



EU Export Specialization Patterns of Selected Accession and Cohesion Countries: Tough Competition on the EU15 Market?

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Abstract:

European integration brings about major impulses for structural change in industry within the enlarged European Union. Focusing on selected accession countries - Hungary, Poland and the Czech Republic - and on four cohesion countries - Spain, Portugal, Ireland and Greece - this paper presents the key shifts in sectoral developments and changing RCA indicators in exports to the EU15. A comparative analysis of the results *indicates that there is intense competition* among the cohesion and the accession countries *as suppliers* on the EU15 market. Poland and the Czech Republic are competitors mainly of Portugal and Greece *in lower and middle quality goods; in some of these product groups* also Hungary is a potential competitor. In addition, Hungary faces competition from Spain and Ireland in some higher quality goods. Analyzing industries according to the OECD taxonomy reveals that there is *intense* market participation of cohesion and accession countries in labour and resource intensive

industries. However, most cohesion and accession countries have a strong comparative disadvantage on the EU15 market in science-based industries. In scale intensive *industries accession countries are gaining competitive power* and thus increasingly competing with cohesion countries.

Resumen:

La integración europea ha supuesto uno de los mayores impulsos para los cambios estructurales en la industria dentro del proceso de ampliación de la Unión Europea. Desde el punto de vista de una selección de los países adheridos –Hungria, Polonia y República Checa- y de los cuatro países que han recibido fondos de cohesión –España, Portugal, Irlanda y Grecia- este artículo presenta los aspectos clave en los desarrollos sectoriales y los cambios en los indicadores RCA¹ relativos a las exportaciones a la UE15. Un análisis comparativo de los resultados indica que hay una fuerte competición entre los países que reciben los fondos de cohesión y los países adheridos como proveedores del mercado de la UE15. Así, Polonia y la República Checa son sobre todo competidores de Portugal y Grecia en productos de calidad media y baja; en algunos de esos grupos de productos también Hungria es un competidor potencial. En consecuencia, Hungria compite cara a cara con España e Irlanda en algunos grupos de bienes de alta calidad. Analizando las industrias según la taxonomía de la OCDE, muestra que hay una intensa participación en el mercado de los países que han recibido fondos de cohesión y en los nuevos socios del factor trabajo e industrias intensivas en este factor. Así, la mayoría los países que reciben fondos de cohesión como los nuevos socios tienen desventaja comparativa con los UE15 en las industrias intensivas en ciencia y tecnología. En las industrias basadas en economías de escala los nuevos socios están incrementando su poder competitivo y de ahí que se esté incrementando la competitividad con los países que reciben los fondos de cohesión.

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¹ *Revealed Comparative Advantage*

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Introduction

EU enlargement creates a wider single market, which stimulates structural adjustment and economic specialization. This implies an increasing interest in analysing foreign trade patterns, in particular export specialization, within the EU market. Special focus is placed on intra-EU trade of accession and cohesion countries, when dealing with EU eastern enlargement. As far as the state of development is concerned, it seems likely that accession countries will in the first place compete with the less developed EU15 countries, namely the cohesion countries. A comparison with the EU15 export specialization patterns of selected accession countries such as Hungary, Poland and the Czech Republic and the four cohesion countries Spain, Portugal, Ireland and Greece, allows us to identify the competitive position of these countries as suppliers on the EU15 market, and indicate whether trade patterns converge within the EU25.

The main idea behind the analysis of convergence in trade patterns is that similarity in production and trade structures among EU25 countries will ease the integration process. From a macroeconomic point of view, one may state that when integration extends far beyond trade, as is the case in the European Union, convergence in production and trade structures will help smooth the integration process. The more similar countries are in terms of sectoral specialization, the more likely it is that they will face symmetric shocks and an increase in business cycle co-movements. Correlation in business cycles is even more important if countries aim to have a common monetary policy, as is relevant for countries eager to join the Eurozone. Efficient specialization should spur competition and growth, as well as economic catching-up in accession countries, which in turn could reinforce convergence of economic specialization. Thus, long term real convergence in the production and trade structures within the EU25 could be achieved. Furthermore, from a theoretical point of view, similar countries integrate more easily, because they are likely to show very similar diversification patterns, thus achieving factor price equalization through trade. Trade in products can, at least to some extent, replace trade in production factors and lead to convergence in factor prices. Thus, incentives to factor mobility, especially to migration, will be reduced. This is extremely important

in the European context, since there are many concerns about potential migration flows within the EU25.¹

There is a long tradition of analysing structural change in the economic literature both for the OECD and the EU15 countries.² The EU eastern enlargement, however, presents a new challenge for research on structural change to which this paper contributes. The remainder of it is organised as follows. Section 2 gives a brief overview on the industrial taxonomy, as analytical categories are needed for the analysis of industrial specialization. Section 3 analyses intra-EU trade flows of three accession countries, namely Hungary, Poland and the Czech Republic and of four cohesion countries, namely Spain, Ireland, Portugal and Greece. Section 4 then paints a picture of competitiveness of cohesion and accession countries as suppliers of goods on the EU15 market. Finally, chapter 5 summarizes and draws conclusions.

Taxonomy: Analytical Sector Classification

Analysing trends in the composition of foreign trade in manufacturing and making sector comparisons among countries requires an appropriate classification of products and industries. In this paper we use a taxonomy of the OECD (1987), which is based on Pavitt (1984). This approach distinguishes five groups of products on the basis of the primary factors affecting the competitive process in each economic activity. It was originally used for ISIC classification; here the converted version for NACE rev. 1.1 is presented. Table 1 summarizes the taxonomy.

The main advantage of the approach adopted here is that it provides a link between the way product groups are defined and the main types of economic benefits which flow from trade:³

- Trade in labour- and resource-intensive products bring the allocation of resources within industries more closely into line with international patterns of factor endowments.
- Trade in scale-intensive products allows firms to increase plant size and lengthen production runs, while at the same time reducing costs.
- Trade in differentiated goods benefits consumers with large product variety without sacrificing the advantages of large-scale production.
- Trade in science-based products makes it likely to spread high fixed costs and risks of R&D over a larger market; this ensures the rapid diffusion of the benefits of new products and processes.

Table 1: OECD Taxonomy

Grouping	Major factor affecting competitiveness	Examples
Labour-intensive	Labour costs	Textiles, leather
Resource-intensive	Access to abundant natural resources	Food, wood, refined petroleum
Scale-intensive	Length of production runs	Motor vehicles, steel
Differentiated goods	Tailoring product to highly varied demand characteristics	Electrical machinery and equipment
Science-based	Rapid application of scientific advance	Office machinery and computing, Pharmaceuticals

Source: OECD 1987, p: 272.

The groups scale-intensive and differentiated goods increasingly overlap in practice, so that one could aggregate these two groups under production intensive goods, as did Pavitt (1984). For the following empirical analysis we will use the OECD type of taxonomy. NACE 2-digit level product groups are divided into the five categories as follows:

Table 2: Relocation of NACE 2-digit level products to taxonomy groups

Groups	NACE 2-digit Classification
Labour-intensive	17, 18, 19, 28, 36
Resource-intensive	15, 16, 20, 23, 26, 27
Scale-intensive	21, 22, 27, 24, 25, 34, 35
Science-based	30, 33, 35
Differentiated goods	29, 31, 32

Source: OECD (1987), Soós (2000), own modifications

Two product groups cannot be clearly relocated to a single taxonomy group. Thus, basic metals (27) belong to both the resource- and scale intensive groups: While iron and steel production belong to the scale-intensive group, the production of non-ferrous metals is rather resource intensive. The manufacture of other transport equipment (35) is also situated between two groups: aircraft and spacecraft are clearly science-based, while shipbuilding and railways belong to the scale-intensive group. The following empirical analysis is based on the OECD taxonomy.

Empirical Analysis of Specialization Patterns of Manufacturing Exports

Subsequent analysis makes use of a modified Revealed Comparative Advantage Index. This is done at a disaggregated level for three accession and four cohesion countries: the focus is on trade with the EU15 countries. Data on exports and imports to the EU15 in the manufacturing sector are used at a 2-digit-level.⁴ Data is classified according to NACE rev.1.1. The list of product groups can be found in the Annex.

RCA-Balassa and its Modification

Trade specialization in the sense of the Revealed Comparative Advantage (RCA) of Balassa (1965) reflects sectoral competitiveness. It reveals a country's sectoral export-import ratio in relation to the export-import ratio of its total economy:

$$RCA_k^{classical} = \frac{\left(\frac{x_k}{m_k} \right)}{\left(\frac{\sum_{k=1}^n x_k}{\sum_{k=1}^n m_k} \right)}$$

where x stands for exports, m for imports and $k \in (1..n)$ for the industrial sectors of the economy.

