COMPETITIVENESS AND AGRI-FOOD TRADE:
AN EMPIRICAL ANALYSIS IN THE EUROPEAN UNION

Alessandro Banterle
Dipartimento di Economia e Politica Agraria, Agro-alimentare e Ambientale
Università degli Studi di Milano – via Celoria 2 – 20133 Milano (Italy)
alessandro.banterle@unimi.it

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Abstract

The purpose of this paper is to analyse the competitive performance of the EU countries for food trade in the European market during the period 1990-2003. To assess such performance the analysis considers comparative advantage and evaluates three indices: export market share (*EMS*), revealed comparative advantage (*RCA*) and net export index (*NEI*). These three indices are found to be high in the Netherlands, France, Belgium and Spain, but only Spain has shown significant competitive performance during the last decade. Also the competitive performance of Germany and Italy is good, although their *RCA* and *NEI* values are low. Among the other countries the trend in the indices for Austria, Portugal and Sweden is on the increase.

1. Introduction

In the last fifteen years important economic changes have affected the competitive situation of the food sector in the European Union; such changes include the completion of a single European Market, globalisation, concentration in the retail sector, and evolution in the patterns of demand for food safety and quality (Traill, 1998). In addition to these changes, the recent introduction of the Euro in twelve European countries has led to modifications in the trading conditions. It was these meaningful factors that prompted the present analysis of the evolution of competitiveness of EU countries, focusing on the Common market food trade which represents an international free trade area.

The purpose of this paper is to analyse the competitive performance of EU countries for the food sector through the use of three indices measuring trade in the European market, allowing a comparison of the trends over the 1990-2003 period.

The economic literature cites several definitions for competitiveness. Indeed the concept of competitiveness is inherent to the analysed economic context and relates to three different levels, namely individual company, individual sector and whole economy, as well as to both the domestic and the international markets. Pitts and Lagnevik (1998) defined competitiveness of industry as "the ability to profitably gain and maintain market share in domestic and/or foreign markets". A similar definition is given by Drescher and Maurer (1999), who analyse competitiveness as the ability of firms or industry to protect and improve their market position with respect to the other competitors, and to adapt market strategies to structural changes. Another definition, in accordance with the previous one, defines competitiveness as the "sustained ability of a nation's industry or firms to compete with foreign counterparts in foreign markets as well as in domestic markets under conditions of free trade" (Kim and Marion, 1997).

The three levels of competitiveness (company, sector and country) are not necessarily inter-linked as the competitiveness of a whole economy cannot be connected to the rise or fall of a particular sector or a particular company. Following Lall and Albaladejo (2004), "declining US competitiveness in textiles does not mean that the US economy is less competitive: the decline reflects its changing endowments and is a necessary shift to new areas of comparative advantage" and for Krugman (1994) "competitiveness is a meaningless word when applied to national economies".

Another point of view can be seen in the approach of Porter (1990); this approach focuses on competitive advantage as the source of competitiveness. The creation and persistence of competitive advantage rises at the company level, and can also be reflected at industry and national levels. Porter (1990) claims that four broad attributes lead to the creation of successful industrial cluster: factors conditions; demand conditions; related and supporting industries; firm strategies, structure and rivalry (Pitts and Lagnevik, 1998; Kim and Marion, 1997).

To characterise the competitiveness of a particular industry such as the food sector it is meaningful to consider economic-theory references and, consequently, the sources of competitiveness concept. The main theory references for competitiveness are based on comparative advantage and competitive advantage.

The framework of comparative advantage is the Heckscher and Ohlin theory: in international trade, resources endowment is a key factor for comparative advantage. Thus, when exporting products a country will specialise in sectors that utilise the most abundant resources and those of low cost. The source of competitiveness is therefore linked to comparative advantage, and thus to resources endowment. The competitiveness assessment is carried out by indices that analyse the competitive performance of a particular sector to point out the comparative advantage.

The framework of competitive advantage is the Porter approach and the four attributes that determine industry competitiveness. From this point of view, the source of competitiveness is linked to the creation of factors of advantage, not to static resource endowments. Competitiveness evaluation is achieved by applying the four attributes in an analysis of a particular industry.

2. Methodological issues

To assess the competitive performance of food products in EU countries over the last fifteen years the present analysis refers to the approach of comparative advantage, evaluating indices calculated on trade data. The indices utilised are the following:
-   export market share (*EMS*),
-   revealed comparative advantage of Balassa (*RCA*),
-   net export index (*NEI*).

The export market share is expressed as:

$$EMS_{ij} = \frac{X_{ij}}{\sum_{j=1}^{n} X_{ij}} * 100 \tag{1}$$

where, X_{ij} denotes exports of sector i from country j and n denotes the number of countries analysed.

The *EMS* index assesses the export share of a country in percentages relative to the exports of a group of countries for a specific sector. The range of the index values goes from zero to 100: in the case of zero, the country has no exports for that sector while for the case of 100 the country is the only exporter. Therefore, the *EMS* outlines the competitive position of a country in the international market for a sector.

The second index is the revealed comparative advantage of Balassa (1965). This index represents a solution to the difficulties in testing the Heckscher and Ohlin theory, and in evaluating comparative advantage for the measuring of factors that influence this concept. According to Balassa comparative advantage would be revealed through an analysis of trade patterns that reflect both relative costs and differences in non price factors (Havrila and Gunawardana, 2003; Lee, 1995). Thus, this index measures the revealed comparative advantage of a country in the trade of a specific product or sector, rather than analysing the source of comparative advantage (Havrila and Gunawardana, 2003). The *RCA* index is the share of the international market for a product or sector of a country divided by its

share of the international market for all products (Pitts and Lagnevik, 1998). Formally the index is expressed as:

$$RCA_{ij} = \frac{X_{ij} / \sum_{j=1}^{n} X_{ij}}{\sum_{i=1}^{m} X_{ij} / \sum_{i=1}^{m} \sum_{j=1}^{n} X_{ij}} * 100 \qquad (2)$$

where, X_{ij} denotes exports of sector i from country j, n denotes the number of countries analysed and m denotes the total number of sectors.

