Trade advantages and integration of Croatian, Hungarian and Slovenian agro-food trade with the European Union

Abstract

The article investigates the revealed comparative export advantage, relative import specialization advantage, relative trade advantage, intra-industry trade and its quality types in agro-food trade of Croatia, Hungary and Slovenia with the European Union (EU) market. The empirical results confirmed bulk of agro-food and forestry products with revealed comparative export advantages on the EU markets for Hungary and to a lesser extent for Croatia, but except for some niche products less for Slovenia. Hungary and Croatia have faced difficulties to sustain revealed comparative export and relative trade advantages in higher processed consumer-ready foods and processed intermediaries. Improvements in intra-industry trade for agro-food products are identified for Hungary and to a lesser extent for Croatia, but less for Slovenia. Competitive trade abilities on the enlarged EU markets cause roles of agro-food sectors in employment and income activities of rural areas that are under increasing competitive pressures for agro-food sector restructuring and rural economy diversification.

Štefan Bojnec
Faculty of Management Koper, University of Primorska,, Cankarjeva 5, SI-6104 Koper p.p. 345, Slovenia
e-mail: stefan.bojnec@fm-kp.si

Imre Fertő
Institute of Economics, MTA, Budaörsi u. 45, H-1112 Budapest, Hungary
e-mail: ferto@econ.core.hu

1 Introduction

A body of theoretical concepts and quantitative approaches are available in literature to explain trade advantages and degree of product, sector or country integration into the international trade. Empirical studies for agro-food trade have highlighted the increasing role of processed and manufactured food products that increased at the expense of raw and bulky agricultural products. Moreover, trade as well as agro-food trade is increasingly of an intra-industry trade nature meaning that similar products are exported and imported at the same time. The reasons in behind are utilization of economies of scale from specialization of production in more liberalized trade and consumer preferences for varieties caused by household's real income growth.

We investigate how trade, relative trade advantages and intra-industry trade in agro-food products might affect agro-food sectors competitiveness and integration of agro-food sectors and rural areas in Croatia, Hungary and Slovenia within the enlarged European Union (EU), where Common Agricultural Policy (CAP) represents crucial elements of the common EU budgetary policy. The paper contributes to the existing literature in at least four significant directions. First, the paper contributes to a better understanding of the levels and composition of relative trade advantages of Croatian, Hungarian and Slovenian agro-food trade. Second, the paper applies recent theoretical and methodological developments in international trade literature employing besides revealed comparative export advantage index also import specialization advantage (RMA) index and relative trade advantage (RTA) index [3, 7, 9, 16], and measures of intra-industry trade (IIT) with the separation of horizontal and vertical IIT [1, 9, 10, 12, 13]. Third, so far some studies focus on international trade competitiveness of Hungarian and Slovenian agro-food sectors [4, 5] but so far not for Croatia. Therefore, on the bases of empirical analyses the paper provides an insight of the level and dynamics in revealed comparative export advantage, import specialization advantage, relative trade advantage indices and IIT measures for agro-food trade of Croatia in comparison with similar results for Hungary and Slovenia using the EU-15 as the benchmark of comparison. The analyses are based on agro-food trade as a whole and by degree of agro-

food product processing over the analysed period. Finally, we explain how these agro-food trade developments, relative trade advantages and IIT have developed and indicate ways how they are likely to develop in the future and how this might influence agro-food sectors, magnitude and directions in multifunctional rural development especially in the enlarged EU. Therefore, the results may also be of broader relevance to those with a direct involvement in commercial trading and to policy makers in rural development programming.

2 Methodology and data

The nature of revealed comparative export advantages is investigated employing the pioneering work introduced by Liesner (1958) [15], but redefined and popularized by Balassa (1965)[2]. The methodological approach is widely used in empirical trade literature to identify a country's weak and strong export sectors. The Revealed Comparative Export Advantage (RXA) index is defined as follows:

RXA = (Xij / Xit) / (Xnj / Xnt)

where X represents exports, i is a country, j is a commodity, t is a set of commodities, and n is a set of countries. The RXA index is based on 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-15. If RXA > 1, then a comparative export advantage is revealed, i.e. a sector in which the country is relatively more specialized in terms of exports. In our case Xij describes Croatian, Hungarian and Slovenian exports, respectively, for a particular agro-food product group to the old EU-15 countries, while Xnj is total agro-food trade of Croatia, Hungary and Slovenia, respectively, to EU-15. Xit denotes the EU-15's exports for a given agro-food product and Xnt total merchandise exports by EU-15 countries, which are used as the benchmark of comparison.

Vollrath (1991) [16] offered an alternative specification of revealed comparative advantage, called the relative trade advantage (RTA), which accounts for exports as well as imports. It is calculated as the difference between revealed comparative export advantage (RXA), and its counterpart, relative import specialization advantage (RMA):

RTA = RXA – RMA

where,

RMA = (Mij / Mit) / (Mnj / Mnt)

where M represents imports. Thus,

RTA = [(Xij / Xit) / (Xnj / Xnt)] – [(Mij / Mit) / (Mnj / Mnt)]

.

