Measuring competitiveness in the EU market:
a comparison between food industry and agriculture

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Abstract - **Facing the growing competition in the European food market, the purpose of this paper is to assess European country competitiveness at the sector level in the intra-EU market over the last fifteen years, comparing the evolution of the food industry, where firms have had to reshape strategies to maintain market position, and agricultural sector, where changes in Common agricultural policy have forced farms to face market trends. The analysis of competitiveness was carried out by assessing trade indices (EMS, RCA, RXA, RMA, NEI). Cluster analysis was also run to classify groups of countries with similar features in terms of competitive performance over the 1991-2006 period. The country that profited most from market integration in both sectors, reaching a high level of competitiveness, was Spain, followed by Germany and Italy which gained competitiveness especially in the food industry. The United Kingdom had the worst performance, with a big decrease in indices, followed by France and Netherlands, still among the first but with lower indices.**
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Keywords - Competitiveness, agri-food sector, EU, RCA**.**

I. INTRODUCTION

Over the last fifteen years several factors have led to increased competition in the European food market. Some are related to general trends, such as globalisation of economic systems, advances in transportation and communication technologies, decrease in logistics costs, and an evolution in demand patterns (Banterle and Carraresi, 2007; Senauer and Venturini, 2004). Other changes are specific to the European situation, such as European Union enlargement, harmonisation of food regulations, and decline of technical barriers (de Frahan and Vancauteren, 2006). Consequently, market integration has risen: according to Eurostat data, agri-food exports for 1990-2006 increased 100% in the EU-15 market, in line with world agri-food exports that increased 40% in 1990-2003 (WTO, 2004). The growth in competition in the European market has had a strong impact on both the food industry, where firms have had to reshape strategies to maintain market position, and on the agricultural sector, where changes in Common agricultural policy have forced farms to face market trends.

The purpose of this paper is to assess European country competitiveness at the sector level in the intra-EU market over the last fifteen years, comparing the evolution of the food industry and agricultural sector. The intra-EU market was chosen as it is a free trade area and there are no distortions due to tariff barriers. Moreover, recent studies highlighted the EU food industry competitiveness in the extra-EU market (Wijnands *et al.*, 2007).

II. THEORETICAL FRAMEWORK

Economic approaches to assess competitiveness differ greatly, and depend on analyses related to level of firms, sectors and overall economy (Frohberg and Hartmann, 1997). Approaches analysing the sector level consider competitiveness to be the ability of a industry to maintain market share, and to compete with foreign counterparts in foreign and domestic markets under free trade conditions (Kim and Marion, 1997; Traill, 1998). As theoretical reference, competitiveness is mainly linked to comparative advantage, which is connected to the Heckscher-Ohlin theory, and to competitive advantage related to the Porter diamond model (Lall, 2001). An analysis of competitiveness at the sector level is usually carried out by assessing trade indices, comparing trends and countries in the international market. In our analysis we considered the indices of export market share (EMS), revealed comparative advantage (RCA), relative export advantage (RXA), relative import advantage (RMA), and net export index (NEI).

The RCA of Balassa (1965) can be defined as a country's share of the international market for a product, or sector, divided by its share for all products (Pitts and Lagnevik, 1998). It reflects both relative costs and differences in non-price factors, approaching the concept of competitive advantage (Havrila and Gunawardana, 2003). Values greater than 100 reveal a country's specialisation in exports for a specific sector.

The RXA and RMA indices of Vollrath (1991) consider both export and import data and, unlike RCA, eliminate country and product double-counting (Fertő and Hubbard, 2003). An RXA index greater than 1 highlights comparative advantage; the RMA index can also be less, or more, than 1.

The NEI index considers a country's sector exports minus its imports, divided by the total value of trade, it lies between -1 (imports only) and +1 (exports only).

III. METHODOLOGICAL ISSUES

The data source is the database of Eurostat external trade (COMEXT). We collected import and export 1991-2006 figures for each EU country, and for each product category from codes 0101 to 2403 of the 4-digit nomenclature. These were aggregated into two sectors, food industry and agriculture, excluding agricultural non-foodstuffs, animal feeding, and fisheries (Banterle, 2005). Only intra-EU trade flow is considered as the analysis assesses the relative competitive performance of the European market member states.

Cluster analysis classified countries with similar features in the dynamic evaluation of competitiveness, to better understand the modifications in competitive levels that have occurred during the years in the EU. To highlight countries' competitiveness gain or loss over time the EU-15 countries were grouped, and the variables are the average rates of variation of each index over the analysed period. Cosine as distance measure and within group linkage rule are utilised.

IV. RESULTS

For 1991-94 food industry and agriculture, we can identify three country groups relative to their EU market competitive positions (tab. 1).

The countries with the highest EMS, in both food industry and agriculture, were France, Belgium-Luxembourg, Netherlands, Germany, Italy, and the United Kingdom. The last three had no specialisation in the considered sectors, demonstrated by RCA and RXA, and were not export oriented (negative NEI and RMA around 1). Belgium-Luxembourg was specialised only in the food industry, whereas France and Netherlands were specialised and export oriented in both sectors. Spain was an exception, with high index values in agriculture, but not the food industry.