There is a wide range of modifications commonly used in the economic literature. The specialization indicator used here is a modification of the classical RCA index, which is often referred to as the ratio of export shares. It reveals the relative comparative advantage of an industry within a country by comparing the share of that particular industry in the country's total exports to the share of that industry in total world exports at a certain point in time. Since we are interested in the question, whether an accession or a cohesion country has a comparative advantage as compared to the EU15, we take the respective country's exports to the EU15 instead of total exports worldwide, and intra-EU15 exports instead of worldwide exports. The modified RCA-Balassa for a specific industry k in country i is defined as follows:

$$RCA_{ik}^{modified} = \frac{\left(\frac{x_{ik}}{\sum_{k=1}^n x_{ik}} \right)}{\left(\frac{x_{jk}}{\sum_{k=1}^n x_{jk}} \right)}$$

where i stands for the accession or cohesion country and j for the EU15. Modified RCA-Balassa has a minimum value of 0 and a maximum value of infinity. If $RCA_{ik} > 1$, country i has a comparative advantage in that industry k as compared to the EU15. If $RCA_{ik} < 1$, there is a comparative disadvantage of country i in industry k . Instead of exports one could also use different variables, such as patents or value added.

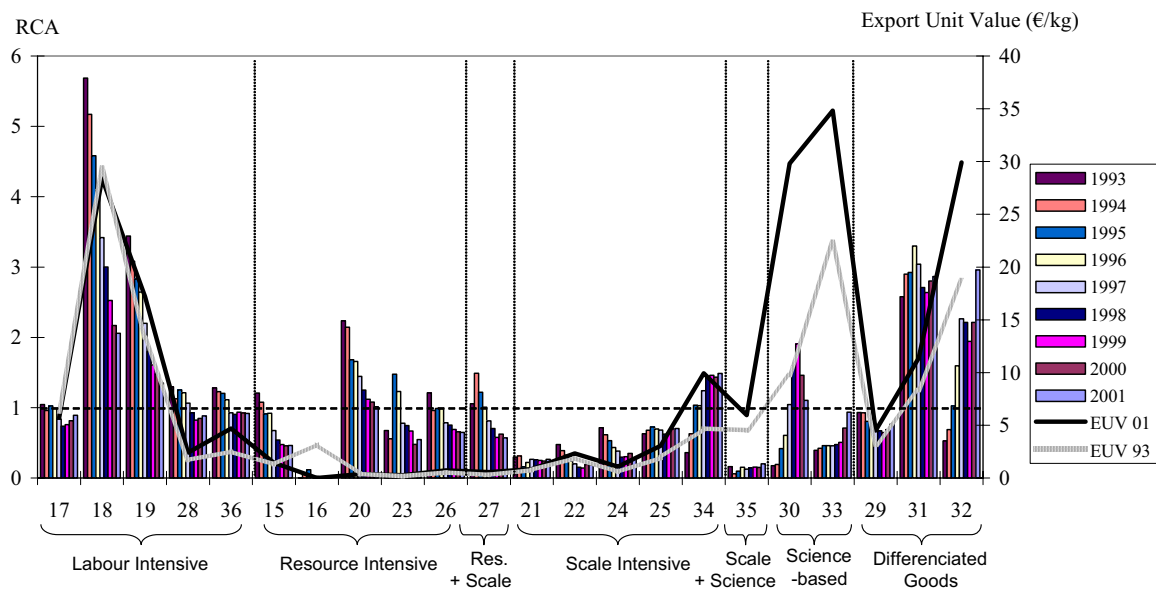
Modified RCA-Balassa in Accession Countries

Figures 1-3 show the modified RCA indices for three accession countries. The horizontal dotted line at 1 (on the left hand scale) indicates the boarder between comparative advantage and disadvantage. The vertical dotted lines indicate the border between the different product categories according to the OECD taxonomy. At the same time one should take a closer look at export unit values (EUV), whose development over time indicates the ability of a country to fetch adequate – if possible higher – prices in world markets. The black line on the right hand side scale shows the export unit values – expressed in €/kg – of the respective product group in the year 2001, the shaded line the export unit values for 1993.

Figure 1 makes clear, that some very high and some very low technology intensive products play the most important role in Hungary's EU exports.⁵ RCAs exceed unity in two labour intensive product groups, wearing apparel (18) and leather products (19), with export unit values of 32 and 17 Euro/kg respectively. However, RCAs have been declining throughout the 1990s in these and in other labour and resource intensive – low and medium technology – product groups. On the contrary, RCAs are rising and exceed unity in the differentiated goods' sectors, especially in electrical machinery and apparatus (31) and in radio, television and communication equipment (32) industries. Here, export unit values rose between 1993 and 2001 reaching more than 10 and 30 Euro/kg respectively in the year 2001. In most of the other product groups, especially in resource and scale intensive industries, which

mostly belong to medium technologies, both RCAs and export unit values are rather low. One exception might be the manufacturing of motor vehicles (34), where Hungary had a comparative advantage throughout the second half of the 1990s with steadily rising RCAs and an export unit value of 10 Euro/kg in the year 2001. Although there is merely a slight comparative advantage left in one science-based product group, namely office machinery and computers (30), export unit values rose considerably between 1993 and 2001.

Figure 1: Hungary – RCA of exports 1993-2001 and Export Unit Values 1993 and 2001

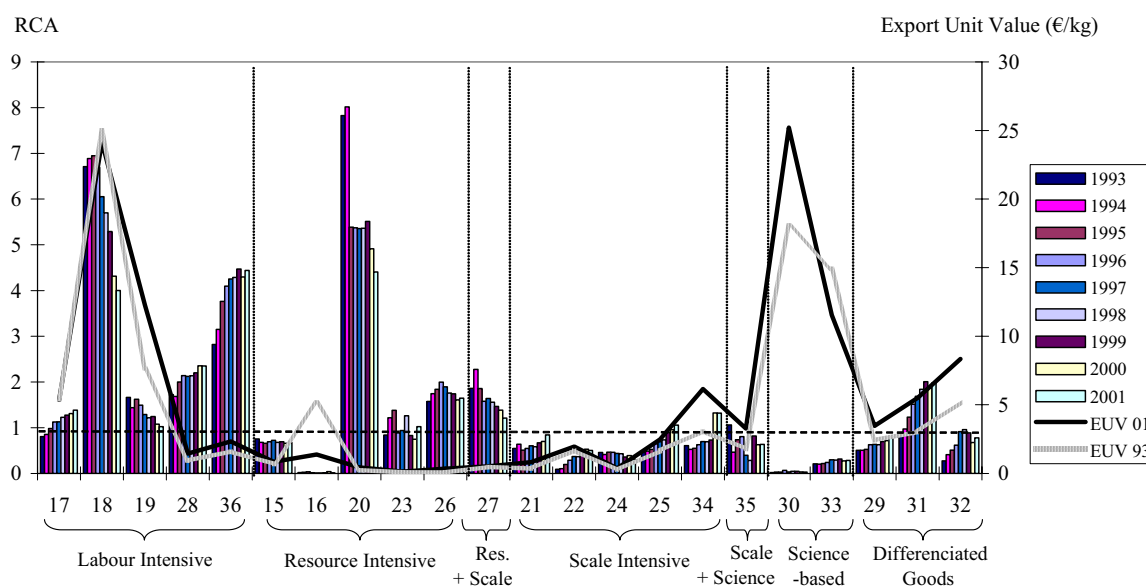


Concerning the importance of the product groups for the Hungarian industries measured by the volume of exports, the product groups 31, 32 and 34 play the most important role. In the year 2001, 12% of manufacturing exports to the EU15 were electrical machinery (31), 20% radio, TV and communication equipment (32) and 25% motor vehicles (34).

Figure 2 shows the respective picture for Poland. Most industries with a relative comparative advantage compared to the EU15 belong to the labour and resource intensive sectors, meaning they are positioned rather low on the technology ladder.⁶ The highest RCAs are yield in wearing apparel (18), furniture (36) and wood and its products (20). However, especially for the latter two, export unit values are extremely low at clearly below 5 €/ kg. The value of one kg of exports in wearing apparel is considerably higher at roughly 25 Euro. In most of the scale intensive, science-based and differentiated goods' sectors Poland still has a comparative

disadvantage, however, many RCAs in these sectors seem to have a tendency to increase. Thus, rubber and plastic products (25), motor vehicles (34) and especially electrical machinery and apparatus (31) have reached levels of RCA exceeding unity by the year 2001. Among these categories, export unit values are the highest in the science-based sector with roughly 25 and 12 €/kg in the year 2001 and 18 and 15 €/kg in the year 1993; however, especially in the science-based sector, Poland's comparative disadvantage is very distinct.

