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Are EU-15 and CEEC agricultural exports in competition? Evidence for 1995-2005

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Abstract

This paper analyses the extent of agricultural competition between EU-15 countries and CEECs during the period 1995–2005 in the light of future EU membership. Finger and Kreinin's index is computed with the BACI database provided by CEPII. The results indicate that Mediterranean countries (Greece, Italy and Spain) have little to fear from EU enlargement to Eastern Europe despite their low production costs. Competition proves to be greater for Northern European countries (Austria, Germany and France) whose exports are similar to those of the New Member States.

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1. Introduction

Farming in Central and Eastern European Countries (CEECs), in all its diversity, has changed substantially over the last 20 years as a result of both transition and integration. Adjusting to the market economy, implementing the *acquis communataire* and joining the European Union (EU) have all entailed significant upheavals in CEECs in general and in their agricultural sector in particular. While average income and agricultural productivity have increased, the farming sectors of post-communist Europe are still blighted by overemployment, insufficient specialization and undersized holdings (Fauve, 2008).

This picture would not be complete if it omitted trade. The opening up of CEECs as part of the transition process and the signing of European agreements in the lead-up to EU membership prompted a surge in trade between CEECs and the EU in the 1990s. CEEC exports to the EU rose sixfold on average from 1989 to 1999 and imports sevenfold (Resmini and Traistaru, 2003). Trade in agricultural output was part of the pattern; between 1999 and 2004 it almost doubled both among the New Member States and between them and the EU-15 (European Economy, 2006).

While this overview is valuable, it remains an overview. It says nothing about competition between Old and New Member States in some agricultural products. It fails to indicate whether the Common Agricultural Policy (CAP) mechanisms from which CEECs were to benefit after joining the EU were not an incentive for some of them to promote certain types of output even *before* joining, thereby risking surplus-generating price drops.

To clarify these questions, this paper examines in five steps how trade competition among 23 EU countries—more specifically between Old Member States and CEECs—has evolved. Firstly, we characterize the farming practices of the countries making up our sample in terms of employment, economic weight and agricultural holdings. Secondly, we present the database: the new BACI database, constructed by the CEPII institute that provides a detailed break-down of trade in agricultural products between EU-15 and CEECs over the period 1995–2005. Thirdly, we use the database to track the changing pattern of agricultural exports from CEECs to the EU between 1995 and 2005. Fourthly, we evaluate the degree of similarity of agricultural exports for specific countries using the index suggested by Finger and Kreinin (1979). Finally, the results obtained allow us to conclude about a possible shift in trade between Old and New Member states during the period before EU membership.

2. Main characteristics of CEEC farming practices

Agriculture was and still is one of the key issues in EU membership for CEECs both because of the sheer size of the sector in the economies of the New Member States and because of the CAP funding for which they might be eligible.

On the first point, two figures are indicative of the significance of agriculture in CEECs: in 2005, just after the fifth enlargement, more than 4% of the working population in CEECs was engaged in farming (a figure that stood at more than 8% for half of those countries) and the sector accounted for more than 2% of GDP in most cases. Of the Old Member States only the Mediterranean countries (Spain, Greece, Italy and Portugal) had similar profiles (see Table 1).

On the second point, that of the extension of CAP mechanisms to countries with a real agricultural potential, a number of studies have pointed out what was at stake (see Duboz and Proutat, 2001, for a literature review and a financial assessment). In a working document dealing with the 'successful integration of Member States in CAP' published in 2002, the European Commission considered that the application of EU price policies in CEECs would essentially encourage the production of cereals and that the effects on beef-and-veal and milk products would also be positive but without entailing any significant increase on the production levels attained thus far.

Farming practices in CEECs can also be apprehended through the characteristics of their agricultural holdings. As Loyat (2004) recalls, one of the main objectives of reform during the transition period was to decollectivize agriculture and to restore private property. This meant dividing up property and agricultural holdings. For instance, in 2005, i.e. at the end of our study period, one in two CEEC holdings was still smaller than 5 hectares except in Estonia and Latvia. In some countries (Slovakia and Hungary respectively), 90% or close to 90% of holdings were small in size. By comparison, in EU-15 it was only in the Mediterranean countries, which were the ones most reliant on agriculture, that the proportion of small-sized holdings exceeded 50%.