If RTA > 0, then a relative trade advantage is revealed, i.e. a sector in which the country's trade is relatively more competitive. Similarly as the RXA index, the RTA is based also on observed trade patterns. It measures a country's exports and imports of a commodity relative to its total exports and imports, respectively, to the corresponding export and import performance

of a set of countries (EU-15), which are used as the benchmark of comparison.

We classify RTA index in three categories: RTA < 0 refers to all those product groups with an absence of relative trade advantage or to products with a relative trade disadvantage. RTA = 0 refers to all those product groups in a break even point without relative trade advantage or relative trade disadvantage. RTA > 0 refers to all those product groups with a relative trade advantage. These boundaries are consistent with theoretical interpretation appropriate for cross-country comparisons.

The methodology to measure the nature of IIT was proposed by Grubel and Lloyd (1975) [14] and later by Greenaway et al. (1994, 1995) [12,13] and some others. Greenaway et al. (GHM) (1994, 1995) [12, 13] express matched IIT as a share of gross bilateral trade:

$$ GHM_k^p = \frac{\sum_j \left[\left(X_{j,k}^p + M_{j,k}^p \right) - \left| X_{j,k}^p - M_{j,k}^p \right| \right]}{\sum_j \left(X_{j,k} + M_{j,k} \right)} $$

where X and M are values of exports and imports, p is either horizontal or vertical IIT, j is the product category ($j=1,\ldots n$) and k is a trading partner. Bilateral trade of a horizontally differentiated product, j, occurs where the unit values of exports (UV_j^x) and imports (UV_j^m), for a particular dispersion factor, α (e.g. 0.15), satisfies the following condition:

$$ 1 - \alpha \leq \frac{UV_j^x}{UV_j^m} \leq 1 + \alpha. $$

Similarly, bilateral trade of a vertically differentiated product is defined as being where:

$\frac{UV_j^x}{UV_j^m} < 1 - \alpha$, or $\frac{UV_j^x}{UV_j^m} > 1+\alpha$.

The vertical IIT represents specialization in varieties of different quality requiring different factor endowments. We define high and low quality vertical IIT as follows. When the relative value of a product is below or over the limit of 0.85/1.15 ($1-\alpha/1+\alpha$), it is considered as low or high quality vertical IIT. Therefore, we adopt this approach of a ±15% unit price threshold as a means of separating horizontally and vertically differentiated products in matched IIT trade.

The empirical analysis focuses on the pre-EU enlargement period using detailed trade data from Organisation for Economic Co-operation and Development (OECD) by the years 1995-2003. Agro-food trade is defined by EU-Commission (1999), which also includes trade in forestry products. Data sample consists of 255 items at four-digit level in Standard International Trade Classification (SITC) system.

3 Empirical results

3.1 Levels and compositions in agro-food trade

Croatia and Slovenia experienced deficit in agro-food trade with the EU-15 markets, and vice versa Hungary, which experienced the largest size of agro-food trade with the EU-15 mar-

kets and trade surplus (Table 1). In the Croatian agro-food export structures by the degree of processing, the prevalence is on bulk raw commodities and recently also on higher value-added consumer-ready foods, whereas in imports particularly on consumer-ready foods. The similar prevalence in agro-food exports and imports structures are also seen for Slovenia. For Hungary, consumer-ready foods prevail in exports and imports of agro-food trade structures with the EU-15 countries.

3.2 Relative agro-food trade advantages

We present first levels, compositions and patterns in development of relative trade (dis)advantages for agro-food products by analysed countries and over the analysed years. Croatia in general experienced revealed comparative export advantages in agro-food products to the EU-15 markets (Table 2). Since 2000, Croatia has strengthened revealed comparative export advantages by the level of the RXA index and by the proportion of agro-food products with the revealed comparative export advantages (RXA > 1) on EU-15 markets. However, on the other hand, there is also an increase in the relative import specialization disadvantages as suggested by the increase of the RMA index and the increase of the proportion of products with the relative import specialization disadvantages (RMA > 1). Finally, there is less clear pattern to reduce relative trade disadvantages (RTA < 0) in agro-food trade of Croatia with the EU-15 markets. The RTA index is deeply negative and only around one-fifth of Croatian agro-food trade with the EU-15 markets experienced relative trade advantages (RTA > 0).