Figure 2: Poland – RCA of exports 1993-2001 and Export Unit Values 1993 and 2001

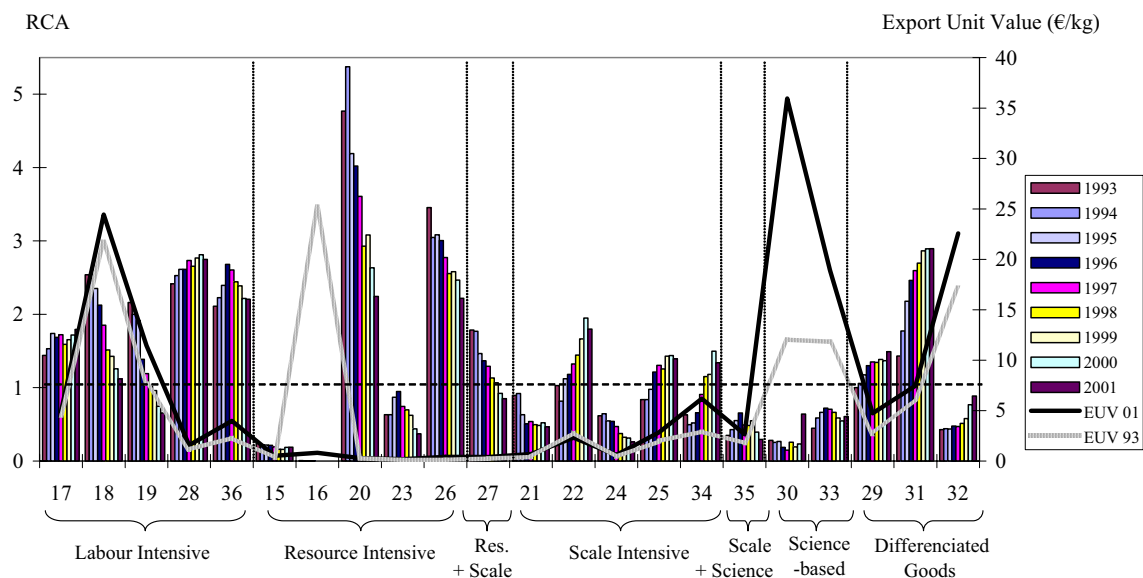


Concerning export shares, only two groups stand out. The share of wearing apparel (18) in total manufacturing exports to EU15 in the year 2001 was 12%, similar to the share of motor vehicles with 13%. The other groups' export shares are rather evenly distributed.

A similar tendency is visible in the Czech Republic (figure 3) as in Hungary. Many of the RCAs in the lower technology sectors have been declining and many in the higher technology intensive sectors have been rising in the course of the time period considered in the analysis. At the same time rather strong comparative advantages can be found all along the technology ladder. Export unit values are similar to the other two countries, especially to Poland. Comparative advantages can be found mainly in the labour intensive, in the resource intensive and also in the differentiated goods' sectors. Within the labour intensive category, wearing apparel (18) with an export unit value of 25 €/kg is losing comparative advantage, as do

leather products (19), which have an export unit value of only 11 Euro per kg. There was a very sharp decline of RCAs as well as of export unit values within the resource intensive category, where export unit values are extremely low in 2001. Similar to the other accession countries, the Czech Republic also has a relative comparative disadvantage in science-based product groups, although, export unit values grew considerably from 12 Euro/kg in 1993 up to 35 Euro per kg in 2001. The sharp rise of RCA in electrical machinery and apparatus (31) is remarkable, despite its low export unit value.

Figure 3: Czech Republic – RCA of exports 1993-2001 and Export Unit Values 1993 and 2001



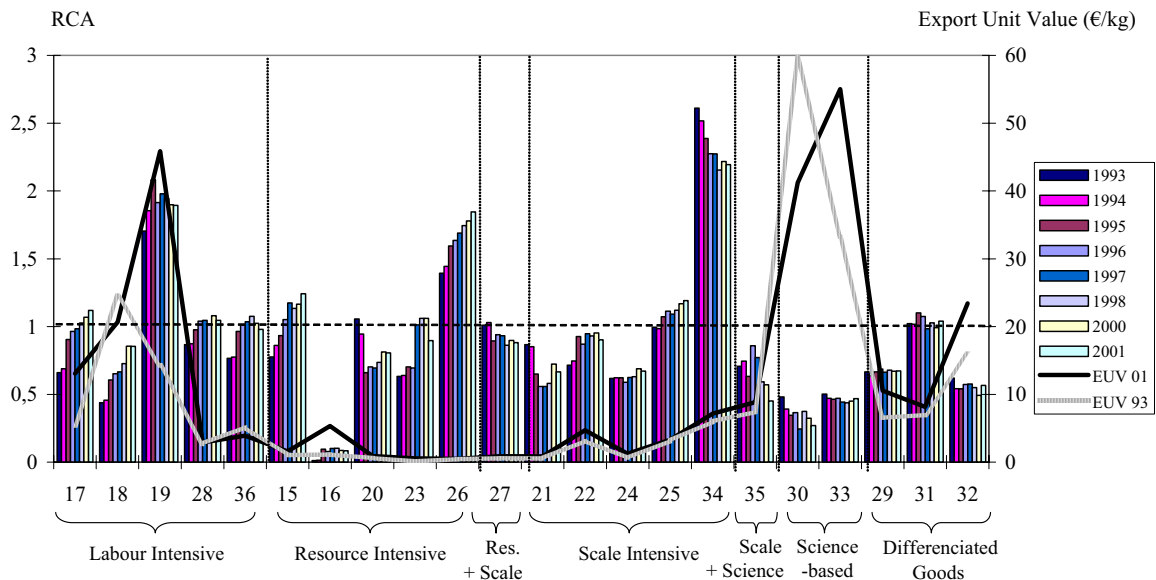
The highest share of manufacturing exports is to be found in motor vehicles (34) with 18% in the year 2001, followed by machinery and equipment (29) with 12% and electrical machinery and apparatus (31) with 11%

Modified RCA-Balassa in Cohesion Countries

Figures 4-7 show the RCA indexes for the four cohesion countries. Spain (figure 4) has a comparative advantage to the EU15 in 8 out of 22 product groups in the year 2001. Although the number of product groups with RCA exceeding one has slightly increased since 1995, there does not seem to be much of a dynamic in the development of Spanish exports to the EU.⁷ Exports are dominated by three lower and middle technology product groups: tanning and dressing of leather (19), non-metallic mineral products (26) and motor vehicles and trailers (34); the latter group is

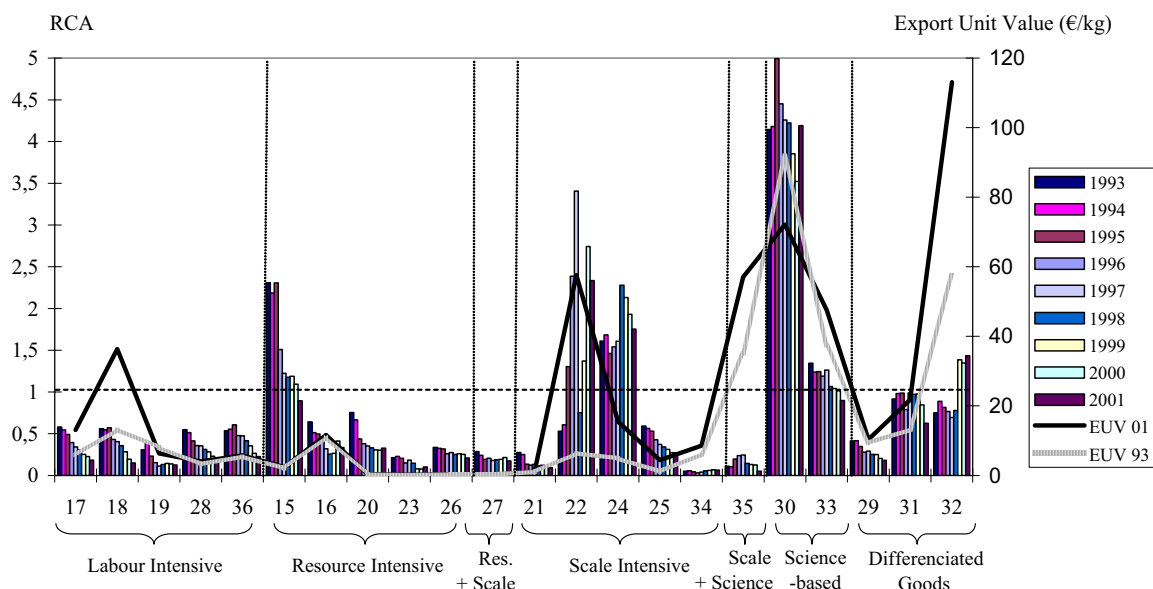
the most important manufacturing export industry, which makes up to 35% of total manufacturing exports to the EU. Each of these three product groups belong to a different OECD category, including labour intensive, resource intensive and scale-intensive production. The only high technology product, in which Spain seems to have a very slight comparative advantage is electrical machinery and apparatus (31). Thus, Spain clearly has specialized in the export of some middle and low technology product groups and has a strong comparative disadvantage in the export of science-based products.

Figure 4: Spain – RCA of exports 1993-2001 and Export Unit Values 1993 and 2001



Nevertheless, science-based products have the highest export unit values with one kg exports of office machinery and computers (30) being worth roughly 60 Euro in 1993 declining to only 40 Euro in 2001; the EUV of one kg of medical and optical instruments' exports is worth 35 Euro in 1993 rising to 55 Euro in 2001. One labour intensive sector also shows rather high figures: the value of 1 kg Spanish leather exports has risen sharply to 45 Euro in 2001. Most of the other product groups' export unit values were below 10 €/kg.

Figure 5: Ireland – RCA of exports 1993-2001 and Export Unit Values 1993 and 2001



In contrast to Spain, Irish exports are dominated by science-based products; especially in the exportation of office machinery and computers (30) Ireland has a very strong comparative advantage compared to the EU15 (figure 5). In addition, the value of science-based exports is much higher than in Spain. 1 kg of office machinery and computers exported from Ireland to the EU15 is worth more than 70 Euro. However, its export unit value has declined from 90 €/kg in 1993. Also concerning trade volumes, office machinery and computers are the most important sector in Irish manufacturing exports to the EU15, as 46% of manufacturing exports to the EU belonged to this product group in the year 2001; followed by chemicals and chemical products (24), which make up roughly one fourth of exports to the EU15. Thus, the scale-intensive product group also plays an important role in Irish foreign trade. Not only in chemicals (24), but also in publishing and printing (22), Ireland has a strong

comparative advantage. These product groups mostly belong to the higher-middle and high technology intensive classes. In the course of the 1990s, two product groups have experienced considerable changes. While in the first half of the 1990s, Irish food and beverages exports had RCAs exceeding unity, their importance decreased considerably towards the end of the sample period. On the contrary, exports in radio, TV and communication equipment (32) have achieved a comparative advantage on the EU15 market in the last years, impressively almost doubling export unit values from 60 €/kg in 1993 up to 110 €/kg in the year 2001. This may explain why the export of these products could gain ground in recent years.