On the opposite, the lowest EMS were for Portugal, Sweden, Finland, and Austria; their competitive position was weak as they were not specialised and their import level was high. The other countries, Ireland, Denmark, Greece, were in an intermediate position: they had medium EMS in both sectors, and different levels of specialisation. Ireland and Denmark were specialised in the food industry, whereas Greece had a better competitive position in agriculture.

To highlight the EU countries' competitive performance in the food industry and agriculture from 1991 to 2006, and to group countries with similar trends, cluster analysis was run, revealing three clusters (Fig. 1).

The first cluster includes Italy, Spain, Sweden, Austria, and Germany. All have good competitive performance, showing positive variation rates for all the indices, in both the food industry and agriculture. Italy and Germany confirmed their good position, Spain shows very good performance, enforcing its specialisation in the food industry, as do Sweden and Austria though their indices still remain low. Cluster 2 includes Portugal, Belgium, and Finland, which gain competitiveness in agriculture, and lose it in the food industry. Belgium was specialised in the food industry and not in agriculture, therefore it improved its situation in the latter, though it is still not specialised. Cluster 3 represents countries with the worst performance. These countries, France, Netherlands, United Kingdom, Ireland, Denmark, Greece and Luxembourg, had decreasing indices in both sectors, showing loss of competitiveness. This is more relevant for France, Netherlands, and United Kingdom which, in principle, had been in the best position but had decreased greatly over the years.

Tab. 1 – Average values 1991-1994 of the competitiveness indices

	Food industry					Agriculture				
	RXA	RMA	RCA	NEI	EMS	RXA	RMA	RCA	NEI	EMS
France	1,20	0,86	115	0,08	19,56	2,42	0,59	190	0,46	28,21
Belgium-Luxemb.*	1,36	0,89	125	0,17	13,48	0,66	1,01	69	-0,17	7,77
Netherlands	1,92	1,07	163	0,34	19,34	1,63	1,28	150	0,22	17,30
Germany	0,51	0,98	61	-0,22	14,94	0,22	1,26	27	-0,61	10,22
Italy	0,59	1,26	64	-0,30	7,41	0,74	1,38	77	-0,26	9,36
United Kingdom	0,63	1,13	68	-0,27	8,13	0,40	0,84	44	-0,37	7,59
Ireland	2,98	1,08	245	0,51	5,88	0,51	0,74	52	-0,04	1,05
Denmark	3,59	0,96	280	0,53	6,83	0,74	0,75	75	0,04	1,63
Greece	2,29	1,85	204	-0,37	1,28	4,62	0,61	407	0,42	2,52
Portugal	0,60	0,70	63	-0,27	0,93	0,18	1,28	19	-0,82	0,95
Spain	0,81	0,76	83	-0,08	4,27	3,58	0,86	299	0,47	13,39
Sweden**	0,24	0,58	26	-0,40	0,92	0,11	0,54	11	-0,67	0,40
Finland**	0,18	0,59	19	-0,49	0,33	0,05	0,71	5	-0,86	0,09
Austria**	0,45	0,61	48	-0,29	1,36	0,35	0,59	36	-0,39	1,03

* from 1991 to 1998 data for Belgium and Luxembourg are connected

** for these countries average values are referred to the period 1995-1998

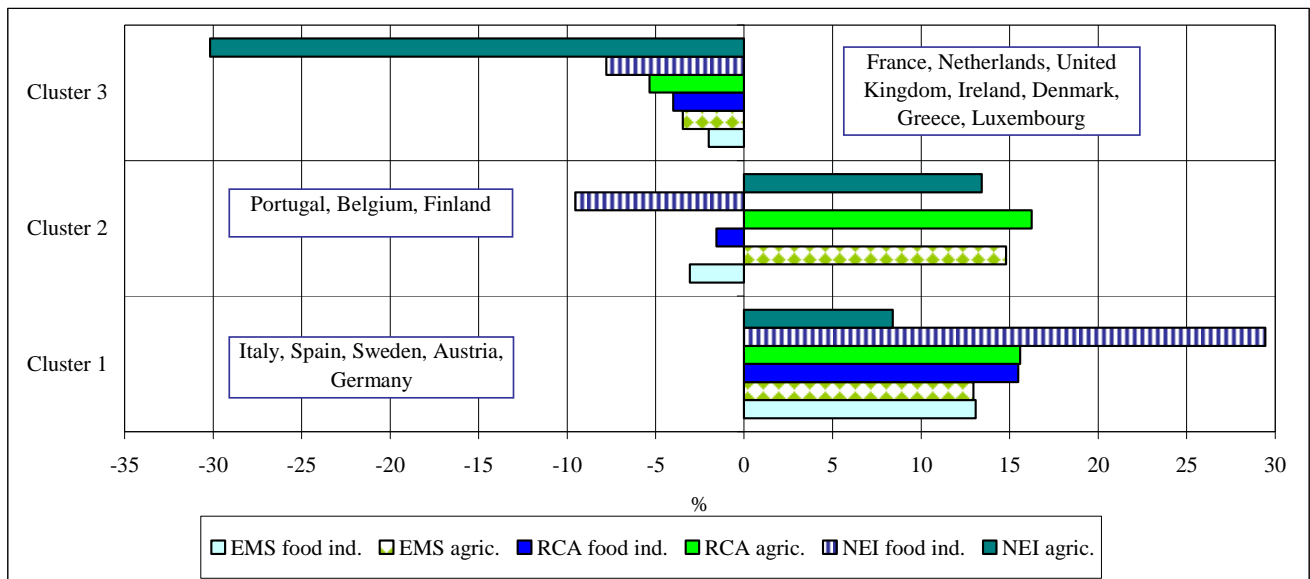   Source: own calculations based on Eurostat database

