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COMPETITIVENESS AND COMPARATIVE ADVANTAGE IN HUNGARIAN AGRICULTURE

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Competitiveness and comparative advantage in Hungarian agriculture

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Abstract

We examine the competitiveness of Hungarian agriculture in relation to that of the EU, based on four indices of revealed comparative advantage, for the period 1992 to 1998. Consistency tests suggest that the indices are less satisfactory as cardinal and ordinal measures, but are useful in identifying whether or not Hungary has a comparative advantage in a particular product group. Despite significant changes in Hungarian agriculture during the 1990s, the results indicate that the pattern of comparative advantage has remained stable. Our findings suggest that Hungary has a comparative advantage for live animals and meat, but not for cereals, contradicting the findings of previous studies which have used different approaches to measuring competitiveness.

Összefoglaló

A dolgozat a magyar mezőgazdaság versenyképességét vizsgálja meg az Európai Unióval szemben. A versenyképesség mérésére a megnyilvánuló komparatív előnyök négy különböző indexét használjuk az 1992 és 1998 közötti időszakra. A konzisztencia tesztek azt sugallják, hogy ezek az indexek kevésbé alkalmasak arra, hogy akár kardinális vagy ordinális mércéül szolgáljanak. Ugyanakkor a megnyilvánuló komparatív előnyök különböző indexei jól használhatóak arra, hogy megállapítsuk, hogy Magyarországnak egy adott termékből van-e megnyilvánuló komparatív előnye vagy sem. Az eredmények arra utalnak, hogy a hazai mezőgazdaságban a kilencvenes években lezajlott lényeges változások ellenére a megnyilvánuló komparatív előnyök szerkezete stabil maradt. Számításaink szerint Magyarországnak komparatív előnyei vannak az EU-val szemben az élő állatok és a húsok esetében, viszont a gabonaféléknél nem. Ez ellentmond a korábbi tanulmányok eredményeivel, amelyek más módszereket alkalmaztak a versenyképesség mérésére.

1. Introduction[1]

Hungary signed an Association Agreement with the European Union (EU) in 1991, which has led to partial trade liberalisation and increased competitive pressures for both partners. With accession to the EU anticipated early in the new millennium, the competitiveness of Hungarian agriculture has implications for international trade between Hungary, member states and third countries. In this paper we examine the competitiveness of Hungarian agriculture in relation to that of the EU. No single measure of competitiveness has general acceptance in the literature. In contrast to recent studies on the competitiveness of Hungarian agriculture which have focussed on price and cost structures, we base our analysis on revealed comparative advantage, using bilateral Hungarian–EU trade data for the 1990s.

The paper is organised as follows. The second section briefly reviews the literature on the competitiveness of Hungarian agriculture during the 1990s. The third section outlines alternative approaches to measuring revealed comparative advantage, the results from which are presented and discussed in *section 4*. *Section 5* deals with changes in Hungary's revealed comparative advantages, with conclusions presented in *section 6*.

2. Recent studies on the competitiveness of Hungarian agriculture

An important aspect of international competitiveness is the level of prices across countries. It is a common assumption that price differences between the EU and the Central and Eastern European Countries (CEECs), including Hungary, will remain significant until eastern enlargement. However, *Orbánné (1998)* shows that prices of food have increased faster in Hungary than in the EU, and consequently consumer price differentials have declined. In recent years agricultural prices in the EU have fallen, while in Hungary they have risen. Hence, price differences at farm-gate level have also declined. In exceptional cases, for example chicken and pork, pro-

[1] This research was undertaken with support from the European Union's PHARE ACE programme 1997. The content of the publication is the sole responsibility of the authors and it no way represents the views of the Commission or its services

ducer prices in Hungary have exceeded those in the EU (Austria, France, Germany and Netherlands), but in general they remain at a lower level.

Heinrich et al. *(1999)* determine the competitiveness of Hungarian agriculture for some important products. Using farm account survey data, they compare Hungarian and German average unit costs and revenues for 1992 to 1998. They find that Hungarian producer prices were below German prices by between 20 and 50 per cent, except for pork. In terms of unit costs, they find all products are competitive compared to Germany, although in the cases of sugarbeet and beef, unit costs exceeded unit revenues, i.e. profits were negative.

Hughes (1998) calculates cross sectional Total Factor Productivity (TFP) indices for different types of farms and analyses international competitiveness using Domestic Resource Costs (DRC). The TFP analysis indicates that smaller farms have higher productivity than larger farms, especially for crop production, but the DRC results suggest that the larger farming companies and co-operative farms are the most internationally competitive.