Figure 6: Portugal – RCA of exports 1993-2001 and Export Unit Values 1993 and 2001

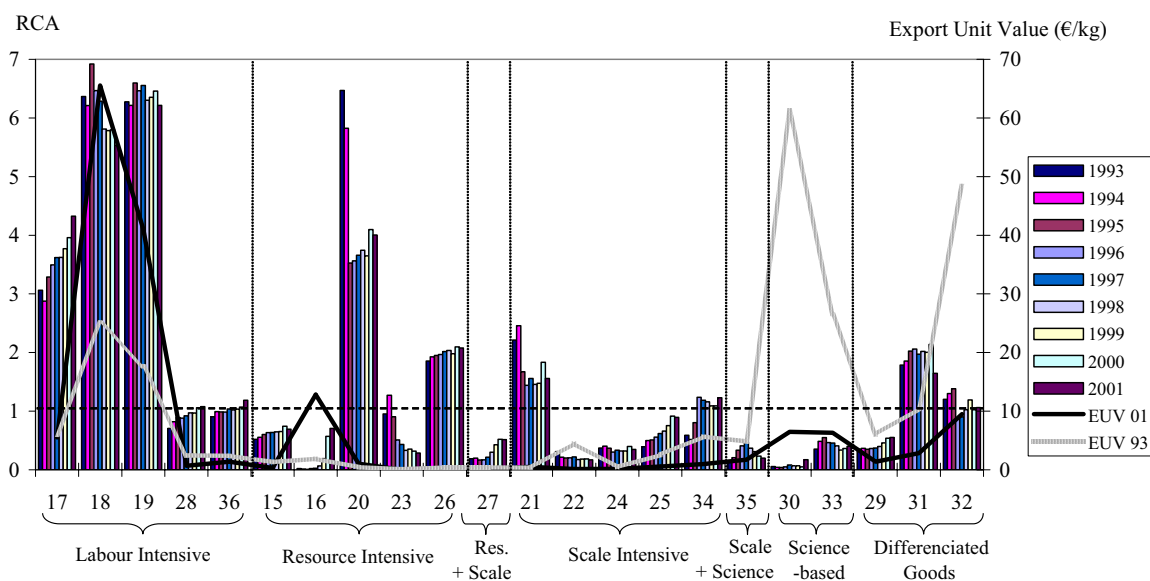
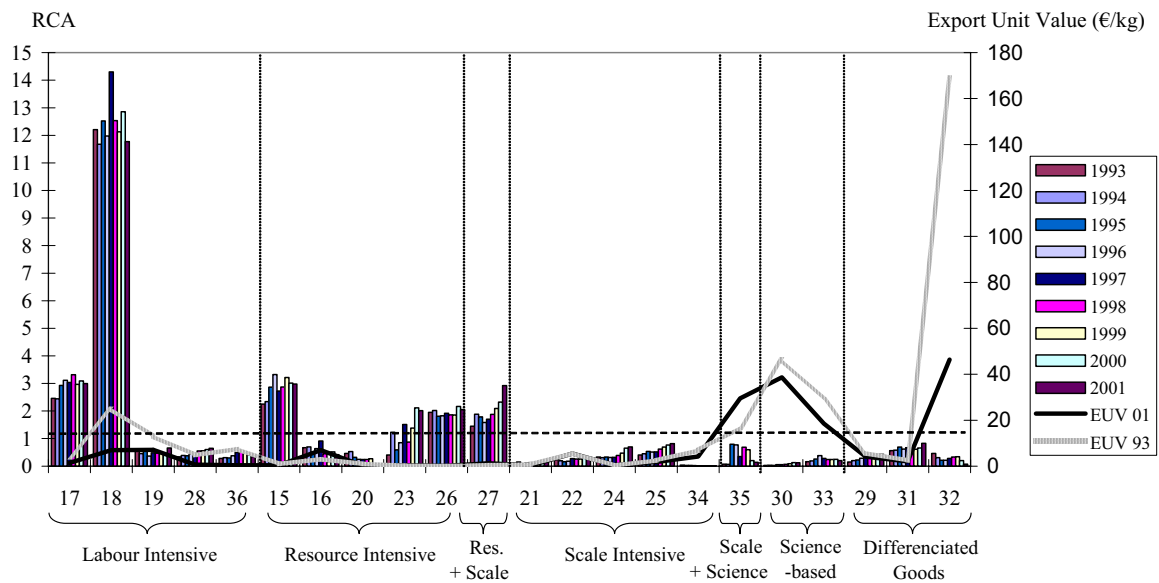


Figure 6 shows that Portuguese export patterns are dominated by sectors with a strong comparative advantage in mostly the low and lower-middle technology product groups. Most RCAs exceeding unity belong to labour intensive industries, such as textiles (17), wearing apparel (18) and leather products (19). These three industries make up more than one fourth of total Portuguese manufacturing exports to the EU15. In the resource intensive industries Portugal is also competitive on the EU15 market with wood and cork products (20) and non-metallic mineral products (26). In most of the scale intensive and science-based product groups there is a clear disadvantage in terms of exports. Some exceptions are pulp and paper products (21),

motor vehicles (34) with an export share of 20% in the year 2001, and electrical machinery and apparatus (31).

However, export unit values have clearly risen in low technology intensive goods from 1993 to 2001, on the contrary, in high technology products, export unit values have sharply declined in the period 1993 to 2001. This may also indicate the increasing importance of low technology exports for the Portuguese economy. 1 kg of wearing apparel exports (18) are worth 65 Euro in 2001 rising from 25 €/kg in 1993, but export unit values of science-based products have declined from 30-60 €/kg in 1993 to merely 8 €/kg in 2001. Most other groups' export unit values remained below 15 €/kg throughout the 1990s.

Figure 7: Greece – RCA of exports 1993-2001 and Export Unit Values 1993 and 2001



The Greek situation is rather puzzling (figure 7). RCAs are dominated by a very high values of comparative advantage in wearing apparel (18), combined with a very low export unit values of 7 Euro, coming down from 25 €/kg in 1993. Compared to the Portuguese 65, the Irish 40, the Hungarian 28, the Czech 25, the Polish 23 and the Spanish 20 €/kg in this product group, it appears that Greece is supplying the EU15 with low quality clothing. These exports are important for the Greek manufacturing industry, as it makes up to one fifth of manufacturing exports the EU15. There are, however, other labour and resource intensive goods, which enjoy a comparative advantage on the EU15 market. These are textiles (17), food and

beverages (15), coke and refined petroleum (23), non-metallic mineral products (26), as well as the resource and scale intensive production of basic metals (27). It is striking that export unit values in all of these categories lay clearly below 10 €/kg. In product groups, where export unit values are considerable higher, such as in science-based and in differentiated goods, Greece has no comparative advantage on the EU15 market at all. Export unit values of radio, TV and communication equipments (32) are strikingly high in 1993 with 170 €/kg, sliding down to only 50 €/kg in 2001. Clearly, in the evolution of Greece's foreign trade to the EU15, it seems to be specialising in low tech industries and often in low quality products.

Competitiveness Among Selected Accession and Cohesion Countries

How does the new competitive landscape of the EU25 look like? Having analysed EU-trade patterns of selected accession and cohesion countries, one major question remains to be answered. Against which cohesion countries will the accession countries compete on the single European market? Will it be the cohesion countries? Will the cohesion countries loose competitive power on the EU market in the course of European integration and EU-Enlargement? Which countries will compete against each other in which types of industries? Since foreign trade competition always concerns at least two countries, we will now turn to a comparative analysis of country results.

From the focus of countries' specialization as suppliers of goods for the EU15 market, one has to proceed in at least two steps to be able to draw conclusions on the competitive landscape of the Single European Market: compare (1) the RCAs and (2) the export unit values.⁸ First of all, two countries face competition on the EU15 market, if both countries have a comparative advantage of exports in this specific industry. Thus, the national share of a product group in total manufacturing exports to the EU15 is higher than the respective share in total intra-EU manufacturing exports. This might be a necessary condition, but is this sufficient for competition? The answer is probably no.