The *RCA* index shows the relation between the export market share of a country for a product or sector and its export market share for total trade in a set of countries. The results of the index can be more or less than 100: a value of more than 100 outlines a country's export market share for a sector as being higher than the export market share for total trade. In this case the country is specialised in exports for that specific sector. Thus, in the context of a country's economic system, that sector is competitive, compared to other sectors, and comparative advantage is revealed due to low relative costs and differences in non price factors. On the other hand, if the value is less than 100 the country is not specialised in that sector and no comparative advantage is revealed.

However, the *RCA* index is affected by the country's total exports, that are connected to the country's economic dimension and its orientation to export. For this reason the same export market share for a sector leads to different *RCA* values if the export market share for total trade is big (lower *RCA* value) or small (higher *RCA* value). Therefore, for industry analysis across countries, Pitts and Lagnevik (1998) suggest that the *RCA* trends be compared over a period. Havrila and Gunawardana (2003) underline three different interpretations of the *RCA* values: dichotomous, ordinal and cardinal. In the dichotomous interpretation the *RCA* is applied to check whether there is a comparative advantage in sector or not; in the ordinal interpretation the *RCA* is applied to rank sectors or countries in terms of comparative advantage; in the cardinal interpretation the *RCA* is applied to measure the dimension of comparative advantage. Furthermore, the *RCA* index, that gives an evaluation of the successful or unsuccessful sectors in competitive terms, can be used for a whole sector such as the food sector or for small sub-sectors.

As the *EMS* and the *RCA* are calculated only on exports data, a third index, the net export index, is calculated in this analysis to see whether imports affect competitive performance or not, considering that in the intra-industry trade situation imports can affect competitive position (Pitts and Lagnevik, 1998). This calculated index takes into account the exports of a country's product or sector minus the imports divided by exports plus imports. The index is formally expressed as:

$$NEI_{ij} = \frac{X_{ij} - M_{ij}}{X_{ij} + M_{ij}} \qquad (3)$$

where, X_{ij} denotes exports of sector i from country j, M_{ij} denotes imports of sector i for country j.

The values range from –1 for imports only, to 1 for exports only; if the index is 0 (zero) the exports and imports have the same level. Thus, a negative value indicates that imports are more important, while a positive value shows the importance of exports.

The data source for the study was the COMEXT data base of Eurostat. The figures for the exports and imports of agri-food products were collected for each European country, defining agri-food products as codes 02 to 22 of the Harmonised Nomenclature (excluding codes 05, 06, 13 and 14, according to Winkelmann *et al.*, 1995). This choice was made to refer only to agri-food products,

agricultural non foodstuffs being excluded. The figures for the exports of total trade were also collected. Consideration was given only to intra-EU trade flow as the analysis addressed the assessment of the relative competitive performance of member states in the EU market, no consideration was given to the position of extra European countries in the EU market or to extra-EU trade.

Data were collected from 1990 to 2003. In the sub-period 1990-1994 data were available for 12 European countries (Belgium and Luxembourg were combined, while Austria, Finland and Sweden were not included), instead the sub-period 1995-2003 has data available for 15 member states, Belgium and Luxembourg still being combined, thus the following tables show 14 states. For this reason the analysis of the trends is referred to the 1995-2003 period.

3. Results

3.1 The export market share of total trade in the EU

In terms of value of total exports in the context of the EU market, the highest export market share (*EMS*) was found in Germany, 23.1% in 2003. Significant *EMS* values were observed for France (13.5%), the Netherlands (12.6%), Belgium (11.1%), the United Kingdom (9.5%) and Italy (9%) (tab. 1). Spain had an intermediate value (6.1%) and following this were the *EMS* levels of Austria (3.3%), Ireland (3.1%), Sweden (3%) and Denmark (2.4%). The European countries with the lowest export market shares are Finland (1.6%), Portugal (1.4%) and Greece (0.4%).

In most European countries the export market share for total trade is connected to the dimension of the economy expressed by GDP, but in some cases, like the Netherlands, Belgium and Ireland, the position of the country in terms of *EMS* is higher than in terms of GDP. Therefore, the economies of these countries are particularly export oriented.

In the period 1995-2003 the growth of total intra-EU exports is valued at 60%, but it is possible to subdivide this period into two parts: 1995 to 2000 when the evolution of exports was very positive, and 2000 to 2003 when the European export market seemed to be quite flat. This trend can be connected to the economic stagnation that occurred in the EU in the early 2000s.

In the countries with the highest values of export market share, there was significant total exports growth in the last decade in the Netherlands and Belgium; the United Kingdom showed a decrease in 2003; the trend of Germany was slightly lower than the EU average, but the trend of France and Italy appears quite limited (fig. 1). A high growth of total exports is found in Spain, as in Ireland and Austria; whereas Sweden and Denmark showed a lower trend than the EU average. With regard to the group of countries with the lowest values of export market share, Finland and Greece showed low growth of total exports, while in Portugal the trend was similar to the EU average.