Banse et al. *(1999*a*)* also analyse the price competitiveness of Hungarian agriculture in the main commodity markets for the period 1990 to 1997, using DRC, private resource costs (PRC) and bilateral (to the EU) resource cost indices. They conclude that crops are more competitive than livestock and also that, in general, arable production is internationally competitive. In spite of significant year-to-year fluctuations, the results indicate that after 1993 some improvement occurred in crop production, while the competitiveness of livestock declined. Overall, their results are consistent with those of *Hughes (1998)*, i.e., under DRC conditions crop production is more competitive than animal production.

Banse et al. *(1999*b*)* investigate the international and private competitiveness of different agricultural and food processing activities in Hungary. Applying DRC analysis they find that crop production is competitive and, with the exception of egg production, that livestock is not competitive. The PRC measure produces a similar result; livestock production is not competitive, except for beef, and arable production is competitive, except for

vegetables. In contrast to agricultural production, most food processing is found to be competitive, except the milk, sugar and tobacco industries.

In summary, the results of these recent studies show that, in Hungary, crops are more competitive than livestock production. Furthermore, most of the arable production is internationally competitive. However, as *Heinrich* et al. *(1999)* point out, it is questionable as to whether Hungary's competitive advantage can be sustained if input prices were to adjust to the EU level.

3. Measuring revealed comparative advantage

The concept of Revealed Comparative Advantage (RCA) is grounded in traditional international trade theory and based on export specialisation. Although variations have been propounded and tested in the literature, the original RCA index was formulated by *Balassa (1965*) as:

$$RCA1_j = \frac{x_{ij}}{x_{wj}} \Big/ \frac{\sum_j x_i}{\sum_j x_w}$$

where x represents exports, i is a country, j is a commodity and w is a set of countries. RCA1 is based on export performance and observed trade patterns; it measures a country's exports of a commodity relative to its total exports and to the corresponding export performance of a set of countries, e.g., the EU. If RCA1>1, then a comparative advantage is revealed.

Vollrath (1991) suggested a modification, referred to as the relative trade advantage:

RCA2 = RXA-RMA

where,

RXA = RCA1

and

$$RMA_j = \frac{m_{ij}}{m_{wj}} \Big/ \frac{\sum_j m_i}{\sum_j m_w}$$

where m represents imports. Thus,

$$RCA2_j = \left(\frac{x_{ij}}{x_{wj}} \Big/ \frac{\sum_j x_i}{\sum_j x_w} \right) - \left(\frac{m_{ij}}{m_{wj}} \Big/ \frac{\sum_j m_i}{\sum_j m_w} \right)$$

This index accounts for imports as well as exports, with relative import advantage (RMA) as the imports counterpart of relative export advantage (RXA), the Balassa index. If RCA2>0, then a trade advantage is revealed. This measure is used by Eiteljörge and *Hartmann (1999)* to analyse the competitiveness of the CEECs in relation to the EU.

A third measure of RCA concentrates only on the trade of the country in question and is defined as the difference between the export share and the import share of a commodity:

$$RCA3_j = \frac{x_{ij}}{\sum_j x_i} - \frac{m_{ij}}{\sum_j m_i}.$$

This net trade share balance is used by *Neven (1995)* in a study of Western and Eastern Europe.

A fourth variant is where the net trade share balance of RCA3 is expressed in relation to the combined trade shares:

$$RCA4_j = RCA3_j \Big/ \left(\frac{x_{ij}}{\sum_j x_i} + \frac{m_{ij}}{\sum_j m_i} \right)$$

$$= \left(\frac{x_{ij}}{\sum_j x_i} - \frac{m_{ij}}{\sum_j m_i} \right) \Big/ \left(\frac{x_{ij}}{\sum_j x_i} + \frac{m_{ij}}{\sum_j m_i} \right)$$

This index is used by *Dimelis* and *Gatsios (1995)*, *Guel* and *Martin (1995)* and *Westin (1998)* to analyse East-West European trade.

A problem with all RCA indices is that observed trade patterns are likely to be distorted by government policies and interventions and may therefore

misrepresent underlying comparative advantages. This is especially true of the agricultural sector, where government interference is commonplace, a point noted by *Balassa (1965)*. Notwithstanding, in the next section we apply the above four RCA indices to the observed agricultural trade patterns of Hungary and the EU during the 1990s, but we return in a later section to the issue of government-induced distortions.