If the export shares of one specific industry in two countries are higher than the respective export share of that industry on the EU market, these countries compete in terms of quantity, but do they compete in terms of quality, too? They still might export goods of completely different quality, which finally do not compete against each other, due to differences in consumers' preferences and to differences concerning purchasing power of consumers. Therefore it seems necessary also to look at the export unit values of the products in order to establish whether they belong to the same quality of goods and thus compete against each other or not. This is done by using the quartiles of the export unit value distribution of the EU15 countries. Hereby

the quartiles of the distribution are assumed to represent the borders between the different quality classes of products: low quality products are situated below the 25%-quartile, lower-middle up to the 50%- quartile, higher-middle up to the 75%-quartile and high quality products are found above the 75%-quartile of the distribution. To simplify: middle quality compiles all values between the 25% and the 75%-quartiles. Accession countries' export unit values are not included in calculating the quartiles, because the main focus lies on the supplier position of the countries on the EU15 market, therefore the point of reference is the quality of intra-EU exports.⁹

From a theoretical perspective one can e.g. distinguish between different quality groups and then find out whether countries show overlaps in one or several of the quality categories. This is particularly interesting if one analyses over time. As regards EUVs in absolute terms, one might have to look at inflation dynamics too, which could distort the picture, as a country's export in a product category might move towards higher EUVs, which, however, could reflect an inflation phenomenon. In the 1990s, however, the inflation rate was rather low in the EU and the OECD countries, respectively, so that one might ignore these inflation aspects.

We will now turn to analysing the competitive structure in the five main product categories of the OECD taxonomy taking into account three accession and four cohesion countries. We compare the situation in the years 1993 and 2001 and analyse the shifts that have taken place.

Labour Intensive Industries

It is striking, that Ireland does not compete in any labour intensive sectors as a supplier on the EU15 market at all. Spain only competes in one product group – leather –, all other countries in at least two or three. The situation in each product group is described in the following.

Textiles (17):

Table 3: Textiles (17) - Low, middle and high quality product suppliers within the EU15 market measured by intra-EU15 export unit values

	Range of Export Unit Values (€/kg) 1993	Range of Export Unit Values (€/kg) 2001	Competitors 1993	Competitors 2001
Low Quality	< 4.7	< 4.9	Greece <i>Czech Republic</i>	Greece
Middle Quality	4.7 - 6.0	4.9 - 8.1		<i>Czech Republic</i> Portugal
High Quality	> 6.0	> 8.1	Portugal	

In both years considered, there are three competitors on the EU15 market, namely Portugal, Greece and the Czech Republic. All three have raised their RCAs from 1993 to 2001, thus strengthening their competitive position on the EU15 market. Greece provides low quality textiles in both years, while the Czech Republic has raised its quality of exports from low to medium, and Portugal has lowered its quality from high to medium. Table 3 summarizes the outcomes; the export unit values shown refer to the EU15 as a benchmark for quality determination.¹⁰

Wearing Apparel (18):

Five countries have a comparative advantage in wearing apparel: Portugal, Greece, Hungary, Poland and the Czech Republic (table 4). From 1993 to 2001 in all three accession countries comparative advantages were considerably reduced, in Hungary and Poland also the quality of exports: all three accession countries now provide the EU15 market with middle quality clothing. Greece has increased its advantage considerably, while reducing export unit values from 25 to 7 €/kg; it now provides the market with low quality wearing apparel. One might say that the accession countries crowded out Greece from middle quality to low quality exports in textiles. High quality textiles are only provided by Portugal in 2001; the rise in Portuguese export unit values from 25 €/kg in 1993 to 65 €/kg in 2001 is remarkable.

Table 4: Wearing Apparel (18) - Low, middle and high quality product suppliers within the EU15 market measured by intra-EU15 export unit values

	Range of Export Unit Values (€/kg) 1993	Range of Export Unit Values (€/kg) 2001	Competitors 1993	Competitors 2001
Low Quality	< 19.3	< 17.9		Greece
Middle Quality	19.3 – 25.0	17.9 – 33.7	Greece Czech Republic	Czech Republic Hungary Poland
High Quality	> 25.0	> 33.7	Portugal Hungary Poland	Portugal

Leather, Luggage, Footwear (19):

The accession countries' market position clearly deteriorated during the 1990s; in the year 2001 only Hungary is left on the market with a comparative advantage in middle quality products. Poland and the Czech Republic do not compete any more.

There is no change in high quality products; Spain and Portugal compete against each other (table 5).

Table 5: Leather (19) - Low, middle and high quality product suppliers within the EU15 market measured by intra-EU15 export unit values

	Range of Export Unit Values (€/kg) 1993	Range of Export Unit Values (€/kg) 2001	Competitors 1993	Competitors 2001
Low Quality	< 10.7	< 13.0	<i>Poland</i> <i>Czech Republic</i>	
Middle Quality	10.7 – 14.0	13.0 – 20.8	<i>Hungary</i>	<i>Hungary</i>
High Quality	> 14.0	> 20.8	Spain Portugal	Spain Portugal

Fabricated Metal Products (28):

Table 6: Fabricated Metal Products (28) - Low, middle and high quality product suppliers within the EU15 market measured by intra-EU15 export unit values

	Range of Export Unit Values (€/kg) 1993	Range of Export Unit Values (€/kg) 2001	Competitors 1993	Competitors 2001
Low Quality	< 2.5	< 2.5	<i>Poland</i> <i>Czech Republic</i>	<i>Poland</i> <i>Czech Republic</i>
Middle Quality	2.5 – 3.1	2.5 – 4.0		
High Quality	> 3.1	> 4.0		

In both years considered, only Poland and the Czech Republic compete against each other with low quality products of roughly 1 - 1.5 €/kg value (table 6).

Furniture (36):

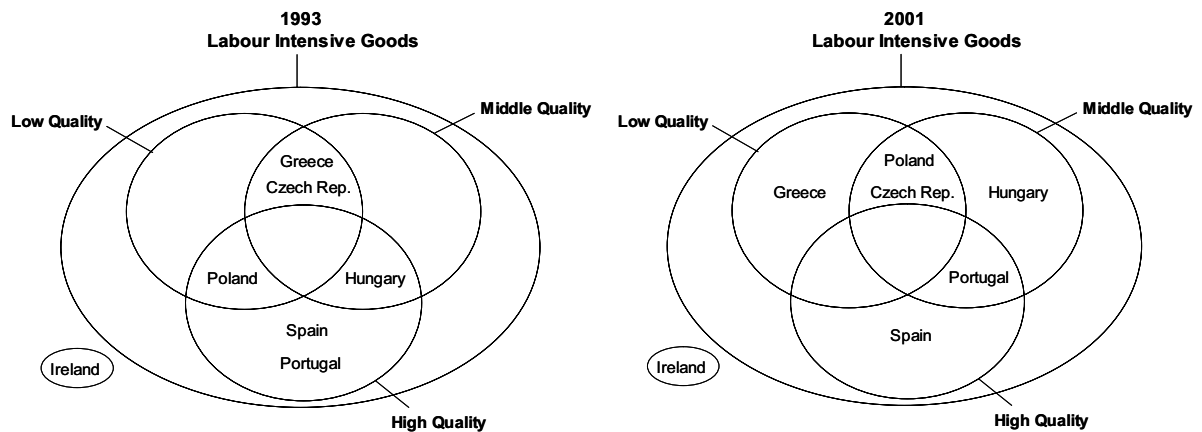
Again, it is only Poland and the Czech Republic which have a comparative advantage. While Poland keeps exporting low quality furniture, the Czech Republic could increase its export unit values considerably and is now providing the EU15 market with middle quality furniture (table 7).

Table 7: Furniture (36) - Low, middle and high quality product suppliers within the EU15 market measured by intra-EU15 export unit values

	Range of Export Unit Values (€/kg) 1993	Range of Export Unit Values (€/kg) 2001	Competitors 1993	Competitors 2001
Low Quality	< 4.5	< 3.5	<i>Poland</i> <i>Czech Republic</i>	<i>Poland</i>
Middle Quality	4.5 – 6.0	3.5 – 6.5		<i>Czech Republic</i>
High Quality	> 6.0	> 6.5		

Figure 8 provides a graphical analysis of the competitive structure in the labour intensive industrial sector as a whole, comparing the years 1993 and 2001.

Figure 8: Structure of Competitiveness within the Labour Intensive Industrial Sectors



To conclude, the competitive position of three countries has not changed: The Czech Republic, Spain and Ireland remain in the same position, whereas the latter is not competing in the labour intensive sectors at all. No country was able to move up the quality ladder from 1993 to 2001. On the contrary, Hungary left the high quality sector and now provides only middle quality goods. Portugal moved from merely high to high and middle quality, Greece from middle and low quality to merely low quality.

Poland combines low and middle quality in 2001, while it used to combine low and high quality in 1993. Generally, the accession and the cohesion countries are rather extensively present on the EU15 market with labour intensive products. Furthermore, these countries seem to specialize more and more on the middle and lower end of the quality ladder, giving space to other suppliers of higher quality labour intensive goods.

Resource Intensive Industries

For the sake of simplicity, the two product groups, which belong to two product categories each, 27 as resource + scale intensive and 35 as scale + science intensive, have been put to either category. Therefore basic metals (27) are included in the resource intensive industries.

While Ireland and Hungary used to compete in resource intensive sectors in 1993, they did not compete any more in 2001. Ireland and Hungary have clearly moved away from exporting resource intensive goods to the EU15. Spain again only competes in one product group – non-metallic mineral products (27)-, the other countries in at least two. Greece is the competitor most often represented within the resource intensive industries.

Tobacco (16):

Neither the cohesion, nor the three accession countries have a comparative advantage in exporting tobacco. This is probably due to the geographical location and the climate of all these countries, which does not favour the cultivation of tobacco.