Table 1. Export market share of total trade intra-EU (%)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
France	16.7	17.1	17.4	16.9	16.9	14.5	14.1	14.2	14.2	14.3	14.0	13.7	13.5	13.5
Belgium and Luxembourg	10.6	10.4	10.2	11.7	11.3	10.1	9.8	9.7	9.8	10.1	10.2	10.6	10.9	11.1
Netherlands	12.5	12.0	11.7	11.3	12.5	10.9	12.3	12.4	12.0	12.2	12.7	12.7	12.5	12.6
Germany	25.8	25.3	25.7	24.1	23.2	23.3	22.2	21.6	21.8	21.9	21.5	21.9	22.2	23.1
Italy	11.9	11.7	11.4	11.5	11.4	10.2	10.3	10.0	9.9	9.6	9.2	9.2	8.8	9.0
United Kingdom	11.5	12.0	11.5	12.2	12.1	10.6	11.0	11.8	11.3	11.2	11.3	10.9	10.9	9.5
Ireland	2.1	2.1	2.3	2.6	2.6	2.5	2.5	2.8	3.2	3.3	3.4	3.6	3.8	3.1
Denmark	2.2	2.3	2.4	2.6	2.4	2.6	2.5	2.5	2.3	2.4	2.4	2.4	2.5	2.4
Greece	0.6	0.6	0.7	0.6	0.6	0.5	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.4
Portugal	1.4	1.4	1.5	1.5	1.5	1.4	1.5	1.5	1.4	1.4	1.4	1.4	1.4	1.4
Spain	4.6	5.0	5.0	5.1	5.5	5.1	5.4	5.2	5.6	5.2	5.6	5.8	5.5	6.1
Sweden						3.7	3.6	3.5	3.5	3.5	3.4	2.9	2.9	3.0
Finland						1.8	1.7	1.7	1.7	1.7	1.8	1.6	1.6	1.6
Austria						2.9	2.8	2.8	2.9	2.9	2.9	3.0	3.2	3.3
EU 15	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: own calculations based on COMEXT data base

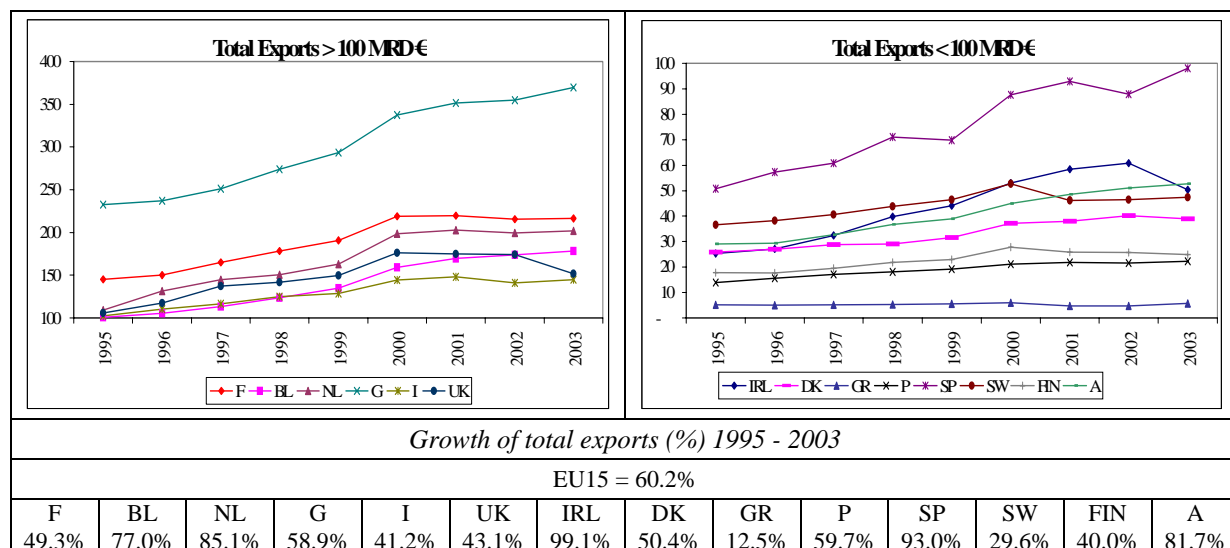|													
Growth of total exports (%) 1995 - 2003													
EU15 = 60.2%													
F	BL	NL	G	I	UK	IRL	DK	GR	P	SP	SW	FIN	A
49.3%	77.0%	85.1%	58.9%	41.2%	43.1%	99.1%	50.4%	12.5%	59.7%	93.0%	29.6%	40.0%	81.7%

Figure 1. Trend of total exports intra-EU

Source: own calculations based on COMEXT data base

3.2 The export market share of agri-food trade in the EU

In terms of value of agri-food exports within the EU market, the most important levels of export market shares (*EMS*) are seen in the Netherlands and France (18.1% and 16.9% respectively in 2003) (tab. 2). Significant *EMS* values can be found for Germany (14.4%), Belgium (11.4%), Spain (11.2%) and Italy (8%), while there is an intermediate value for the United Kingdom (6%), followed by the *EMS* levels of Denmark (4.7%), Ireland (3.4%) and Austria (2.3%). Low *EMS* values are observed in Sweden (1.2%), Greece (1%), Portugal (1%) and Finland (0.3%).

During the 1995-2003 period the trend of the agri-food exports in the EU is different from that of total trade since there is no clear distinction between the two sub-periods, in fact in the later years the growth of agri-food exports in the European market is more marked than in the nineties, showing the anti-cyclical feature of food products. The global increase of the agri-food exports intra-EU in the period 1995-2003 is valued at 47.1%, lower than the increase of total trade.