4. Revealed comparative advantages of Hungarian agriculture

We focus on Hungary's agricultural trade with the fifteen member states of the EU during the period 1992–98. In calculating RCAs, all trade flows refer to those between Hungary and the EU. The data are supplied by the OECD at the four-digit level of the Standard International Trade Classification (SITC). There are 253 four-digit product categories, to which we add two five-digit product categories (wheat starch and maize starch). The full sample therefore covers 255 product categories and covers bilateral trade flows between Hungary and the EU in each of the seven years. RCAs are calculated at both the two-digit and four-digit level of the SITC.

Table 1 displays summary statistics (mean and coefficient of variation) for the four RCA indices, described in *section 3*, for Hungarian agricultural trade with the EU over the period 1992–98. (The RCA indices are presented in full in the Appendix.) The indices present a similar pattern, with all four showing a revealed comparative advantage for five of the 22 product groups: live animals, meat, vegetables and fruit, oilseeds, and cork and wood. The low coefficients of variation for these product groups indicate that the indices were fairly stable over the seven year period (as confirmed by inspection of the annual indices reported in the Appendix). Other product groups revealing a comparative advantage are animal oils and fats (RCA1, RCA2 and RCA4), crude animal and vegetable materials (RCA1 and RCA2), and cereals, sugar and beverages (RCA2). The coefficients of variation for these groups are higher, suggesting greater variability from year to year.

Table 1 Revealed comparative advantages of Hungary with respect to EU, by product group and RCA index, 1992–98

	Mean, 1992–98				Coefficient of variation (%), 1992–98			
Index Revealed comparative advantage if:	RCA1 >1	RCA2 >0	RCA3 >0	RCA4 >0	RCA1	RCA2	RCA3	RCA4
00: Live animals other than animals of division 03	**4,45**	**4,16**	**0,05**	**0,67**	17	18	24	18
01: Meat and meat preparations	**4,75**	**4,43**	**0,25**	**0,61**	5	8	18	25
02: Dairy products and birds' eggs	0,19	-0,07	-0,04	-0,54	46	-98	-77	-23
03: Fish, crustaceans, molluscs	0,11	-0,02	-0,01	-0,50	29	-130	0	-25
04: Cereals and cereal preparations	0,81	**0,45**	0,00	-0,03	50	103	-	-921
05: Vegetables and fruits	**2,20**	**1,84**	**0,07**	**0,23**	15	18	13	14
06: Sugar, sugar preparations and honey	0,86	**0,41**	-0,01	-0,10	18	84	-283	-259
07: Coffee, tea, cocoa, spices	0,87	-0,11	-0,06	-0,57	29	-206	-15	-12
08: Feedstuff for animals	0,96	-0,92	-0,07	-0,62	25	-24	-27	-13
09: Miscellaneous edible products & preparations	0,29	-0,74	-0,09	-0,86	81	-33	-26	-6
11: Beverages	0,43	**0,18**	-0,02	-0,22	14	77	-73	-67
12: Tobacco and tobacco manufactures	0,10	-0,75	-0,02	-0,61	74	-25	-33	-41
21: Hides, skins and furskins, raw	0,92	-0,22	-0,02	-0,55	20	-144	-57	-26
22: Oil seeds and oleaginous fruits	**11,60**	**11,23**	**0,04**	**0,55**	37	38	43	36
23: Crude rubber	0,18	-0,64	0,00	-0,88	85	-32	-	-11
24: Cork and wood	**3,33**	**2,36**	**0,04**	**0,36**	16	24	18	17
26: Textiles fibres and their wastes	0,83	-0,11	-0,02	-0,55	41	-359	-48	-29
29: Crude animal and vegetable materials, n.e.s.	**2,12**	**1,38**	-0,04	-0,23	13	17	-38	-40
41: Animal oils and fats	**3,73**	**3,38**	0,00	**0,14**	59	61	265	149
42: Fixed vegetable oils and fats	0,30	-0,44	-0,02	-0,67	113	-144	-94	-52
43: Processed animal and vegetable oils and fats	0,19	-0,95	-0,04	-0,96	43	-43	-53	-2
59212: Wheat/Maize starch	0,20	-0,05	0,00	-0,71	131	-588	-	-50

Source: Authors' calculation based on SITC code data at two-digit level.
Note: Revealed comparative advantages are shown in bold.