Poland does not fit into this overall picture. Although farming contributes roughly as much to national GDP in Poland (2.5%) as it does in, say, Hungary (2.7%), Poland has far and away more agricultural holdings than other European countries. One in four of Europe's farms is in Poland; Poland alone accounts for 65% of CEEC agricultural holdings.

Even before they joined the EU, the agricultural situation of the future Member States was a cause for concern for the European Commission (2002). It took the view that the unfavourable structure of agriculture in CEECs, in particular the high number of small exploitations and also the prolonged existence of a semi-subsistence agriculture alongside a growing sector oriented towards commercial production, would raise a number of administrative and economic headaches for the CAP.

Table 1. **Agriculture in the EU (1999 and 2005)***

Country	Percentage of working population engaged in agriculture		Agriculture as percentage of GDP		Number of agricultural holdings (×1000)		
	1999	*2005*	*1999*	*2005*	*2005*	*of which **: < 5 ha (%)*	*≥ 50 ha (%)*
Germany	2.9	2.3	0.9	0.6	389.88	22.6	21.7
Austria	6.2	5.3	1.2	1.0	170.64	32.2	6.4
Belgium	2.4	2.1	1.2	0.8	51.54	26.6	16.6
Denmark	3.3	3.2	2.0	1.2	51.68	3.4	32.1
Spain	7.4	5.2	4.1	2.8	1079.42	53.5	9.2
Finland	6.4	4.9	0.9	0.9	70.62	9.3	18.8
France	4.3	3.8	2.4	1.7	567.14	26.0	35.2
Greece	17.0	12.4	7.1	4.7	833.59	76.3	0.8
Ireland	8.6	5.9	2.9	1.3	132.67	7.0	17.8
Italy	5.4	4.1	2.6	1.9	1728.53	73.6	2.2
Luxembourg	1.7	1.7	0.7	0.3	2.45	0.2	0.4
Netherlands	3.2	3.3	2.4	1.7	81.83	28.8	13.1
Portugal	12.7	11.8	3.3	1.7	323.92	74.8	3.2
United Kingdom	1.6	1.4	0.9	0.4	286.75	37.3	26.0
Sweden	3.0	2.3	0.7	0.4	75.81	14.8	24.8
Estonia	8.8	5.8	5.1	1.9	27.75	45.3	8.1
Hungary	7.1	4.8	4.5	2.7	714.79	89.7	1.6
Latvia	15.3	12.6	3.6	2.2	128.67	47.3	3.4
Lithuania	20.2	14.8	7.9	2.9	252.95	51.4	2.3
Poland	18.1	17.1	3.3	2.5	2476.47	70.7	0.8
Czech Republic	5.2	4.1	3.4	1.0	42.25	53.0	15.2
Slovakia	7.4	4.9	4.1	1.2	68.49	90.0	3.8
Slovenia	10.2	8.9	3.2	1.8	77.17	59.4	0.4
EU-25		4.9		1.3	9691.23	61.6	6.9

Source: Eurostat.

* CEEC figures are only available from 1999. Consequently, we use this year instead of 1995, which is the beginning of our study period.

** Authors' computations following Eurostat.

3. Data: countries, years and sectors

The BACI database is provided by the CEPII institute (Gaulier and Zignago, 2007) and has three major advantages for our purposes. Firstly, it provides reliable data for EU-15 and CEECs. Secondly, it covers an essential period, i.e. the years of transition and pre-membership. Thirdly, it provides a very fine sector-based breakdown of trade in agricultural products.

We have chosen to deal with the 15 Member States and the eight New Member States (here CEEC-8) that joined the EU on 1 May 2004. Bulgaria and Romania were omitted since they joined on 1 January 2007, two years after the close of our study period.