Food and Beverages (15):

While Ireland used to be strongly present in this market in the year 1993, it does not have a relative comparative advantage any more in 2001. Greece is the only remaining competitor moving from middle to low quality products (table 8).

Table 8: Food and Beverages (15) - Low, middle and high quality product suppliers within the EU15 market measured by intra-EU15 export unit values

	Range of Export Unit Values (€/kg) 1993	Range of Export Unit Values (€/kg) 2001	Competitors 1993	Competitors 2001
Low Quality	< 0.5	< 0.7		Greece
Middle Quality	0.5 – 1.0	0.7 – 1.5	Greece	
High Quality	> 1.0	> 1.5	Ireland	

Wood and Cork (20)

In 1993 Poland and the Czech Republic were competing against each other in low quality wooden exports, Hungary and Portugal in medium quality. Until 2001 Hungary exited the market, Portugal upgraded from middle to high quality products, and Poland downgraded from low to middle quality. Thus, there does not seem to be tough competition among these countries any more (table 9).

Table 9: Wood and Cork (20) - Low, middle and high quality product suppliers within the EU15 market measured by intra-EU15 export unit values

	Range of Export Unit Values (€/kg) 1993	Range of Export Unit Values (€/kg) 2001	Competitors 1993	Competitors 2001
Low Quality	< 0.4	< 0.4	<i>Poland</i> <i>Czech Republic</i>	<i>Czech Republic</i>
Middle Quality	0.4 – 0.7	0.4 – 0.8	<i>Hungary</i> <i>Portugal</i>	<i>Poland</i>
High Quality	> 0.7	> 0.8		<i>Portugal</i>

Coke, Refined Petroleum, Nuclear Fuel (23)

The only competitor in this market is Greece, who moved from exporting middle quality products in 1993 to high quality in 2001 (table 10).

Table 10: Coke, Refined Petroleum and Nuclear Fuel (23) - Low, middle and high quality product suppliers within the EU15 market measured by intra-EU15 export unit values

	Range of Export Unit Values (€/kg) 1993	Range of Export Unit Values (€/kg) 2001	Competitors 1993	Competitors 2001
Low Quality	< 0.1	< 0.2		
Middle Quality	0.1 – 0.2	0.2– 0.3	<i>Greece</i>	
High Quality	> 0.2	> 0.3		<i>Greece</i>

Other non-metallic mineral products (26)

Table 11: Other non-metallic mineral products (26) - Low, middle and high quality product suppliers within the EU15 market measured by intra-EU15 export unit values

	Range of Export Unit Values (€/kg) 1993	Range of Export Unit Values (€/kg) 2001	Competitors 1993	Competitors 2001
Low Quality	< 0.3	< 0.3	Greece <i>Czech Republic</i> <i>Poland</i>	Greece Portugal
Middle Quality	0.3 – 0.5	0.3– 0.7	Portugal Spain	<i>Poland</i> <i>Czech Republic</i> Spain
High Quality	> 0.5	> 0.7		

Five of seven countries compete in this product group – with the exception of Ireland and Hungary. Greece remains in the position of supplying low quality, and Spain as a middle quality exporter. The accession countries moved up the quality ladder with Poland and the Czech Republic changing from low quality supplier in 1993 to middle quality in 2001, while Portugal changed from a middle to low quality supplier. High quality non-metallic products are still exported to the EU15 by other groups outside the accession and the cohesion countries (table 11).

Basic Metals (27):

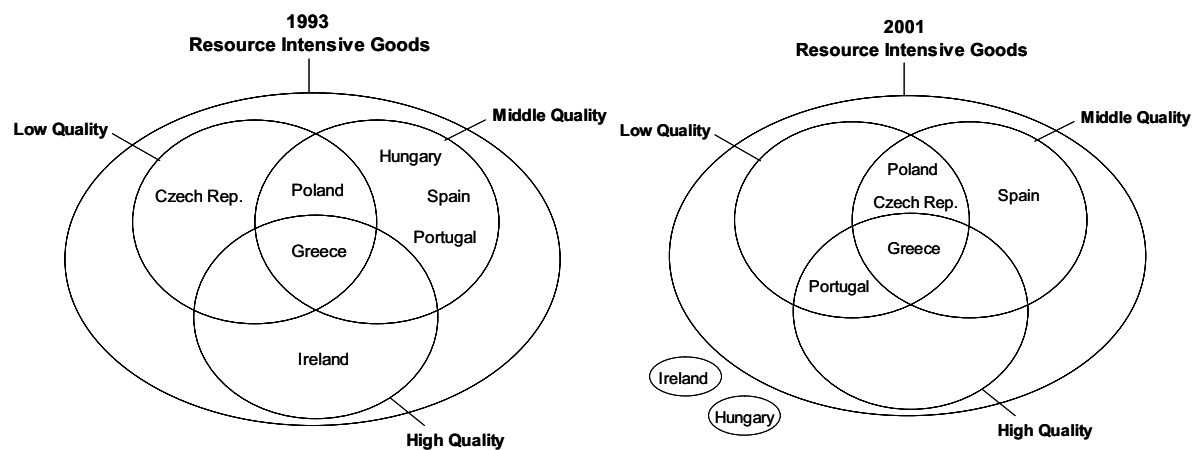
The Czech Republic has reduced its RCAs to such an extent, that it did not have a relative comparative advantage any more in the year 2001. It had competed against Greece in the low quality product group; however, Greece has upgraded its quality and supplied high quality basic metals to the EU15 in 2001. Polish exports belonged to the low quality group in the year 2001, whereas they were middle quality in 1993 (table 12).

Table 12: Basic Metals (27) - Low, middle and high quality product suppliers within the EU15 market measured by intra-EU15 export unit values

	Range of Export Unit Values (€/kg) 1993	Range of Export Unit Values (€/kg) 2001	Competitors 1993	Competitors 2001
Low Quality	< 0.4	< 0.6	Greece <i>Czech Republic</i>	<i>Poland</i>
Middle Quality	0.4 – 0.5	0.6– 0.8	<i>Poland</i>	
High Quality	> 0.5	> 0.8		Greece

Figure 9 provides a graphical analysis of the competitive structure in the resource intensive industrial sectors as a whole comparing the years 1993 and 2001. Two countries completely exited competition in resource intensive industries: Ireland and Hungary. Three countries remained as suppliers in the same type of quality: Poland, Spain, and Greece. Thus two countries altered their competitive position in the EU15 market. The Czech Republic has partially upgraded and now provides medium quality goods in addition to low quality; this is especially the case for non-metallic mineral products. Portugal has down- and upgraded at the same time and is now supplying the EU15 with low and high quality: Portuguese export quality of non-metallic mineral products moved from high to low quality, while wooden and cork exports counted as middle quality in 1993 and upgraded to high quality by 2001. The task of finding an overall trend of development within the resource intensive sectors seems to be too challenging.

Figure 9: Structure of Competitiveness within the Resource Intensive Industrial Sectors



Scale Intensive Industries

Other transport equipment (35) is included in here, as airspace is the only item which belongs to science-based goods, while most of the other transport equipment is rather scale-intensive in production. The situation in each product group is described in the following.

***Pulp and Paper* (21):**

Table 13: Pulp and Paper (21) - Low, middle and high quality product suppliers within the EU15 market measured by intra-EU15 export unit values

	Range of Export Unit Values (€/kg) 1993	Range of Export Unit Values (€/kg) 2001	Competitors 1993	Competitors 2001
Low Quality	< 0.7	< 0.7	Portugal	Portugal
Middle Quality	0.7 – 0.9	0.7– 0.9		
High Quality	> 0.9	> 0.9		

In both years, the only country with a relative comparative advantage is Portugal. It supplies the EU15 with low quality pulp and paper products (table 13).

***Publishing and Printing* (22):**

It is one of very few product groups, where export unit values of the EU15 declined between 1993 and 2001. Furthermore, in 1993 no country considered in this analysis had a relative comparative advantage; in 2001 the Czech Republic and Ireland entered the market. Ireland's export unit value of almost 58 €/kg is extraordinarily high, particularly if one considers that the second highest value, offered by the UK, is 10 €/kg (table 14).

Table 14: Publishing and Printing (22) - Low, middle and high quality product suppliers within the EU15 market measured by intra-EU15 export unit values

	Range of Export Unit Values (€/kg) 1993	Range of Export Unit Values (€/kg) 2001	Competitors 1993	Competitors 2001
Low Quality	< 3.8	< 2.6		<i>Czech Republic</i>
Middle Quality	3.8 – 5.9	2.6– 5.2		
High Quality	> 5.9	> 5.2		Ireland

Chemicals and Chemical Products (24):

Table 15: Chemicals (24) - Low, middle and high quality product suppliers within the EU15 market measured by intra-EU15 export unit values

	Range of Export Unit Values (€/kg) 1993	Range of Export Unit Values (€/kg) 2001	Competitors 1993	Competitors 2001
Low Quality	< 0.7	< 1.0		
Middle Quality	0.7 – 1.3	1.0 – 2.2		
High Quality	> 1.3	> 2.2	Ireland	Ireland

Ireland alone appears as a competitor on the chemicals market. It supplies high quality products. Again, it strikes out with a remarkable increase in export unit values, which rose from 5 €/kg in 1993 to more than 15 €/kg in 2001. The latter is an extreme outlier, since the second highest export unit value offered by Luxembourg amounts for only 4 €/kg (table 15).