Notwithstanding that the general pattern of revealed comparative advantage reported for the four indices is similar, specific results are likely to be sensitive to the index used. Indeed, *Ballance* et al. *(1987)* have suggested some simple statistical tests for examining the extent to which various

measures of revealed comparative advantage are consistent. The usual interpretation of an RCA index is that it identifies the extent to which a country has a comparative (dis)advantage in a commodity with respect to another country or group of countries. *Ballance* et al. offered two other interpretations. First, that the index provides a ranking of commodities by degree of comparative advantage. Second, that the index identifies a binary type demarcation of commodities based on comparative advantage and comparative disadvantage. Referring to these three interpretations as cardinal, ordinal and dichotomous measures of comparative advantage, they suggest a test of consistency for each.

As a cardinal measure of comparative advantage, the consistency test over different indices is based on the simple correlation coefficient. As *Table 2* shows, there are very high levels of correlation (>0,97) between RCA1 and RCA2 in each of the seven years, except for 1994. Correlations between all other pairs of RCA indices over the period are low (<0,46). Thus, except for RCA1 and RCA2, the indices, interpreted as cardinal measures, do not produce consistent results.

Table 2 Correlation coefficients among RCA indices, 1992–98

Year	1992	1993	1994	1995	1996	1997	1998
RCA1:							
RCA2	0,985	0,994	0,723	0,977	0,995	0,992	0,998
RCA3	0,302	0,324	0,345	0,312	0,314	0,241	0,124
RCA4	0,397	0,422	0,433	0,438	0,417	0,371	0,269
RCA2:							
RCA3	0,321	0,339	0,260	0,331	0,333	0,262	0,135
RCA4	0,421	0,441	0,311	0,457	0,444	0,398	0,283
RCA3:							
RCA4	0,446	0,421	0,412	0,412	0,441	0,421	0,437

Source: Based on SITC code data at four-digit level.

The consistency test for RCA indices as ordinal measures is based on the rank correlation coefficient for each pairing. Results for our four RCAs show that the indices are moderately consistent, except for the pairings of

RCA1 and RCA3 *(Table 3)*. The highest coefficients (>0,8) are for the pairings of RCA3 and RCA4, indicating that these indices are the most consistent in terms of ranking commodities, in each year, by revealed comparative advantage.

Table 3 Rank correlation coefficients among RCA indices, 1992–98

Year	1992	1993	1994	1995	1996	1997	1998
RCA1:							
RCA2	0,699	0,588	0,583	0,538	0,543	0,581	0,617
RCA3	0,433	0,406	0,374	0,355	0,356	0,368	0,374
RCA4	0,522	0,574	0,557	0,566	0,531	0,535	0,558
RCA2:							
RCA3	0,756	0,801	0,802	0,813	0,756	0,768	0,745
RCA4	0,766	0,787	0,795	0,795	0,749	0,767	0,765
RCA3:							
RCA4	0,840	0,820	0,818	0,802	0,813	0,805	0,813

Source: Based on SITC code data at four-digit level.

The test for RCA indices as a dichotomous measure is simply the share of product groups in which both of the paired indices suggest comparative advantage or comparative disadvantage. This test indicates that all four of our RCA indices are highly consistent, with shares of >0,8 *(Table 4, see on next page)*. Moreover, RCA3 and RCA4 are perfectly consistent, with a share of 1.

These simple tests for consistency shed light on the sensitivity of any conclusions based on the various RCA indices. The tests on RCA indices as cardinal and ordinal measures confirm that the indices are inconsistent or only moderately consistent, in accord with the findings of Ballance et al. However, the use of RCA indices as a binary-type measure of comparative advantage or comparative disadvantage is supported by the dichotomous test. Accordingly, our RCA measures are useful proxies in determining whether or not Hungary has a comparative advantage in a particular commodity or product group.

Table 4 Dichotomous test shares of RCA indices, 1992–98

Year	1992	1993	1994	1995	1996	1997	1998
RCA1:							
RCA2	0,859	0,863	0,886	0,851	0,875	0,859	0,824
RCA3	0,820	0,855	0,843	0,859	0,824	0,812	0,824
RCA4	0,820	0,855	0,843	0,859	0,824	0,812	0,824
RCA2:							
RCA3	0,855	0,859	0,878	0,871	0,843	0,827	0,851
RCA4	0,855	0,859	0,878	0,871	0,843	0,827	0,851
RCA3:							
RCA4	1,000	1,000	1,000	1,000	1,000	1,000	1,000

Source: Based on SITC code data at four-digit level.