Table 2. Export market share of agri-food trade intra-EU (%)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
France	24.1	22.5	22.5	22.3	21.0	20.6	20.0	20.3	19.2	19.2	18.5	17.4	17.8	16.9
Belgium and Luxembourg	9.5	9.6	9.6	11.2	11.0	11.2	11.3	11.2	11.5	11.6	11.7	11.9	11.9	11.4
Netherlands	19.8	19.2	18.9	18.0	19.2	17.5	16.7	15.9	16.4	16.2	15.5	15.5	16.3	18.1
Germany	12.5	13.1	13.3	12.6	12.3	13.0	13.0	12.7	13.4	13.4	14.0	14.5	13.2	14.4
Italy	7.9	8.1	7.7	8.0	7.9	6.9	8.4	8.2	8.2	8.6	8.3	8.4	8.6	8.0
United Kingdom	6.9	7.6	7.6	7.4	7.7	7.3	7.0	7.4	7.2	7.1	6.8	6.1	6.6	6.0
Ireland	4.0	4.2	4.9	5.0	4.9	4.9	4.0	3.5	3.4	3.6	3.6	3.5	3.5	3.4
Denmark	6.5	6.2	6.1	6.2	6.0	6.1	5.8	6.0	5.5	5.6	5.7	5.9	5.8	4.7
Greece	1.7	1.8	2.0	1.5	1.5	1.6	1.6	1.3	1.4	1.6	1.3	1.1	1.0	1.0
Portugal	0.8	0.8	0.8	0.8	0.8	0.8	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Spain	6.4	6.9	6.6	7.1	7.7	8.0	9.0	9.7	10.0	8.9	10.3	11.1	10.7	11.2
Sweden						0.8	0.9	1.0	1.0	1.0	1.1	1.1	1.2	1.2
Finland						0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Austria						1.0	1.2	1.3	1.5	1.8	2.0	2.1	2.2	2.3
EU 15	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: own calculations based on COMEXT data base

In the group of countries with the highest *EMS* values, a significant growth of agri-food exports in the last decade is noted in Spain, Italy, Germany and Belgium, but the trend in France and the Netherlands is lower than the EU average, except for the high growth of the Netherlands in 2003 (fig. 2). A limited increase in agri-food exports is also observed in the United Kingdom, Denmark and Ireland, whereas high growth is found in Austria. In the group of countries with low *EMS* values, the trend of Portugal and Sweden is higher than the EU average, while the trend of Finland and Greece is lower.

It is interesting to consider the incidence of agri-food exports on total exports, shown in fig. 3 with reference to the average of three years values during the 1995-2003 period. A high incidence is observed in Greece and Denmark. Values between 10% and 20% are found in France, the Netherlands and Spain. Values between 5% and 10% are noted in Belgium, Germany, Italy, the United Kingdom, Ireland, Portugal and Austria. A low incidence, less than 5%, is found in Sweden and Finland. During the 1995-2003 period such incidence decreased in most European countries, but it is increased in the cases of Italy, Portugal, Sweden and Austria.

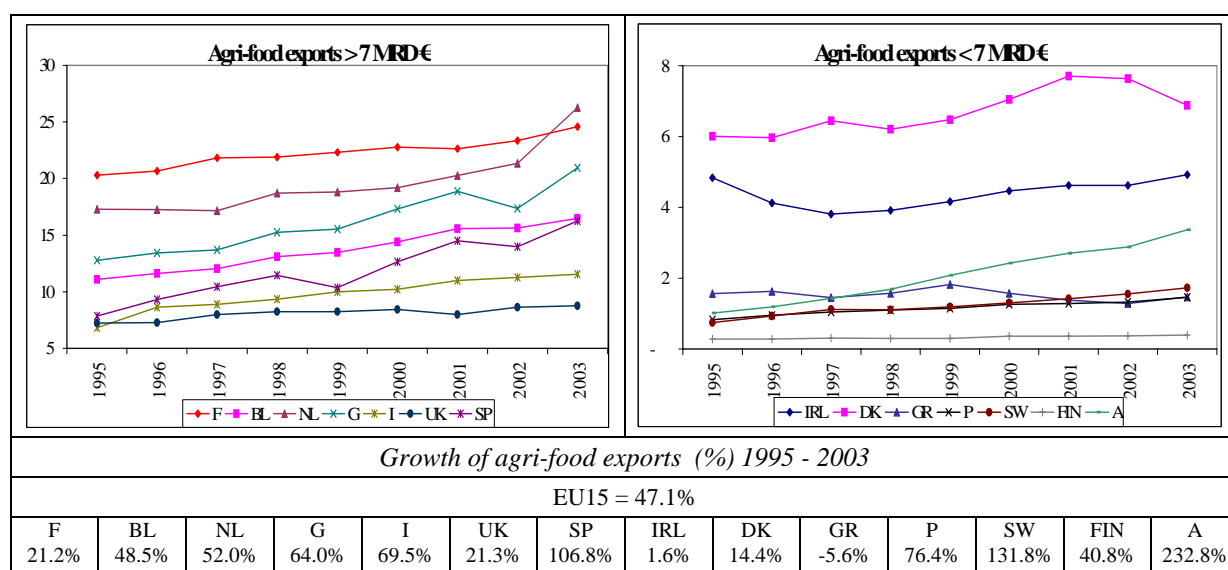| Growth of agri-food exports (%) 1995 - 2003													
EU15 = 47.1%													
F	BL	NL	G	I	UK	SP	IRL	DK	GR	P	SW	FIN	A
21.2%	48.5%	52.0%	64.0%	69.5%	21.3%	106.8%	1.6%	14.4%	-5.6%	76.4%	131.8%	40.8%	232.8%