Rubber and Plastic Products (25):

While no country had a comparative advantage in 1993, the Czech Republic and Spain compete against each other with middle quality products in 2001 (table 16).

Table 16: Rubber and Plastic (25) - Low, middle and high quality product suppliers within the EU15 market measured by intra-EU15 export unit values

	Range of Export Unit Values (€/kg) 1993	Range of Export Unit Values (€/kg) 2001	Competitors 1993	Competitors 2001
Low Quality	< 2.5	< 1.9		
Middle Quality	2.5 – 3.1	1.9– 3.8		<i>Czech Republic</i> Spain
High Quality	> 3.1	> 3.8		

Motor Vehicles and Trailers (34):

Table 17: Motor Vehicles and Trailers (34) - Low, middle and high quality product suppliers within the EU15 market measured by intra-EU15 export unit values

	Range of Export Unit Values (€/kg) 1993	Range of Export Unit Values (€/kg) 2001	Competitors 1993	Competitors 2001
Low Quality	< 6.0	< 6.5		<i>Poland</i> <i>Czech Republic</i> Portugal
Middle Quality	6.0 – 7.4	6.5– 7.8	Spain	Spain
High Quality	> 7.4	> 7.8		<i>Hungary</i>

In this product group the accession and the cohesion countries have gained a lot of ground in the course of the 1990s. While only Spain was competing in the market in 1993, Poland, the Czech Republic and Portugal entered the market with low quality products and Hungary even with high quality motor vehicles and trailers. Spain remains supplying medium quality to the EU15 countries in both years (table 17).

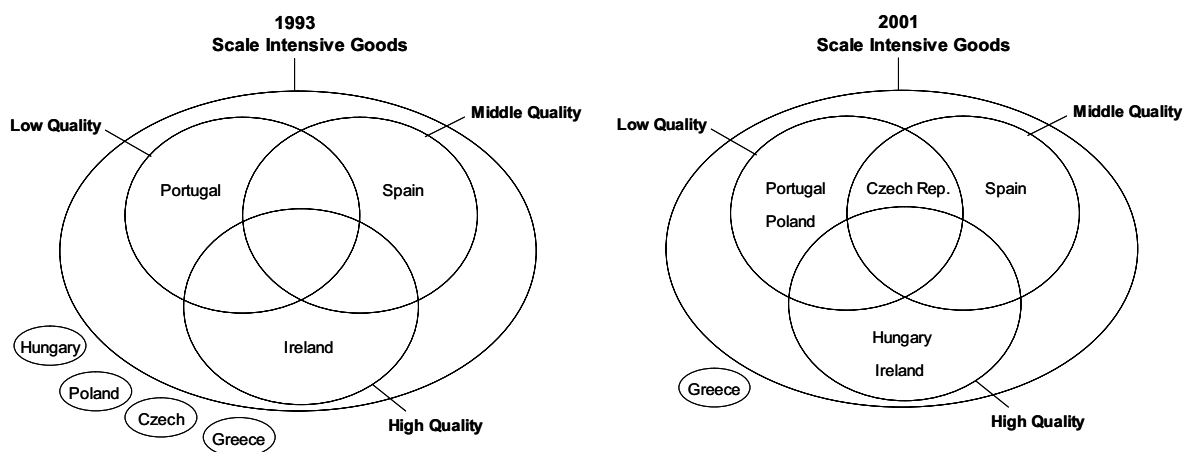
Other Transport Equipment (35):

This group has been included in the scale intensive category, although some of its products are rather science-based. However, it is not of significance for this analysis, as neither accession nor cohesion countries have an RCI exceeding one in this group.

Figure 10 provides a graphical analysis of the competitive structure in the scale intensive industrial sectors as a whole comparing the years 1993 and 2001.

In particular the accession countries managed to place themselves on the scale-intensive markets in the second half of the 1990s, although none of them had a comparative advantage in any scale intensive product group in the first half of the 1990s. Hungary is now a new competitor for Ireland in the high quality segment, the Czech Republic supplies middle and low quality products, and Poland is a new competitor for Portugal in the low quality segment. Greece is still not represented in any scale-intensive product group.

Figure 10: Structure of Competitiveness within the Scale Intensive Industrial Sectors



Science-Based Industries

Office Machinery and Computers (30):

In this sector there was a global fall of absolute prices in the 1990s due to enormous technological progress, which might impair quality ladder analysis. However, we assume that relative quality groupings are hardly affected by this phenomenon.

In 1993 Ireland is the only country with a relative comparative advantage on the EU15 market for office machinery and computers. It provided high quality products. Until 2001 it reduced the export unit values to middle quality. Also Hungary entered the market with low quality products (table 18).

Table 18: Office Machinery and Computers (30) - Low, middle and high quality product suppliers within the EU15 market measured by intra-EU15 export unit values

	Range of Export Unit Values (€/kg) 1993	Range of Export Unit Values (€/kg) 2001	Competitors 1993	Competitors 2001
Low Quality	< 53.6	< 43.1		<i>Hungary</i>
Middle Quality	53.6 – 77.8	43.1– 84.9		Ireland
High Quality	> 77.8	> 84.9	Ireland	

Medical and Optical Instruments (33):

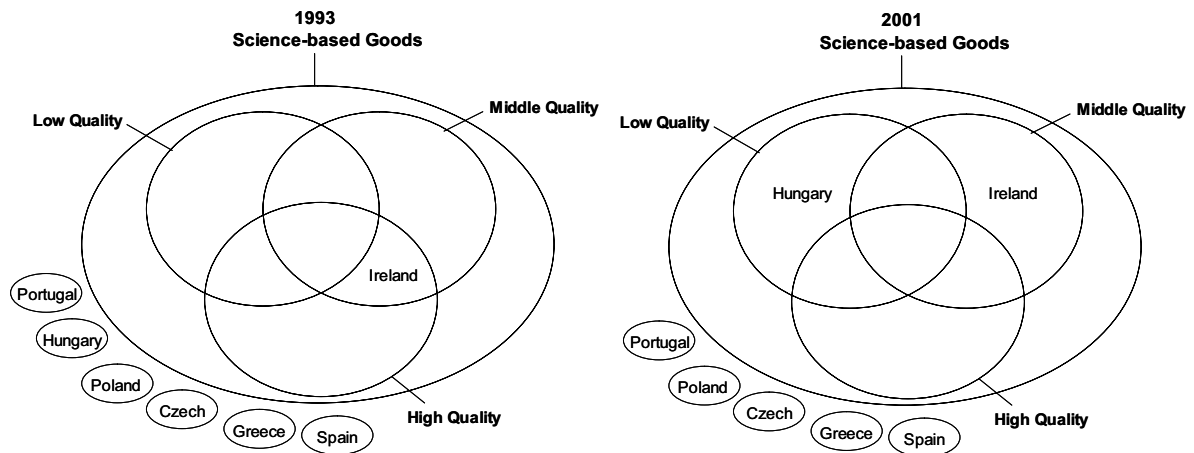
Table 19: Medical and Optical Instruments (33) - Low, middle and high quality product suppliers within the EU15 market measured by intra-EU15 export unit values

	Range of Export Unit Values (€/kg) 1993	Range of Export Unit Values (€/kg) 2001	Competitors 1993	Competitors 2001
Low Quality	< 28.8	< 24.2		
Middle Quality	28.8 – 54.0	24.2– 56.2	Ireland	
High Quality	> 54.0	> 56.2		

Participation in this sector is very scarce. Only Ireland used to have a relative comparative advantage in middle quality products in 1993, which did not exist any more in 2001 (table 19).

Figure 11 provides a graphical analysis of the competitive structure in the science-based industrial sectors as a whole comparing the years 1993 and 2001.

Figure 11: Structure of Competitiveness within the Science-based Industrial Sectors



It is striking that hardly any countries compete within the science-based sectors. In 1993 only Ireland with middle and high quality goods; by 2001 Ireland had downgraded to only middle quality goods, and Hungary entered with low quality goods. All the other countries do not have a comparative advantage at all.

Differentiated Goods

Machinery and Equipment (29):

Few words are required to describe the competitive situation in machinery and equipment. While none of the countries considered competed in 1993, only the Czech Republic managed to enter the market and to offer low quality products in 2001 (table 20).

Table 20: Machinery and Equipment (29) - Low, middle and high quality product suppliers within the EU15 market measured by intra-EU15 export unit values

	Range of Export Unit Values (€/kg) 1993	Range of Export Unit Values (€/kg) 2001	Competitors 1993	Competitors 2001
Low Quality	< 6.5	< 6.9		<i>Czech Republic</i>
Middle Quality	6.5 – 9.4	6.9 – 10.2		
High Quality	> 9.4	> 10.2		

Electrical Machinery and Apparatus (31):

This is the only product group within the differentiated goods, where participation is rather lively among the accession and the cohesion countries. Hungary, the Czech Republic and Portugal have a comparative advantage in both years 1993 and 2001, however, only Hungary remains in the same product quality. The Czech Republic and Portugal swap positions: The Czech Republic succeeds in moving from low to middle quality, Portugal, on the other hand, slides down from middle to low quality products. None of the countries considered compete in high quality (table 21).

