10	5
Slovenia	0.731	0.725	0.726	0.721	9	5
Romania	0.821	0.686	0.798	0.691	12	3

Source: Own calculations based on Eurostat -Comext

Table 8 - Quality Ranges (% of total exports) – Volume of Trade

	1995					2001					λ_i	
	HH_i	H_i	M_i	L_i	LL_i	HH_i	H_i	M_i	L_i	LL_i	1995	2001
Bulgaria	6.1	3.6	34.1	12.6	43.6	9.8	2.8	42.7	10.0	34.6	0.17	0.28
C. Republic	9.2	2.8	25.7	10.7	51.5	14.2	4.4	31.3	11.5	38.7	0.19	0.37
Estonia	9.9	3.0	28.6	15.7	42.8	28.8	4.9	31.4	7.9	26.9	0.22	0.97
Hungary	11.5	13.0	38.2	8.4	28.9	35.3	7.8	25.3	13.8	17.9	0.66	1.36
Latvia	3.1	1.7	61.6	3.5	30.1	10.2	6.2	29.8	29.5	24.4	0.14	0.30
Lithuania	3.3	4.4	29.0	11.8	51.5	15.9	7.4	43.4	9.6	23.7	0.12	0.70
Poland	5.5	5.0	34.3	10.0	45.2	9.9	4.8	40.2	11.2	33.9	0.19	0.33
Slovakia	4.5	10.3	30.0	11.1	44.1	15.8	6.1	40.7	11.6	25.8	0.27	0.59
Slovenia	19.8	17.4	20.8	8.3	33.7	23.2	4.7	31.3	7.0	33.7	0.89	0.69
Romania	3.8	2.1	28.1	14.1	51.9	13.8	8.7	30.8	16.2	30.6	0.09	0.48
CEEC - average	7.7	6.3	33.0	10.6	42.3	17.7	5.8	34.7	12.8	29.0	0.29	0.61
EU(14)- average	23.3	13.1	45.8	7.0	11.0	31.0	10.4	38.1	6.7	13.8	2.31	2.32

Source: Own calculation based on Eurostat-Comext

Table 9 - Quality Ranges (% of total exports) – Number of Products

	1995					2001					λ'_i	
	HH'_i	H'_i	M'_i	L'_i	LL'_i	HH'_i	H'_i	M'_i	L'_i	LL'_i	1995	2001
Bulgaria	13.5	2.8	11.3	6.7	65.6	18.9	3.8	14.0	7.3	56.0	0.23	0.36
C. Republic	18.1	4.2	17.2	8.6	51.9	24.0	5.0	18.6	8.1	44.3	0.37	0.55
Estonia	16.6	3.3	12.3	6.2	61.5	29.6	5.6	13.2	6.5	45.1	0.29	0.68
Hungary	22.9	6.9	16.7	7.2	46.3	30.6	5.9	18.2	6.7	38.5	0.56	0.81
Latvia	11.8	3.2	13.9	6.0	65.1	28.1	4.3	12.3	6.1	49.1	0.21	0.59
Lithuania	14.3	3.9	9.2	6.1	66.5	24.6	4.9	12.9	6.7	50.8	0.25	0.51
Poland	15.3	4.1	16.6	7.3	56.8	21.9	5.3	19.3	8.1	45.4	0.30	0.51
Slovakia	15.4	4.7	15.0	7.1	57.8	22.9	4.9	16.2	7.8	48.3	0.31	0.50
Slovenia	25.9	5.2	15.5	6.9	46.5	30.4	5.8	15.7	6.4	41.8	0.58	0.75
Romania	12.2	4.1	13.1	6.2	64.3	21.9	4.7	14.7	6.0	52.7	0.23	0.45
CEEC - average	16.6	4.2	14.1	6.8	58.2	25.3	5.0	15.5	7.0	47.2	0.33	0.57
EU(14)- average	37.7	9.2	23.7	6.6	22.8	41.1	8.6	21.4	6.1	22.9	1.74	1.85

Source: Own calculation based on Eurostat-Comext