5. Changes in revealed comparative advantage

Two indicators of the *change* in structure of exports can be constructed using RCAs *(Hoekman* and *Djankov, 1996)*. The first measures the relative importance of those exports which revealed a comparative advantage in time period t but a comparative disadvantage (RDA) in t+1, and vice versa, that is, an RDA in t and an RCA in t+1. Those product groups in which Hungary had an RCA in 1992 but an RDA in 1998, or vice versa, account for < 10 per cent of total exports *(Table 5)*.[2] And in all cases bar one, the share of these product groups, for which there was a 'switch' in comparative (dis)advantage, declined over the period. This suggests that the structure of Hungary's revealed comparative advantage did not change radically during the 1990s.

Table 5 Changes in Structure of Hungarian Agricultural Exports, 1992 and 1998

Index	Share in total exports of product groups where:	
	RCA_{92} and RDA_{98}	RDA_{92} and RCA_{98}

[2] The results based on RCA3 and RCA4 are identical because of the perfect match under the dichotomous consistency test – see *Table 4*.

	1992	1998	1992	1998
RCA1	8,4	1,4	2,6	2,7
RCA2	5,1	1,8	7,0	1,3
RCA3	7,2	4,0	1,5	1,4
RCA4	7,2	4,0	1,5	1,4

Source: Based on SITC code data at four-digit level.

A second indicator of change in export composition over time is obtained by measuring the correlation between the RCA index in time period t and subsequent time periods. Using 1992 as the base year, the simple correlation coefficients for our four RCA indices for Hungary over 1993–98 tend to be high, with a few exceptions *(Table 6)*, again suggesting that the structure of comparative advantage did not alter significantly during the 1990s. The exceptions are 1994 under RCA2 and, perhaps more significantly, a marked decline over 1996 to 1998 under RCA1 and RCA2, which indicates an alteration in the pattern of revealed comparative advantage in the later years of the period, although this is not evident in RCA3 and RCA4.

Table 6 Correlation coefficients of RCA indices between 1992 and 1993–98

Index	Base year	1993	1994	1995	1996	1997	1998
RCA1	1992	0,8225	0,7416	0,7546	0,8395	0,6523	0,3219
RCA2	1992	0,8224	0,4272	0,7702	0,8348	0,6476	0,3244
RCA3	1992	0,9078	0,8427	0,8165	0,8492	0,8256	0,8045
RCA4	1992	0,7422	0,7614	0,6932	0,7181	0,6852	0,6936

Source: Based on SITC code data at two-digit and four-digit level.

Mention was made earlier of the problem of using observed trade patterns to identify comparative advantage when, in reality, these trade flows are often distorted by government policies and interventions. This is particularly the case in agriculture, where government support of the industry and explicit use import restrictions and export subsidies distort trade. As a measure of government support to agriculture, the *OECD (1999)* produce

Nominal Assistance Coefficients (NCAs) by country and commodity. The NCA is a measure of producer support expressed in relation to gross farm receipts valued at world (undistorted) prices; a value of >1 indicates positive support, a value of 1 indicates zero support and a value of <1 indicates negative support. NCAs for 1998 indicate that government support of Hungarian agriculture was highest for livestock products and sugarbeet, lower for oilseeds and negative for cereals, whilst in the EU it was more uniform and at a higher level *(Table 7)*. Both simple and rank correlation coefficients between the two sets of NCAs are –0,47, suggesting a difference in the pattern of commodity support in Hungary and the EU.

Table 7 NCAs for Hungary and the EU, 1998

Commodity	Hungary	EU
Wheat	0,8	2,2
Maize	0,8	1,8
Other grains	0,8	3,1
Barley	0,8	3,0
Oilseeds	1,1	2,0
Sunflower	1,1	2,5
Sugarbeet	1,7	1,8
Milk	2,1	2,3
Beef & veal	1,2	2,6
Pig meat	1,1	1,1
Poultry meat	1,3	1,2
Sheep meat	0,9	2,8
Eggs	2,2	1,1

Source: OECD 1999.