We focus first on 1995 and 2005, i.e. the first and last years of the sample available in the BACI database. We also focus on the year 1999 in the subsequent empirical analysis for three reasons. Firstly, most of the data on agriculture in CEECs were only available from 1999 onwards (see Table 1 above). Secondly, it was in 1999 that the European Commission opened negotiations with each CEEC, thereby promoting deregulation and the development of trade in agricultural products. Thirdly, EU enlargement to CEECs was taken into account in the 2000–2006 financial perspectives, as decided in Berlin in March 1999. Financial assistance from the European communities to the Eastern candidate countries was furnished *via* SAPARD, 'Special Pre-Accession Programme for Agriculture and Rural Development', an instrument created in 2000.

Finally, we have classified agricultural products by type. The BACI database consists of an annual database of values and quantities exchanged at the finest level and runs to more than 5000 products. We therefore needed to group some of these items so as to identify where competition was strongest. This was done in two stages. First, we established a preliminary grouping of 5000 products into 47 broad categories, a shift from level 5 to level 3, based on the SITC Rev. 4 nomenclature. Then these 47 categories were further assembled into 21 classes by product type: raw products (cereals), processed (or directly consumable) or intermediate (for food processing industries). We feel that this classification accurately covers the spectrum of European agricultural output.

4. The structure of agricultural exports from CEEC-8 to EU-15

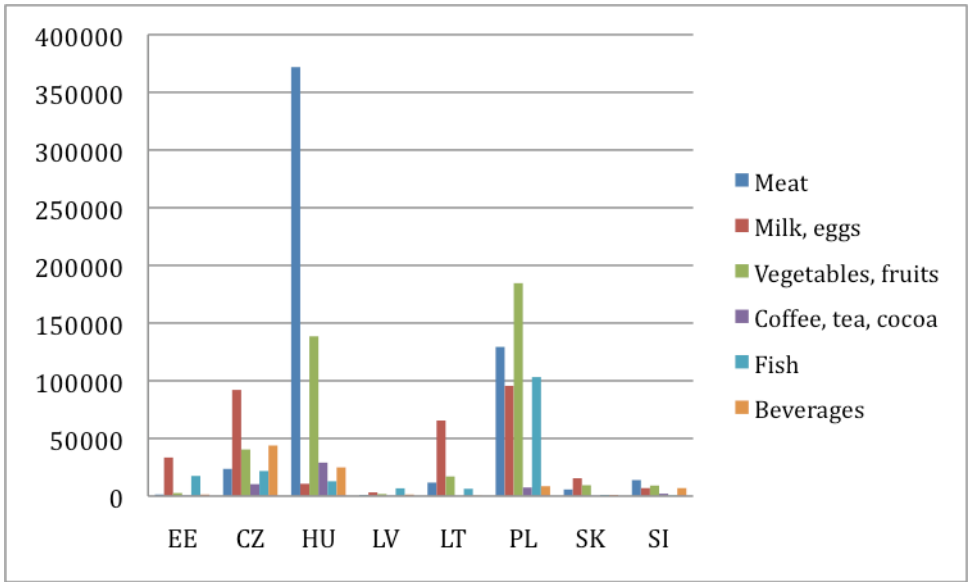
The days when live animals, meat-based products, and fruit and vegetables accounted for most or even all of eastern European exports are gone (Duboz, 2002). Although that triad still made up a good proportion of agricultural exports from CEEC-8 to EU-15 in 2005 it was no longer exclusive. Diversification occurred between 1995 and 2005. Polish milk and fish and even more so Czech and Hungarian cereals, oleaginous crops and sugar made up a significant proportion of exports from CEEC-8 to EU-15 in the mid 2000s (see Figures 1–7).

Hungary, Poland, and the Czech Republic were the major eastern European exporters in 1995 as in 2005, albeit with a nuance worth noting. Poland had overtaken Hungary as the leading exporter for most products. Lukas and Mládek (2006) attribute this to Hungary's drive to expand its markets even before it joined the EU. However, it fell behind because of excessive production costs, in particular for livestock, and the delay in meeting European standards. Poland by contrast achieved spectacular export levels in 2005 compared to the past mainly through its low production (and especially labour) costs.