Figure 2. Trend of agri-food exports intra-EU

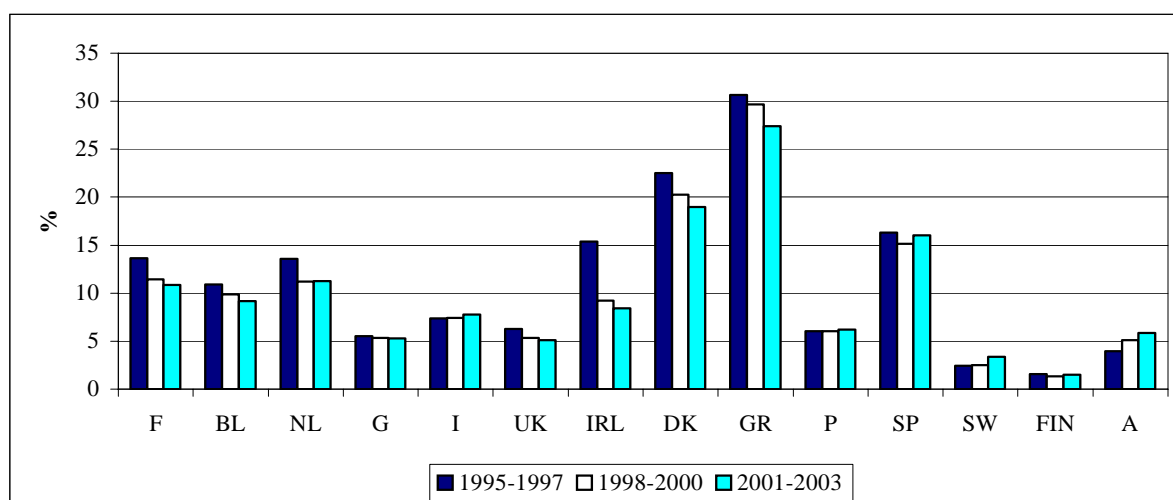Source: own calculations based on COMEXT data base

Figure 3. Agri-food exports on total trade exports intra-EU (%)

Source: own calculations based on COMEXT data base

The relation between the *EMS* of total trade and the *EMS* of agri-food products can be seen in figure 4 for the average of 2001-2003; note how the axes are shifted to a hypothetical point of equal distribution of shares (7.1%) among the European countries (with reference to 14 countries). In this way four areas become evident:

- one with high *EMS* values for both total trade and agri-food products,
- the second with high *EMS* values for agri-food products but low values for total trade,
- the third with low *EMS* values for both total trade and agri-food products,
- the fourth with high *EMS* values for total trade but low values for agri-food products.

An analysis of figure 4 outlines a distribution in the first and third areas for most countries, except for Spain and the United Kingdom. A high *EMS* level for both the agri-food products and total trade (first area) characterises five countries, though the values differ: the Netherlands, France, Germany, Belgium and Italy. Instead, a low level of *EMS* for both the agri-food product and total trade (third area) is observed in seven countries, Denmark, Ireland, Austria, Sweden, Portugal, Greece and Finland. A high *EMS* was found for agri-food products in Spain but there was a relatively low *EMS* for total trade. The United Kingdom has the opposite situation: high *EMS* for total trade and a low one for agri-food products.
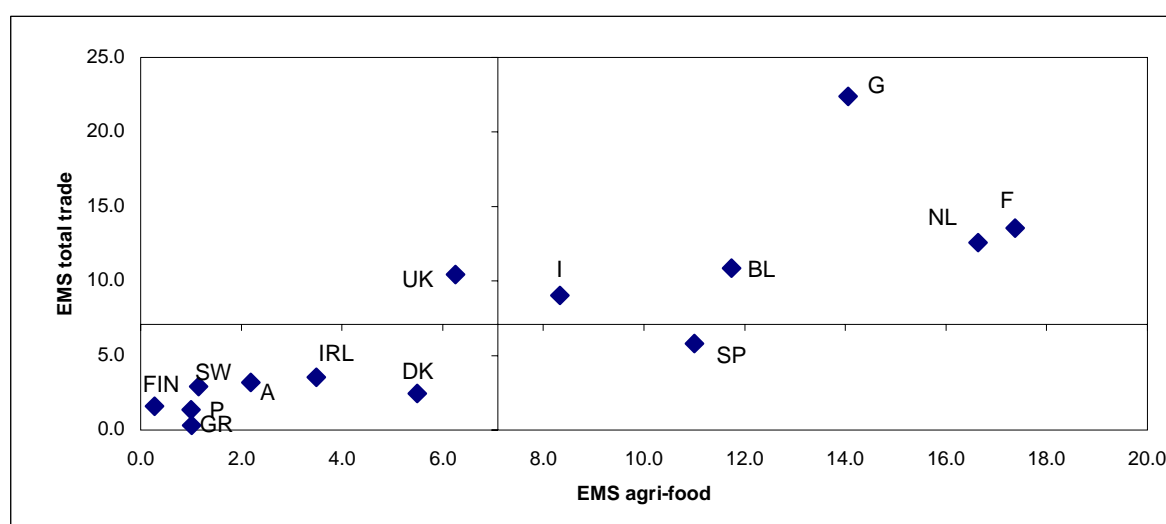

Figure 4. Relation between *EMS* total trade and *EMS* agri-food trade in the EU – 2001-2003

Source: own calculations based on COMEXT data base

3.3 The RCA of agri-food trade in the EU

A level of *RCA* for agri-food products above 100 is found in seven European countries (tab. 3): Greece (285 in 2003), Denmark (195), Spain (183), the Netherlands (144), France (125), Ireland (108) and Belgium (102). The high *RCA* values in Greece and Denmark can be explained by the small export market share for total trade. During the 1995-2003 period in the context of these countries, a growth of the *RCA* value is observed only in Spain where *RCA* shifts from 157 to 183 (+17%). In Greece the trend of *RCA* shows a growth over the last decade but with the exception of the last year (tab. 4).