There is a wealth of literature on the welfare gains from agricultural trade liberalisation, e.g. *Tyers* and *Anderson (1988* and *1992)* and *OECD (1995)*. This implies that agricultural policies must have an impact on trade flows (i.e. volume) and possibly on trade patterns (i.e. direction). However, *Peterson* and *Valluru (2000)* fail to show that government policies significantly affect the pattern of agricultural trade. They conclude that natural factor endowments are of prime importance, as predicted by conventional

trade theory, with agricultural policies affecting flows but not underlying patterns. Thus, we conclude that our RCA indices, particularly when used as a dichotomous measure, are satisfactory indicators of underlying comparative advantage, in spite of the distortionary effects of agricultural policies.

6. Summary and conclusions

This paper has presented an analysis of the competitiveness of Hungary's agricultural products in relation to those of the EU, based on four different RCA indices calculated for the period 1992 to 1998. Consistency tests suggest that any results need to be interpreted with care. The indices are less satisfactory as cardinal and ordinal measures, but are useful in identifying whether or not Hungary has a comparative advantage in a particular product group.

Results indicate that Hungary has revealed comparative advantages for live animals, meat, vegetables and fruits, oil seeds, and cork and wood, according to all four RCA indices. Despite significant changes in Hungarian agriculture during the 1990s, the pattern of comparative advantage has remained fairly stable. These results tend to contradict the findings of recent studies which, using different methods for measuring competitiveness, have found that arable production is internationally competitive. Our findings suggest that Hungary has a comparative advantage for live animals and meat, but not for cereals. The reasons for this contradiction may be due to the difference in methods used to determine the notion of competitiveness. Our calculations are based on observed trade data and attention has been drawn to the possible influence of government-induced distortions in the workings of international markets. As *Gorton* et al. *(2000)* point out, agricultural trade between Central European countries and the EU is regulated by Association Agreements, and limited preferential access and tariff rate quotas are still effective barriers for what otherwise may be exportable commodities, e.g. cereals. Nevertheless, our analysis offers an alternative insight into the issue of competitiveness and comparative advantage in Hungarian agriculture.

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Appendix

Table A1 Revealed comparative advantages of Hungary to EU by product groups (RCA1)

SITC	1992	1993	1994	1995	1996	1997	1998
00: Live animals other than animals of division 03	5,60	4,81	4,77	4,05	3,94	4,67	3,30
01: Meat and meat preparations	5,05	4,50	4,69	4,50	5,12	4,82	4,56
02: Dairy products and birds' eggs	0,33	0,29	0,16	0,12	0,15	0,09	0,22
03: Fish, crustaceans, molluscs and preparations thereof	0,13	0,09	0,14	0,14	0,15	0,07	0,08
04: Cereals and cereal preparations	0,58	0,39	0,76	1,02	0,55	0,74	1,60
05: Vegetables and fruits	2,92	2,15	2,33	1,96	2,03	1,96	2,08
06: Sugar, sugar preparations and honey	0,84	0,86	0,70	0,85	1,09	0,65	1,01
07: Coffee, tea, cocoa, spices, and manufactures thereof	1,37	0,84	0,92	0,94	0,73	0,66	0,62
08: Feedstuff for animals (excluding unmilled cereals)	1,39	0,86	0,74	0,95	1,16	0,74	0,89
09: Miscellaneous edible products and preparations	0,73	0,46	0,33	0,17	0,13	0,11	0,10
11: Beverages	0,43	0,37	0,38	0,40	0,43	0,50	0,53
12: Tobacco and tobacco manufactures	0,20	0,16	0,16	0,04	0,11	0,01	0,03
21: Hides, skins and furskins, raw	1,16	1,00	1,11	0,71	0,73	0,91	0,80
22: Oil seeds and oleaginous fruits	6,45	15,75	14,61	15,23	14,48	7,45	7,25
23: Crude rubber (including synthetic and reclaimed)	0,34	0,10	0,15	0,46	0,10	0,07	0,06
24: Cork and wood	4,40	3,26	2,85	2,96	3,07	3,14	3,61
26: Textiles fibres and their wastes	1,12	0,46	1,01	0,59	0,42	1,26	0,95
29: Crude animal and vegetable materials, n.e.s.	2,03	2,24	2,70	1,93	1,97	2,02	1,96
41: Animal oils and fats	7,33	5,92	4,09	2,39	3,18	1,90	1,29
42: Fixed vegetable oils and fats, crude, refined or fractionated	0,99	0,50	0,23	0,05	0,05	0,09	0,20
43: Processed Animal and vegetable oils and fats	0,11	0,10	0,20	0,22	0,13	0,21	0,33
59212: Wheat/Maize starch	0,71	0,14	0,35	0,12	0,00	0,05	0,00

Source: Authors calculation based on SITC code data at two-digit level.