Other CEECs followed this trend towards the development of export markets. Although levels

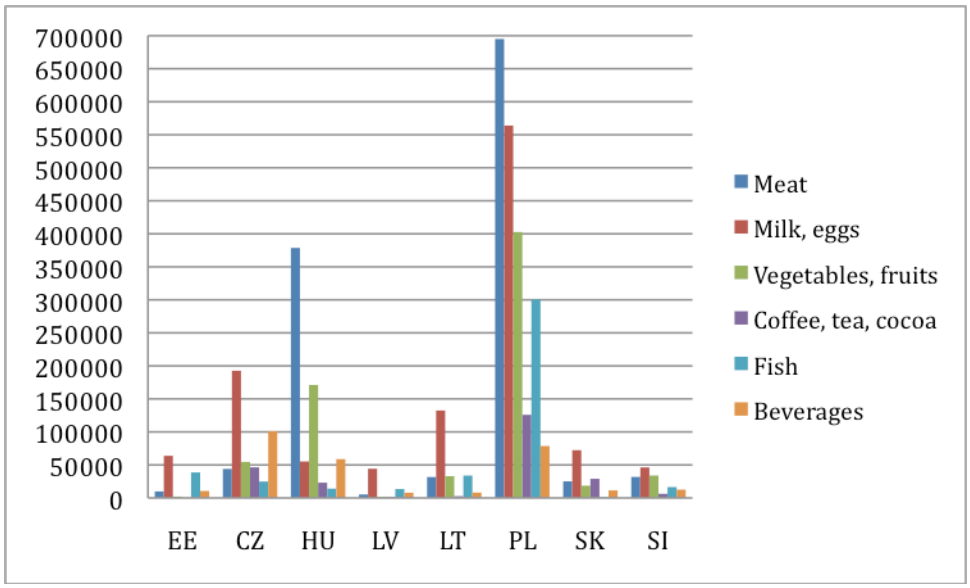
are still at very low, Slovakia and Slovenia for example have increased their exports of some processed products and even more so intermediate products (see Figures 2 and 7).

Figure 1. **CEEC-8 exports to EU-15 in 1995** (processed products: US $(000))



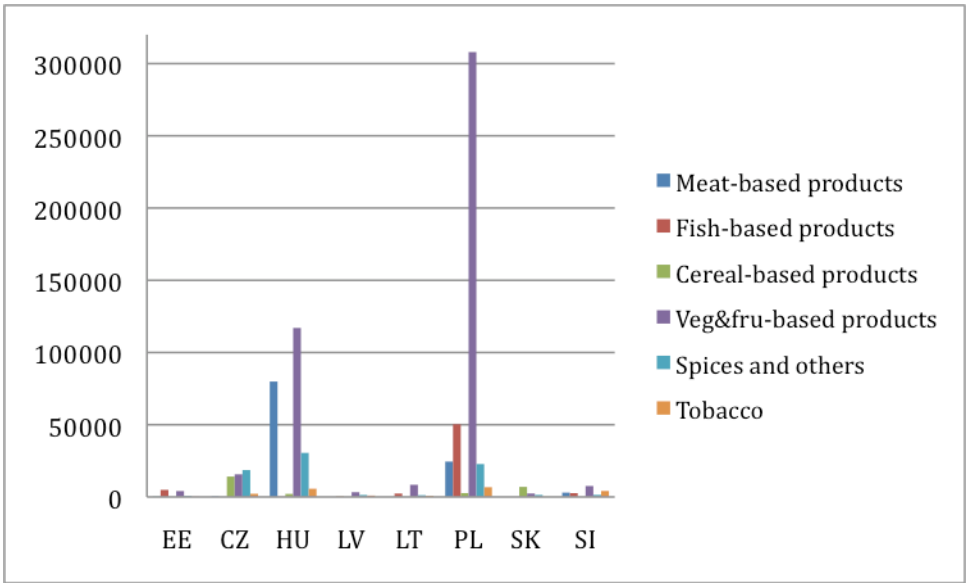
Source: Authors' calculations based on BACI database

Figure 2. **CEEC-8 exports to EU-15 in 2005** (processed products: US $(000))