A *RCA* level below 100 is observed in the other seven countries: Italy (88 in 2003), Portugal (73), Austria (70), the United Kingdom (64), Germany (63), Sweden (40) and Finland (18). But during the last decade, six of these countries show a growth in the *RCA* value, only in the United Kingdom does the *RCA* value decrease. The growth of *RCA* is significant, particularly in Austria, Sweden, Italy and Portugal. Therefore, in eight European countries it is possible to note a process of specialisation in the food sector over the last decade, improving their competitive position and increasing the comparative advantage in this sector.

Table 3. Revealed comparative advantage of agri-food trade intra-EU

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
France	145	132	129	132	125	142	142	143	136	135	132	127	132	125
Belgium and Luxembourg	89	92	94	96	97	112	114	115	117	115	115	113	110	102
Netherlands	158	160	161	160	154	161	136	128	137	133	123	123	130	144
Germany	48	52	52	52	53	56	59	59	61	61	65	66	60	63
Italy	66	69	68	69	69	67	81	82	83	90	90	91	97	88
United Kingdom	59	63	66	60	63	69	64	63	64	64	61	56	60	64
Ireland	188	197	212	193	186	194	157	127	109	109	107	97	93	108
Denmark	294	270	248	240	246	235	229	242	236	237	240	250	231	195
Greece	274	275	288	251	262	311	338	309	333	376	333	364	327	285
Portugal	57	58	54	52	54	60	63	67	67	69	76	72	75	73
Spain	140	140	130	140	140	157	168	186	178	172	183	192	194	183
Sweden						21	25	30	28	30	31	38	41	40
Finland						16	16	17	15	15	16	17	18	18
Austria						35	42	47	51	62	68	68	69	70
EU 15	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Source: own calculations based on COMEXT data base

Table 4. Growth of *RCA* for agri-food trade intra-EU

	1995	1996	1997	1998	1999	2000	2001	2002	2003
France	100	100	101	96	95	93	89	93	88
Belgium and Luxembourg	100	102	103	105	103	102	101	98	91
Netherlands	100	84	80	85	83	76	76	81	89
Germany	100	105	106	110	110	117	119	107	112
Italy	100	120	122	123	133	133	136	144	131
United Kingdom	100	93	91	93	92	88	81	87	92
Ireland	100	81	65	56	56	55	50	48	56
Denmark	100	97	103	100	101	102	106	98	83
Greece	100	109	99	107	121	107	117	105	91
Portugal	100	104	110	112	115	125	120	124	120
Spain	100	107	119	114	109	117	122	123	117
Sweden	100	123	145	135	143	152	183	197	195
Finland	100	101	109	94	96	103	106	111	110
Austria	100	119	134	144	175	194	194	194	200

Source: own calculations based on COMEXT data base

The relation between *RCA* and *EMS* for agri-food products is shown in figure 5 for the average of 2001-2003; note the shift of the axes for the *RCA* value of 100 and the point of equal distribution for *EMS*, indicating four areas.

In the first area countries with high *EMS* values for agri-food products and *RCA* values of more than 100 are located. The Netherlands, France, Spain and Belgium are classified in this cluster. During the last decade only Spain shows growth in both *RCA* and *EMS* values, showing a clear improvement in its competitive position.

The second area covers the countries with high *EMS* values for agri-food products but *RCA* values less than 100. Germany and Italy are set in this cluster, and increased *RCA* and *EMS* values for the 1995-2003 period can be noted for both, revealing good competitive performance.

The third area shows the countries with low *EMS* values for agri-food products and *RCA* values less than 100. The United Kingdom, Austria, Portugal, Sweden and Finland are set in this cluster. These countries have a weak competitive position for the food sector in the EU market, nevertheless in the last decade there has been growth in both the *RCA* and *EMS* values in Austria, Portugal and Sweden.

The fourth area shows the countries with low *EMS* values for agri-food products but *RCA* values more than 100. Denmark, Ireland and Greece are classified in this cluster, and none shows any increase in either the *RCA* or *EMS* value during the last decade.
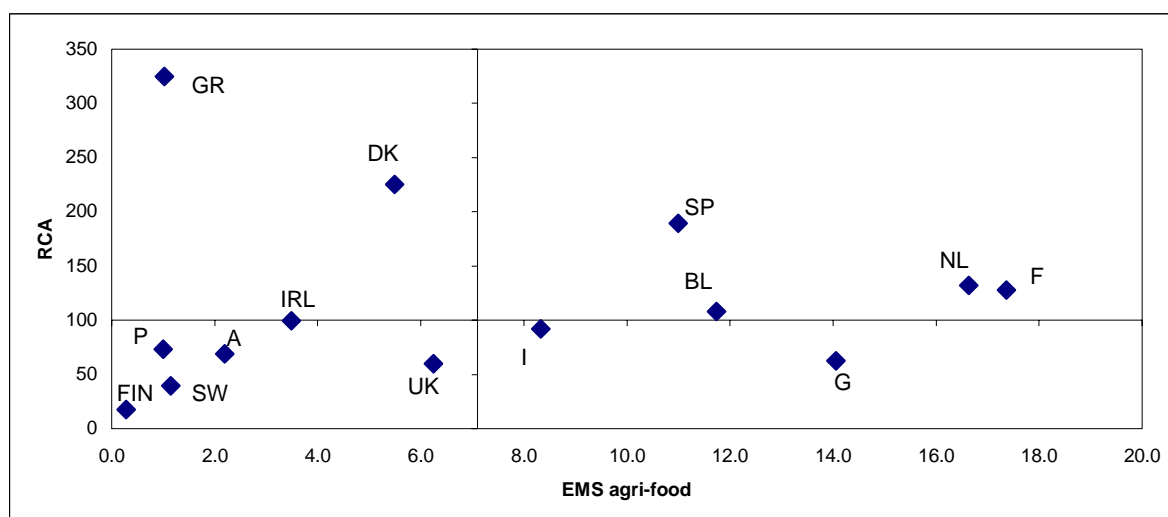
Figure 5. Relation between *EMS* and *RCA* for agri-food trade in the EU – 2001-2003