Table A2 Revealed trade advantages of Hungary to EU by product groups (RCA2)

SITC	1992	1993	1994	1995	1996	1997	1998
00: Live animals other than animals of division 03	5,22	4,60	4,51	3,82	3,68	4,32	2,96
01: Meat and meat preparations	4,89	4,22	4,11	4,09	4,92	4,55	4,25
02: Dairy products and birds' eggs	-0,10	-0,07	-0,18	-0,05	-0,01	-0,14	0,03
03: Fish. crustaceans. molluscs and preparations thereof	-0,01	-0,04	-0,04	0,01	0,02	-0,05	-0,04
04: Cereals and cereal preparations	0,23	-0,02	0,18	0,75	0,20	0,45	1,33
05: Vegetables and fruits	2,53	1,81	1,92	1,54	1,67	1,64	1,80
06: Sugar. sugar preparations and honey	0,58	-0,23	0,20	0,42	0,74	0,39	0,76
07: Coffee. tea. cocoa. spices. and manufactures thereof	0,37	-0,14	-0,19	-0,15	-0,41	-0,13	-0,15
08: Feedstuff for animals (excluding unmilled cereals)	-0,49	-0,82	-0,92	-1,07	-0,98	-1,15	-1,00
09: Miscellaneous edible products and preparations	-0,73	-0,92	-1,18	-0,73	-0,57	-0,52	-0,53
11: Beverages	0,01	0,10	0,10	0,13	0,19	0,33	0,40
12: Tobacco and tobacco manufactures	-0,80	-0,37	-0,77	-0,77	-0,97	-0,88	-0,69
21: Hides. skins and furskins. raw	-0,01	-0,09	-0,36	-0,60	-0,60	-0,14	0,26
22: Oil seeds and oleaginous fruits	6,16	15,51	14,10	14,78	14,18	7,12	6,78
23: Crude rubber (including synthetic and reclaimed)	-0,81	-0,75	-0,61	-0,32	-0,89	-0,44	-0,64
24: Cork and wood	3,30	2,27	1,87	1,78	2,01	2,36	2,90
26: Textiles fibres and their wastes	0,14	-0,45	0,11	-0,41	-0,67	0,32	0,20
29: Crude animal and vegetable materials. n.e.s.	1,24	1,41	1,85	1,15	1,22	1,41	1,40
41: Animal oils and fats	6,71	5,48	3,68	2,10	2,91	1,60	1,16
42: Fixed vegetable oils and fats. crude. refined or fractionated	0,73	0,08	-0,86	-0,62	-0,46	-1,02	-0,96
43: Processed Animal and vegetable oils and fats	-0,50	-0,51	-0,58	-1,25	-1,49	-1,25	-1,09
59212: Wheat/Maize starch	0,54	-0,18	0,17	-0,14	-0,46	-0,15	-0,16

Source: Authors calculation based on SITC code data at two-digit level.

Table A3 Revealed comparative advantages of Hungary to EU by product groups (RCA3)