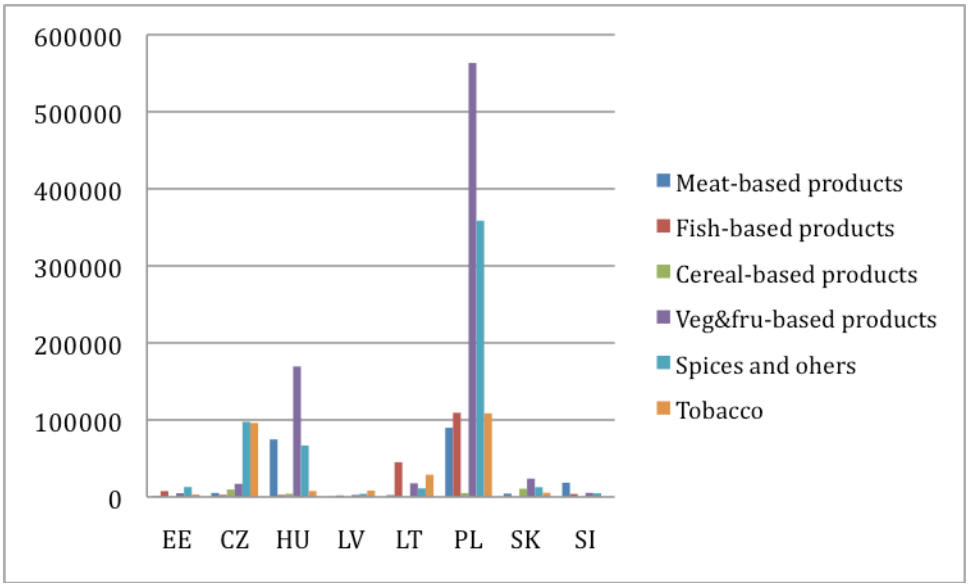
Source: Authors' calculations based on BACI database

Figure 3. **CEEC-8 exports to EU-15 in 1995** (other processed products: US $(000))



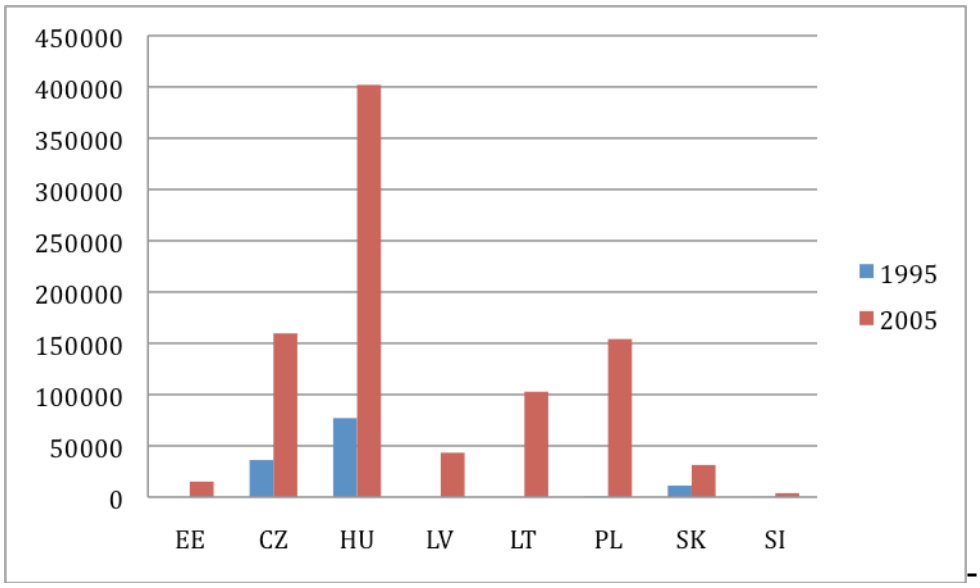
Source: Authors' calculations based on BACI database

Figure 4. **CEEC-8 exports to EU-15 in 2005** (other processed products: US $(000))