Source: own calculations based on COMEXT data base

3.4 The NEI of agri-food trade in the EU

A positive value of the net export index (*NEI*) for agri-food products is found in six European countries: the Netherlands (0.31 in 2003), Denmark (0.30), Spain (0.26), Ireland (0.23), France (0.12) and Belgium (0.11) (tab. 5). In all these countries also the *RCA* index has values greater than 100. During the 1995-2003 period in this group of countries only Spain shows a clear improvement in *NEI*, while there is a slight increase in Belgium and stability in the Netherlands. The *NEI* values decrease in Denmark, Ireland and France.

A negative value of *NEI* is observed in the other eight European countries: Austria (-0.05 in 2003), Italy (-0.14), Germany (-0.15), Greece (-0.34), Sweden (-0.37), United Kingdom (-0.38), Portugal (-0.42) and Finland (-0.61). All these countries, except Greece, also have *RCA* values less than 100. In the last decade an improvement in *NEI* values is noted in Austria, Italy, Germany and Sweden, whereas the *NEI* values become more negative in the other four countries, Greece, the United Kingdom, Portugal and Finland.

Table 5. Net export index for agri-food trade intra-EU

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
France	0,21	0,18	0,18	0,18	0,14	0,16	0,16	0,17	0,14	0,14	0,12	0,11	0,11	0,12
Belgium and Luxembourg	0,01	-0,01	0,00	0,08	0,08	0,08	0,12	0,10	0,11	0,09	0,11	0,10	0,10	0,11
Netherlands	0,30	0,31	0,28	0,33	0,32	0,31	0,33	0,32	0,33	0,35	0,34	0,34	0,34	0,31
Germany	-0,33	-0,33	-0,33	-0,29	-0,31	-0,28	-0,28	-0,26	-0,23	-0,23	-0,19	-0,17	-0,18	-0,15
Italy	-0,30	-0,30	-0,28	-0,23	-0,21	-0,24	-0,16	-0,17	-0,15	-0,13	-0,14	-0,12	-0,10	-0,14
United Kingdom	-0,37	-0,30	-0,30	-0,28	-0,26	-0,24	-0,28	-0,31	-0,31	-0,33	-0,34	-0,38	-0,38	-0,38
Ireland	0,40	0,41	0,47	0,50	0,47	0,50	0,40	0,31	0,29	0,27	0,27	0,22	0,22	0,23
Denmark	0,55	0,52	0,50	0,48	0,47	0,43	0,42	0,40	0,37	0,38	0,39	0,39	0,35	0,30
Greece	-0,17	-0,11	-0,08	-0,23	-0,24	-0,20	-0,17	-0,26	-0,25	-0,19	-0,29	-0,28	-0,36	-0,34
Portugal	-0,28	-0,40	-0,43	-0,45	-0,45	-0,41	-0,41	-0,39	-0,43	-0,44	-0,43	-0,46	-0,42	-0,42
Spain	0,20	0,17	0,12	0,12	0,15	0,16	0,24	0,27	0,23	0,22	0,24	0,24	0,26	0,26
Sweden						-0,43	-0,41	-0,37	-0,40	-0,40	-0,38	-0,38	-0,39	-0,37
Finland						-0,50	-0,58	-0,58	-0,62	-0,61	-0,58	-0,59	-0,60	-0,61
Austria						-0,37	-0,35	-0,33	-0,27	-0,19	-0,13	-0,13	-0,11	-0,05

Source: own calculations based on COMEXT data base

The relation between *NEI* and *EMS* for agri-food products can be seen in figure 6 for the average of 2001-2003: the axes are shifted in the value of zero for *NEI* and in the point of equal distribution for

EMS. Thus, high and low values of *EMS* linked to positive and negative values of *NEI* outline four areas.

The distribution of the countries in these four areas is similar to the distribution described for the relation between *RCA* and *EMS*. The only exception is Greece that, in this case, is set in the area with a low *EMS* value and a negative value of *NEI*.

Finally, the relation between *NEI* and *RCA* can be analysed from figure 7 for the average of 2001-2003. Again the axes for zero *NEI* and 100 *RCA* are shifted. Moreover, the size of the circles represents the values of the *EMS* index for agri-food products.