Table 21: Electrical Machinery and Apparatus (31) - Low, middle and high quality product suppliers within the EU15 market measured by intra-EU15 export unit values

	Range of Export Unit Values (€/kg) 1993	Range of Export Unit Values (€/kg) 2001	Competitors 1993	Competitors 2001
Low Quality	< 7.3	< 5.8	<i>Czech Republic</i>	<i>Poland</i> <i>Portugal</i>
Middle Quality	7.3 – 10.7	5.8 – 12.7	<i>Portugal</i> <i>Hungary</i>	<i>Hungary</i> <i>Czech Republic</i>
High Quality	> 10.7	> 12.7		

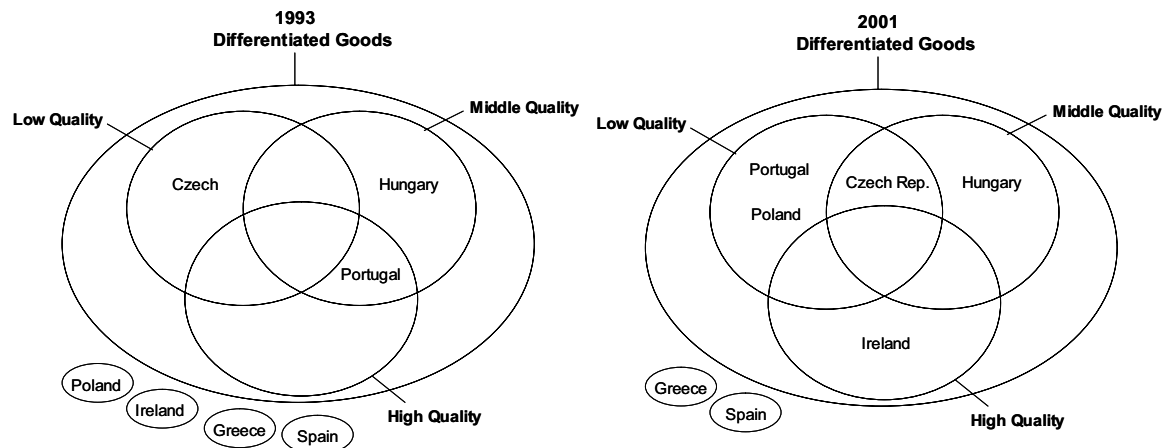
Radio, Television and Communications (32):

Although there are only a small number of countries in the market, there is relatively considerable movement within this product group. No country competes in both years 1993 and 2001. While Portugal supplied high quality goods in 1993, it did not compete any more in 2001. Instead, Ireland takes the position of supplying high quality and Hungary enters competition with middle quality. However, there is no competition among the accession and the cohesion countries, however, possibly with other European Union countries (table 22).

Table 22: Radio, Television and Communications (32) - Low, middle and high quality product suppliers within the EU15 market measured by intra-EU15 export unit values

	Range of Export Unit Values (€/kg) 1993	Range of Export Unit Values (€/kg) 2001	Competitors 1993	Competitors 2001
Low Quality	< 22.1	< 28.0		
Middle Quality	22.1 – 42.4	28.0 – 91.9		<i>Hungary</i>
High Quality	> 42.4	> 91.9	Portugal	Ireland

Figure 12: Structure of Competitiveness within the sectors of Differentiated Goods



Finally, figure 12 summarizes the competitive structure of differentiated goods in both years. It seems that accession and cohesion countries gained competitive power in the sectors of differentiated goods in the course of the 1990s. While four countries were outsiders in 1993, namely Poland, Ireland, Greece and Spain, only Greece and Spain are left outside in 2001. Merely Hungary remains in the same sectors in both years. The Czech Republic upgrades from only low to low and middle quality. Portugal and Poland provide low quality goods in 2001. Ireland enters the market with high quality products, thus, accession and cohesion countries are represented all along the quality ladder in 2001.

Summary and Conclusions

We can summarize the results from two points of view. Firstly, we can compare each country's position in all industries throughout the 1990s. The Czech Republic has never had a comparative advantage with a high quality product. Poland seems to have downgraded its export product quality on the EU15 market: while in the year 1993 it supplied the EU15 with all three types of quality goods, it did not have a relative comparative advantage with high quality products any more in 2001 – whether this implies concerns for economic policy is difficult to say. Thus, the Czech Republic and Poland seem to specialize in the EU15 market in low and middle quality products. Hungary, on the other hand, started off with middle and high quality products and by 2001 it had also entered the market of low quality goods. Thus, now it competes along the entire length of the quality ladder.

On the contrary, Spain and Ireland have never had a relative comparative advantage with low quality products. Thus, Spain and Ireland seem to specialise in the EU15 market as suppliers of middle and higher quality goods. The other countries, Portugal and Greece, spread their comparative advantages across the range of low, middle and high quality products.

From this point of view, Poland and the Czech Republic are competitors mainly of Portugal and Greece in the lower and middle quality goods, but Hungary is also a potential competitor. In addition, Hungary faces competition from Spain and Ireland in higher quality products.

Secondly, we can analyse each product category separately. In labour and resource intensive industries there is an intensive market participation of accession and cohesion countries. With the exception of Spain in labour intensive goods, these countries specialize in medium and lower quality goods, scarcely competing in high quality. Ireland does not participate much in the market for both labour and resource intensive goods, whereas Hungary's only field of non-participation is in resource intensive goods. In scale intensive product groups, the accession countries gain more and more ground in the 1990s and subsequently, mostly again in low and medium quality. Only Hungary is able to compete with high quality goods against Ireland. Greece lacks sufficient resources, is therefore not competing in resource intensive sectors at all. Accession and cohesion countries are very weak in competing in science-based industries. Most countries do not compete in that market segment at all, only Ireland and later on Hungary were able to enter, however not with high quality products. The situation looks much better for the differentiated goods, where by the end of the 1990s all accession countries were competing. However, Greece and Spain remain on the outside in all cases. Again, the supply of high quality goods is mainly left to other European countries, only Ireland provides some high quality goods.

The comparative analysis of specialization within the EU market with a special focus on cohesion and accession countries is rather complex to put it in a nutshell. However, there appear to be some findings, which are rather robust for the 1990s:

- Accession countries are gaining competitive power in scale intensive industries.
- Most accession and cohesion countries have a strong disadvantage in science-based industries.
- Ireland competes neither in labour intensive, nor in resource intensive industries.
- Hungary does not compete in resource intensive industries.
- Spain does not compete in differentiated goods.
- The Czech Republic and Poland tend to supply low and middle quality products and tend to compete against Greece and Portugal.
- Hungary, in addition, supplies higher quality goods competing against Spain and Ireland in some product groups.
- High quality goods are, however, mostly not supplied by accession and cohesion countries on the EU15 market.

To gain a complete picture of the competitive structure of suppliers on the EU15 market, one might include other European countries and some non-European suppliers of the EU market, as well. Due to the aim of this paper to analyse the competition, with which accession countries will be confronted on the EU market, the approach of looking at the cohesion countries is appropriate. We find that both the accession and the cohesion countries compete mostly within the same product categories with lower and medium quality goods. Thus, higher quality products, and especially science-based products of all qualities, are still supplied to the EU15 by countries other than the accession and the cohesion countries.

Annex:

NACE rev. 1.1 Classification at the 1, 2 and 3-digit level (in parts)

D	Manufacturing
15	Manufacture of food products and beverages
16	Manufacture of tobacco products
17	Manufacture of textiles
18	Manufacture of wearing apparel; dressing and dyeing of fur
19	Tanning and dressing of leather, manufacture of luggage, handbags, saddlery, harness and footwear
20	Manufacture of wood and of products of wood and cork, except furniture;
21	Manufacture of pulp, paper and paper products
22	Publishing, printing and reproduction of recorded media
23	Manufacture of coke, refined petroleum products and nuclear fuel
24	Manufacture of chemicals and chemical products
25	Manufacture of rubber and plastic products
26	Manufacture of other non-metallic mineral products
27	Manufacture of basic metals
28	Manufacture of fabricated metal products, except machinery and equipment
29	Manufacture of machinery and equipment n.e.c.
30	Manufacture of office machinery and computers
31	Manufacture of electrical machinery and apparatus n.e.c.
32	Manufacture of radio, television and communication equipment and apparatus
33	Manufacture of medical, precision and optical instruments, watches and clocks
34	Manufacture of motor vehicles, trailers and semi-trailers
35	Manufacture of other transport equipment
36	Manufacture of furniture, manufacturing n.e.c.
37	Recycling

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¹ For further explanation see also De Benedictis and Tajoli (2003).

² See e.g. Dalum and Villumsen (1996) and Laursen (1998).

³ Following description is according to OECD (1987) pp: 274 ff.

⁴ Data is extracted from the COMEX database of the European Commission.

⁵ See also Kaminski (1999).

⁶ See also Dyker and Kubelias (2000).

⁷ This is in line with some empirical analyses that emphasize the fact that national export specialization within the OECD countries is rather sticky. Thus, the speed of convergence of export structures is low. See Dalum and Villumsen (1996) as well as Laursen and Drejer (1997).

⁸ If needed, one could in addition take a look at the importance of specific sectors and industries for the economy as a whole, by for instance analysing the sectoral export shares to GDP.

⁹ The distribution of the EU15 export unit values for the year 1993 does not include all 15 countries: due to data availability, Sweden, Austria and Finland had to be excluded.

¹⁰ For a better visualization of the results, accession countries will be italicised in the upcoming tables.