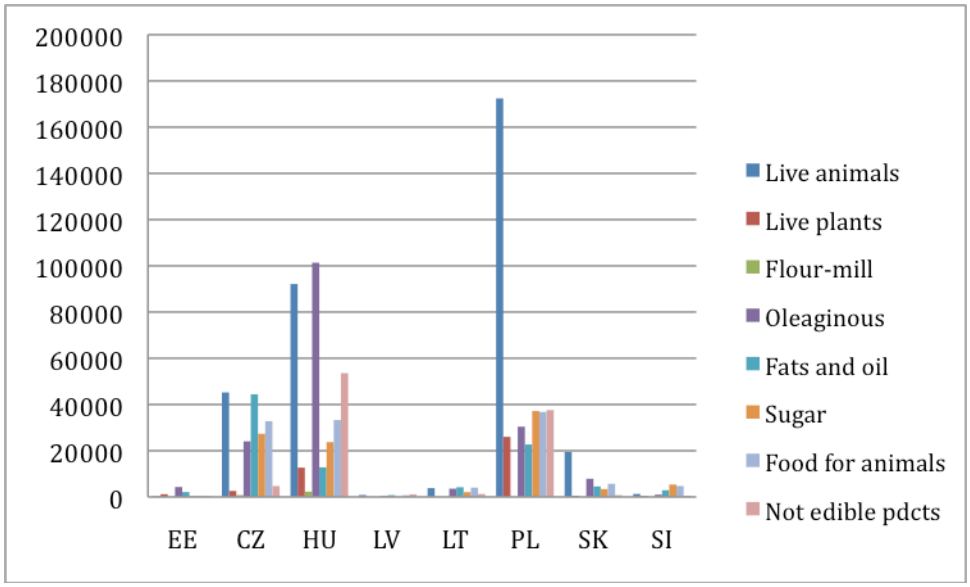
Source: Authors' calculations based on BACI database

Figure 5. **CEEC-8 cereal exports to EU-15 in 1995 and in 2005** (US $(000))



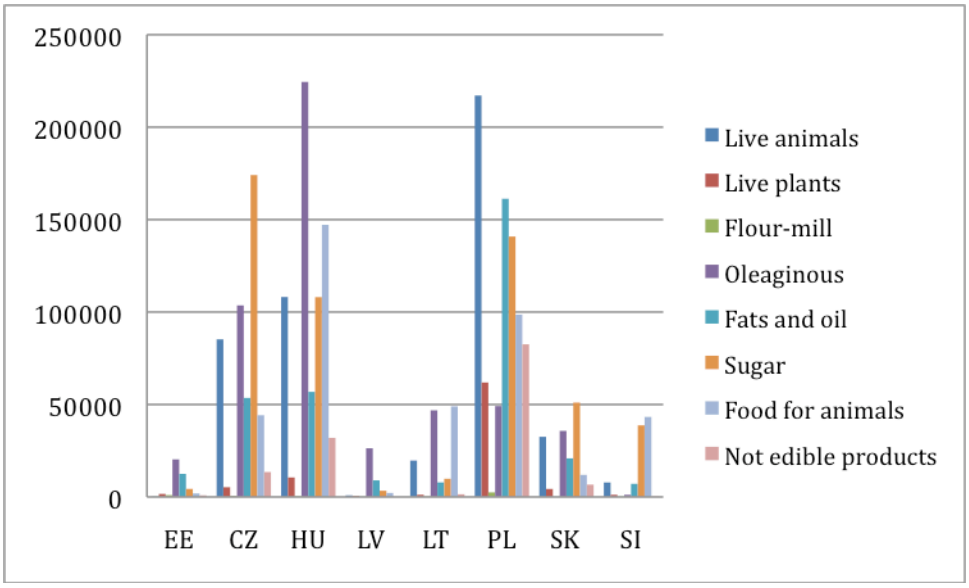
Source: Authors' calculations based on BACI database

Figure 6. **CEEC-8 exports to EU-15 in 1995** (intermediate products: US $(000))



Source: Authors' calculations based on BACI database

Figure 7. **CEEC-8 exports to EU-15 in 2005** (intermediate products: US $(000))



Source: Authors' calculations based on BACI database

5. The similarity with agricultural exports from EU members

Finger and Kreinin's (1979) index measures the degree of similarity of exports for two countries towards a third market. It is computed as follows:

$$S(ab,c) = \sum_{i=1}^{N} \min\left[X_i(ac), X_i(bc)\right] \qquad (1)$$

where N is the number of products and:

- $X_i(ac)$ is the share of product i in country a's exports to country c
- $X_i(bc)$ is the share of product i in country b's exports to country c

Here $N = 21$. We have computed this index for all pairings of CEEC-8 and EU-15 countries, i.e. 112 pairs. Country /*c*/ takes the value: EU-15. We have computed this index for agricultural products in general, and also for intermediate agricultural products and for processed agricultural products, i.e. 336 indices for each year of the period 1995–2005. We present the most relevant results for our research question, which is the way Old and New Member States compete with each other for some types of agricultural products.