In the area with *RCA* values of more than 100 and positive *NEI* values, there are six countries: the Netherlands, France, Belgium, Spain, Denmark and Ireland. Seven countries fall within the area with *RCA* values less than 100 and negative values of *NEI*: Germany, Italy, the United Kingdom, Austria, Sweden, Portugal and Finland. Only Greece is set in the area with *RCA* values more than 100 but negative values of *NEI*.
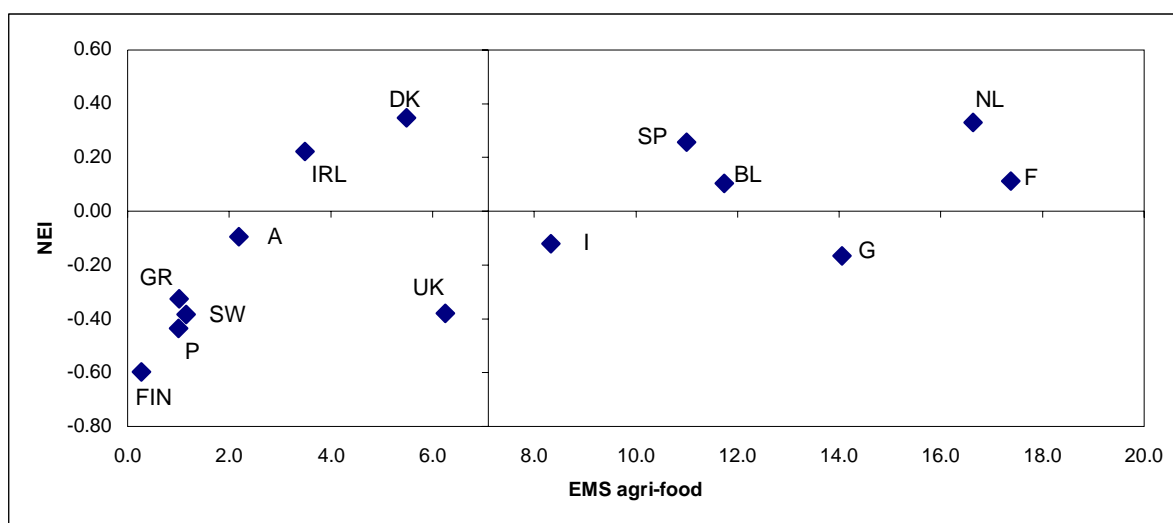

Figure 6. Relation between *EMS* and *NEI* for agri-food trade in the EU – 2001-2003

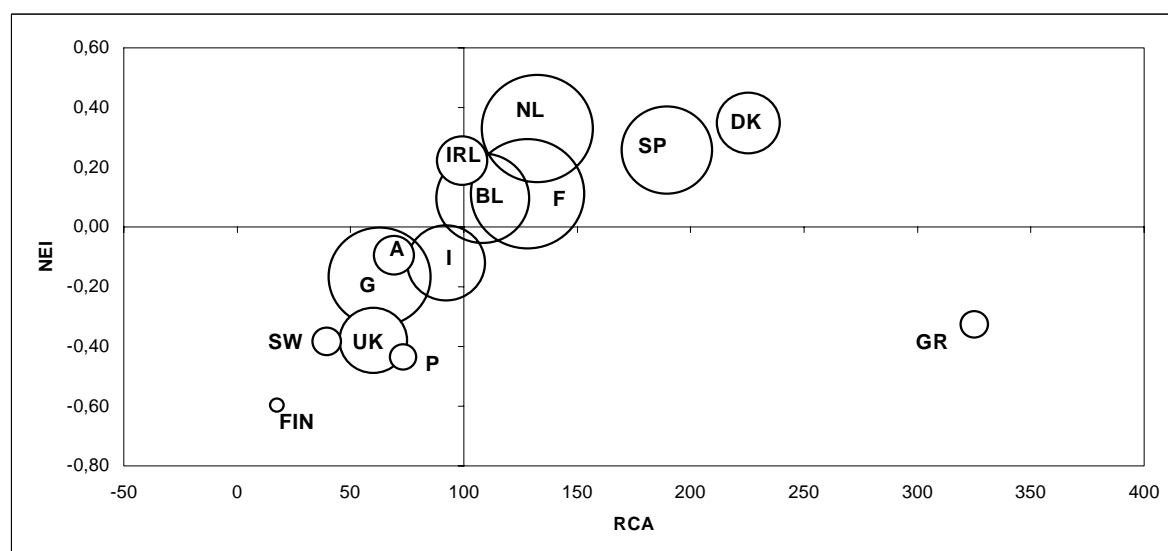Source: own calculations based on COMEXT data base

Figure 7. Relation among *RCA*, *NEI* and *EMS* for agri-food trade in the EU – 2001-2003

Source: own calculations based on COMEXT data base

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This distribution indicates, in a static analysis, a correlation between the values of *RCA* and the values of *NEI*. However, in terms of dynamics, the trends of the *RCA* and *NEI* values over the 1995-2003 period differ in some countries, though most European countries show similar trends with an increase or decrease of both the indices.

4. Conclusion

The results of the three indices, used to assess competitive performance in European countries for the agri-food trade in the EU market during the last decade, can be combined to give a profile of country clustering.

The first cluster is characterised by high levels of *EMS* in agri-food products, values greater than 100 for *RCA* and positive values for *NEI*. The Netherlands, France, Belgium and Spain are classified in this cluster. In these countries the food sector appears competitive and export oriented within the European market, but during the last decade a growth of all three indices is observed only in Spain, revealing significant competitive performance. In Belgium an increase in *EMS* and *NEI* is found, but the *RCA* index decreases. In the Netherlands the *EMS* and *RCA* values decrease (except for *EMS* in 2003) and the *NEI* values increase slightly. In France the trend of all three indices is to decrease.

The second cluster shows high levels of *EMS* in agri-food products, but values less than 100 for *RCA* and negative values for *NEI*. Germany and Italy are classified in this cluster. During the last decade the three indices of these countries have grown, outlining good competitive performance.

The third cluster is characterised by low levels of *EMS* in agri-food products, but values of more than 100 for *RCA* and positive values for *NEI*. Denmark, Ireland and Greece are classified in this cluster even if in Greece the value of *NEI* is negative. During the last decade there has been a decrease in the three indices of these countries, showing a decline of the competitive position.

Finally, the fourth cluster shows low levels of *EMS* in agri-food products, values less than 100 for *RCA* and negative values for *NEI*. The United Kingdom, Austria, Portugal, Sweden and Finland are classified here. These countries have a weak competitive position, but in Austria, Portugal and Sweden there is growth in the three indices (except for *NEI* in Portugal), revealing a positive competitive performance.

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