Fig. 1 - Distribution of the indices' rate of variation among clusters for the period 1991-2006 (averages of the indices of the countries per cluster)

   Source: own calculations based on Eurostat database

The situation of the 2003-2006 level of competitiveness (including new member states) highlights countries profiting from integration of the EU market (tab. 2).

The indices show the countries with the highest EMS, both in the food industry and agriculture: France, Netherlands, Germany, Italy, Spain, and Belgium. France and Netherlands notably worsened, though their indices remain high, whereas Germany and Italy, though not specialised, improved, especially in the food industry.

On the opposite, the countries with the lowest EMS are Greece, Portugal, Luxembourg, Sweden, Finland, Austria and the new member states.

However, we can highlight good performance for Sweden and Austria.

In an intermediate position there are United Kingdom, Ireland and Denmark, all worsened their position, especially the first that, in 1991-94, was among the best.

In summary: the country that profited most from market integration in both sectors, reaching a high level of competitiveness, was Spain, followed by Germany and Italy which gained competitiveness especially in the food industry. The United Kingdom had the worst performance, with a big decrease in indices, followed by France and Netherlands, still among the first but with lower indices.

Tab. 2 - Average values 2003-2006 of the competitiveness' indices

	Food industry					Agriculture				
	RXA	RMA	RCA	NEI	EMS	RXA	RMA	RCA	NEI	EMS
France	1,38	1,01	130	0,06	14,44	2,09	0,71	184	0,37	20,50
Belgium	1,23	0,98	119	0,14	10,89	0,95	0,82	95	0,11	8,70
Luxembourg	0,54	1,20	55	-0,37	0,33	0,40	0,74	40	-0,30	0,24
Netherlands	1,34	1,04	127	0,35	14,43	1,63	1,36	151	0,32	17,20
Germany	0,67	0,70	74	0,16	16,75	0,29	1,08	35	-0,26	8,01
Italy	0,93	1,23	94	-0,13	7,82	0,85	1,22	86	-0,18	7,17
United Kingdom	0,73	1,33	76	-0,37	6,29	0,31	1,03	33	-0,61	2,73
Ireland	1,66	1,43	157	0,27	3,93	0,44	1,02	45	-0,20	1,13
Denmark	2,94	1,36	255	0,35	5,46	0,77	1,09	77	-0,14	1,65
Greece	2,41	1,98	221	-0,44	0,88	3,39	0,98	323	0,04	1,28
Portugal	0,88	1,36	89	-0,39	0,99	0,51	1,39	52	-0,60	0,58
Spain	1,53	0,88	145	0,10	7,38	5,24	0,97	412	0,52	21,03
Sweden	0,41	0,89	43	-0,36	1,21	0,18	0,82	19	-0,63	0,53
Finland	0,24	0,74	26	-0,49	0,36	0,07	0,74	7	-0,82	0,10
Austria	0,80	0,74	82	-0,03	2,71	0,48	0,74	50	-0,27	1,65
Cyprus	1,44	1,59	138	-0,74	0,03	9,98	0,95	834	0,18	0,19
Czech Rep.	0,40	0,59	42	-0,15	0,99	0,43	0,68	44	-0,19	1,05
Estonia	0,97	1,14	97	-0,22	0,19	0,30	0,68	31	-0,51	0,06
Hungary	0,47	0,51	49	0,03	0,88	1,10	0,44	110	0,46	1,97
Lythuania	1,33	1,22	130	-0,09	0,34	1,38	1,06	137	0,01	0,36
Latvia	1,16	1,47	114	-0,39	0,15	1,01	1,23	1589	-0,02	1,93
Malta	0,12	1,79	13	-0,93	0,01	0,12	0,76	12	-0,85	0,01
Poland	1,11	0,59	109	0,23	2,70	0,73	0,81	73	-0,11	1,82
Slovenia	0,24	0,61	26	-0,51	0,12	0,18	0,80	18	-0,72	0,09
Slovakia	0,44	0,64	46	-0,17	0,46	0,54	0,61	55	-0,05	0,56

Source: own calculations based on Eurostat database

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