Table 2 provides our computations for Finger and Kreinin's indices for some CEEC-8 and EU-15 country pairings for all of their agricultural exports toward the EU-15 for 1995, 1999 and 2005. These countries were chosen based on the relative size of their agricultural sector (see Table 1 above) and/or on their weight in the European agricultural exports (see Figures 1–7 above).

Table 2. **Similarity of overall agricultural exports to EU-15 for selected CEEC-8 and EU-15 pairings**

Country	Poland	Hungary	Czech Republic	Slovakia
	1995 1999 2005	*1995 1999 2005*	*1995 1999 2005*	*1995 1999 2005*
Germany	0.46 0.45 0.71	0.45 0.46 0.52	0.71 0.63 0.69	0.57 0.45 0.67
Austria	0.52 0.44 0.65	0.58 0.45 0.50	0.70 0.60 0.63	0.60 0.40 0.63
Spain	0.48 0.55 0.59	0.41 0.45 0.46	0.49 0.50 0.41	0.36 0.31 0.42
France	0.52 0.49 0.70	0.52 0.54 0.63	0.76 0.68 0.76	0.65 0.50 0.68
Greece	0.52 0.50 0.57	0.38 0.38 0.37	0.46 0.45 0.42	0.35 0.27 0.39
Italy	0.49 0.50 0.60	0.46 0.47 0.45	0.51 0.54 0.48	0.37 0.32 0.47

Source: Authors' calculations based on BACI database

Tables 3 and 4 provide our computations for Finger and Kreinin's indices for exports to the EU-15 by selected CEEC-8 and EU-15 pairings, for processed products and intermediate products respectively.

Table 3. **Similarity of exports to EU-15 of processed products for selected CEEC-8 and EU-15 pairings**

Country	Poland	Hungary	Czech Republic	Slovakia
	1995 1999 2005	*1995 1999 2005*	*1995 1999 2005*	*1995 1999 2005*
Germany	0.44 0.43 0.69	0.39 0.40 0.53	0.71 0.67 0.79	0.62 0.68 0.69
Austria	0.51 0.41 0.64	0.53 0.46 0.51	0.69 0.67 0.78	0.54 0.58 0.71
Spain	0.50 0.56 0.60	0.44 0.48 0.58	0.51 0.56 0.44	0.44 0.52 0.48
France	0.51 0.50 0.73	0.48 0.47 0.54	0.78 0.81 0.76	0.60 0.61 0.66
Greece	0.72 0.65 0.62	0.42 0.47 0.54	0.46 0.59 0.47	0.43 0.55 0.46
Italy	0.53 0.51 0.60	0.52 0.51 0.61	0.60 0.69 0.64	0.47 0.57 0.53

Source: Authors' calculations based on BACI database

Table 4. **Similarity of exports to EU-15 of intermediate products for selected CEEC-8 and EU-15 pairings**

Country	Poland	Hungary	Czech Republic	Slovakia
	1995 1999 2005	*1995 1999 2005*	*1995 1999 2005*	*1995 1999 2005*
Germany	0.54 0.55 0.77	0.49 0.53 0.69	0.80 0.52 0.60	0.55 0.51 0.63
Austria	0.69 0.70 0.70	0.65 0.62 0.76	0.89 0.54 0.79	0.73 0.56 0.79
Spain	0.52 0.59 0.60	0.44 0.51 0.44	0.66 0.46 0.44	0.46 0.41 0.46
France	0.66 0.67 0.78	0.63 0.63 0.72	0.85 0.55 0.79	0.72 0.60 0.82
Greece	0.15 0.14 0.31	0.13 0.12 0.21	0.33 0.16 0.24	0.20 0.11 0.25
Italy	0.53 0.48 0.59	0.32 0.42 0.41	0.40 0.43 0.42	0.36 0.34 0.43