SITC	1992	1993	1994	1995	1996	1997	1998
00: Live animals other than animals of division 03	0,06	0,07	0,06	0,05	0,05	0,05	0,03
01: Meat and meat preparations	0,30	0,26	0,18	0,22	0,30	0,26	0,22
02: Dairy products and birds' eggs	-0,09	-0,05	-0,04	-0,02	-0,01	-0,02	-0,02
03: Fish. crustaceans. molluscs and preparations thereof	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01
04: Cereals and cereal preparations	0,00	-0,04	-0,03	0,03	-0,02	0,00	0,06
05: Vegetables and fruits	0,08	0,07	0,08	0,06	0,06	0,07	0,08
06: Sugar. sugar preparations and honey	0,00	-0,04	0,00	-0,01	0,00	0,00	0,01
07: Coffee. tea. cocoa. spices. and manufactures thereof	-0,06	-0,07	-0,05	-0,06	-0,08	-0,07	-0,06
08: Feedstuff for animals (excluding unmilled cereals)	-0,05	-0,06	-0,06	-0,07	-0,07	-0,08	-0,11
09: Miscellaneous edible products and preparations	-0,13	-0,12	-0,10	-0,08	-0,07	-0,07	-0,08
11: Beverages	-0,03	-0,02	-0,02	-0,03	-0,02	0,00	0,00
12: Tobacco and tobacco manufactures	-0,03	-0,01	-0,02	-0,03	-0,03	-0,02	-0,02
21: Hides. skins and furskins. raw	-0,01	-0,01	-0,02	-0,03	-0,04	-0,03	-0,01
22: Oil seeds and oleaginous fruits	0,02	0,05	0,05	0,03	0,06	0,03	0,02
23: Crude rubber (including synthetic and reclaimed)	0,00	0,00	0,00	0,00	0,00	0,00	0,00
24: Cork and wood	0,04	0,04	0,04	0,04	0,04	0,05	0,06
26: Textiles fibres and their wastes	-0,03	0,00	-0,02	-0,02	-0,02	-0,02	-0,02
29: Crude animal and vegetable materials. n.e.s.	-0,06	-0,04	-0,01	-0,04	-0,04	-0,04	-0,04
41: Animal oils and fats	0,01	0,00	0,00	0,00	0,00	0,00	0,00
42: Fixed vegetable oils and fats. crude. refined or fractionated	0,00	0,00	-0,02	-0,02	-0,02	-0,06	-0,04
43: Processed Animal and vegetable oils and fats	-0,02	-0,01	-0,02	-0,04	-0,05	-0,05	-0,06
59212: Wheat/Maize starch	0,00	0,00	0,00	0,00	0,00	0,00	0,00

Source: Authors calculation based on SITC code data at two-digit level.

Table A4 Revealed comparative advantages of Hungary to EU by product groups (RCA4)

SITC	1992	1993	1994	1995	1996	1997	1998
00: Live animals other than animals of division 03	0,61	0,79	0,73	0,73	0,69	0,70	0,42
01: Meat and meat preparations	0,84	0,60	0,38	0,51	0,76	0,60	0,55
02: Dairy products and birds' eggs	-0,69	-0,53	-0,68	-0,47	-0,39	-0,62	-0,41
03: Fish. crustaceans. molluscs and preparations thereof	-0,61	-0,53	-0,43	-0,40	-0,30	-0,62	-0,58
04: Cereals and cereal preparations	-0,04	-0,41	-0,28	0,31	-0,21	-0,01	0,41
05: Vegetables and fruits	0,23	0,24	0,27	0,20	0,18	0,22	0,26
06: Sugar. sugar preparations and honey	0,22	-0,58	-0,08	-0,17	-0,11	-0,16	0,17
07: Coffee. tea. cocoa. spices. and manufactures thereof	-0,50	-0,61	-0,51	-0,50	-0,66	-0,62	-0,62
08: Feedstuff for animals (excluding unmilled cereals)	-0,47	-0,62	-0,64	-0,61	-0,56	-0,69	-0,72
09: Miscellaneous edible products and preparations	-0,79	-0,80	-0,83	-0,87	-0,88	-0,90	-0,92
11: Beverages	-0,39	-0,31	-0,26	-0,30	-0,27	-0,05	0,02
12: Tobacco and tobacco manufactures	-0,65	-0,42	-0,67	-0,95	-0,45	-0,27	-0,89
21: Hides. skins and furskins. raw	-0,47	-0,44	-0,49	-0,72	-0,76	-0,62	-0,38
22: Oil seeds and oleaginous fruits	0,65	0,67	0,60	0,33	0,75	0,66	0,22
23: Crude rubber (including synthetic and reclaimed)	-0,97	-0,98	-0,94	-0,78	-0,95	-0,79	-0,76
24: Cork and wood	0,25	0,37	0,40	0,31	0,36	0,42	0,41
26: Textiles fibres and their wastes	-0,67	-0,29	-0,49	-0,63	-0,76	-0,43	-0,61
29: Crude animal and vegetable materials. n.e.s.	-0,37	-0,22	-0,06	-0,25	-0,26	-0,21	-0,25
41: Animal oils and fats	0,46	0,22	0,19	-0,12	0,03	-0,09	0,31
42: Fixed vegetable oils and fats, crude, refined or fractionated	-0,07	-0,27	-0,76	-0,91	-0,92	-0,92	-0,84
43: Processed Animal and vegetable oils and fats	-0,96	-0,95	-0,93	-0,96	-0,98	-0,96	-0,95
59212: Wheat/Maize starch	-0,05	-0,77	-0,41	-0,82	-1,00	-0,91	-0,98

Source: Authors calculation based on SITC code data at two-digit level.