Source: Authors' calculations based on BACI database

Table 2 shows that over the transition period 1995–1999, the degree of similarity of agricultural exports between central European countries and some EU countries mostly decreased for Poland and the Czech Republic, systematically decreased for Slovakia, but mostly increased for Hungary. It is therefore difficult to identify any general tendency. However, between 1999 and 2005, which was a period of liberalization of agricultural trade, the indices follow a clear trend. The Finger and Kreinin index systematically increases in Poland and Slovakia and continues increasing for the similarity of Hungarian exports with those of Germany, Spain and France. The Czech Republic is a special case, since the index values either increase or decrease depending on the two sub-periods considered. Moreover, in 2005, a divide opens between Southern and Northern European countries. With the notable exception of Poland, the index is systematically below 0.5 for the similarity of exports from the three other CEECs considered and exports from Spain, Greece and Italy. However, it is above 0.5 for the similarity of exports from these CEECs and exports from France, Germany and Austria. Some proximity effect seems to be at work here, since Germany and Austria export the same types of products as their immediate eastern neighbours. Indeed, for Germany, the highest indices are obtained for the two countries with which it shares a common border, Poland (0.71) and the Czech Republic (0.69). Similarly, Austria's exports are similar to exports from the Czech Republic and Slovakia (0.63), countries with which Austria shares a border.

Consideration of the distinction between processed products and intermediate products (Tables 3 and 4) does not reveal any fundamentally new information. However, it does indicate that France's exports are similar to those of the four central European countries considered, and the

degree of similarity is higher for intermediate products than for processed products. Indices for Greece are particularly low, below 0.25, for intermediate products [1].

We conclude from these results that there is clear competition between immediate neighbouring countries. Germany and Austria should be more fearful of competition from agricultural products of the newcomers than the Mediterranean countries need be. Although geographically more remote, but having similar climatic conditions to Germany and Austria, France might also fear such competition. This relatively surprising result is similar to that reported by Palazuelos-Martinez (2007) for economic sectors other than agriculture. He analyses trade between some of the most advanced CEECs (Hungary, the Czech Republic, Slovenia and Slovakia) using Spain as a benchmark, from 1993 to 2000, to determine the characteristics of the trade patterns that emerged in the 1990s. He reports that the Czech Republic and especially Hungary are focusing increasingly on R&D and technology-intensive exports, such as certain chemicals, electronics, telecommunication equipment and machinery for specific industries. He therefore concludes that if this trend towards specialization holds up in the long term, the most advanced CEECs may even specialize in some industries in which Northern EU countries have a comparative advantage rather than in the industries of countries like Spain.

6. Conclusion

In the context of EU enlargement, this article has focused on the way competition between Old Member States and CEECs evolved over the period 1995–2005. Based on the computation of Finger and Kreinin's index, we show that contrary to their expectations, Mediterranean countries are not the countries that most need to fear EU enlargement to Eastern Europe. Although the low production costs of the newcomers may have prompted this fear, it appears that, following the accession of CEECs, competition is fiercer for Northern European countries, since their exports for the most part are similar to exports from the New Member States.

With respect to policy implications, we note that accession to the EU has changed the financial conditions faced by CEECs. The adoption of the CAP has led to a substantial increase in real support for farmers in most New Member States. Their knowing that future higher and more predictable payments were to come may have indirectly influenced farmers' choices prior to EU accession. Latruffe *et al*. (2010) report that with EU membership and the introduction of the CAP in Lithuania, farmers have changed their behaviour: previously uncultivated land has been brought back into production and farmers are more willing to operate larger farms. Eastern European farmers may have adjusted to the future policy environment by choosing to specialize in agricultural productions similar to those of Northern Europe rather than those of Southern Europe. In order to explain the reasons for such a choice, a future direction of research would be

[1] In the absence of a formal statistical test with respect to the evolution of Finger and Kreinin's indices between two periods, only broad tendencies are uncovered. A formal econometric analysis may provide further indications but it is the subject of future research.

to take a closer look at the products they specialize in and the nature of their current comparative advantages.

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