Hungary experienced revealed comparative export advantages in agro-food products on the EU-15 markets, but both the mean value of the RXA index and the proportion of the agro-food products with the revealed comparative export advantages deteriorated over time. Moreover, Hungary experienced relative import specialization disadvantages in agro-food products. The RMA index tends to increase as well as the proportion of the agro-food products with the relative import specialization disadvantage increased a bit over time. As a result, whereas Hungary in the mid-1990s experienced considerable relative trade advantage (RTA > 0) in agro-food products on the EU-15 markets, these favourable levels deteriorated over time both in terms of the magnitude of the RTA index and of the proportion of the agro-food products with the relative trade advantage. In the years 2001-2002 Hungary experienced relative trade disadvantage on the EU-15 markets, and the RTA index stabilized around zero (0) in 2003 with the lowest proportion of the agro-food products with the relative trade advantage on the EU-15 markets. These results indicate that the effects of liberalization, privatization and restructuring in the Hungarian agro-food sectors had the initial positive effects on relative trade advantages for the Hungarian agro-food sector on the EU-15 markets. However, the later developments suggest difficulties for Hungarian agro-food sectors to maintain relative trade advantages on the EU-15 markets due to deteriorations of export performances on

the EU-15 markets and particularly due to difficulties in competition on domestic markets with the imported agro-food products from the EU-15 markets.

Trade measures for Slovenia confirmed revealed comparative export disadvantages, relative import specialization disadvantages and relative trade disadvantages in agro-food products on the EU-15 markets. Only around 11 percent of Slovenian agro-food exports to the EU-15 markets are classified with revealed comparative export advantages and only 15 percent of total agro-food trade of Slovenia with the EU-15 experienced relative trade advantages. These numbers are relatively low. Yet, more than one-third of agro-food imports from the EU-15 countries to Slovenia are classified with relative import specialization disadvantages. These results suggest that Slovenia experienced difficulties to find agro-food products able to be with revealed comparative export advantages on the EU-15 markets, but on the other hand there is also a relatively high proportion of agro-food products where Slovenia is not able to compete on domestic markets with the agro-food imports from the EU-15 markets. The Slovenian imports of agro-food products from the EU-15 markets increased substantially covering domestic consumption where production is either not existent or substituting inefficient domestic production, which is very low or is shrinking.

3.3 Relative trade advantages for agro-food product by the degree of processing

Following Chen et al. (2000)[6] we classify agro-food trade into four product groups by the degree of processing: bulk raw commodities, processed intermediates, consumer-ready food, and horticulture. Table 3 presents levels and compositions of relative trade advantages by product groups.

The RXA indices for Croatia revealed comparative export advantages in agro-food products on the EU-15 markets. In comparison with Hungary, the RXA index for Croatia for processed intermediates is lower, but higher for consumer-ready food. This indicates that Croatia experienced revealed comparative export advantages in specific high-degree processed consumer-ready products. However, the RMA indices for Croatia indicate relative import specialization disadvantages particularly for consumer-ready food and processed intermediates, whereas the RTA indices clearly indicate Croatian relative trade disadvantages on the EU-15 markets. The Croatian relative trade advantage is clearly confirmed only for bulk raw agricultural, food and forestry products. For horticultural products, although the RTA index is close to zero, it is also of a positive sign suggesting relative trade advantages for some Croatian horticultural products (natural honey, plants and parts of plants for perfume for pharmacy) on the EU-15 markets.

Hungarian agro-food product groups explored revealed comparative export advantages on the EU-15 markets, but the level of the RXA indices vary by product groups. The RXA index indicates very strong revealed comparative export advantages for bulk raw agricultural, forestry and food products as well

Tab. 1. Levels and Compositions in Agro-Food Trade

	1995	1996	1997	1998	1999	2000	2001	2002	2003
					Croatia				
Export (in USD)	248,986	240,598	208,806	214,212	210,570	198,059	224,548	286,404	410,253
% bulk raw commodities	60	59	63	69	70	69	60	57	47
% processed intermediates	8	11	10	7	7	8	8	9	7
% consumer-ready food	29	28	25	22	20	21	29	31	44
% horticulture	3	2	2	2	2	3	3	2	2
Import (in USD)	592,577	551,748	513,257	433,810	361,157	361,248	431,860	532,884	668,454
% bulk raw commodities	5	6	7	6	6	7	8	8	6
% processed intermediates	14	18	19	17	17	19	18	18	16
% consumer-ready food	65	63	61	63	64	62	62	62	65
% horticulture	16	13	13	14	14	12	12	11	13
					Hungary				
Export (in USD)	1,392,459	1,449,494	1,297,957	1,324,011	1,321,855	1,237,938	1,320,414	1,511,930	1,898,908
% bulk raw commodities	23	21	20	24	25	26	23	31	26
% processed intermediates	16	16	16	12	12	14	14	13	16
% consumer-ready food	53	57	58	56	56	53	56	49	50
% horticulture	7	7	7	7	7	7	7	8	8
Import (in USD)	627,293	532,309	584,700	597,865	510,508	562,194	649,401	783,559	980,077
% bulk raw commodities	9	10	10	11	12	11	11	10	10
% processed intermediates	24	27	30	29	28	27	24	26	24
% consumer-ready food	54	47	47	44	44	46	48	48	49
% horticulture	13	15	13	16	17	16	16	17	18
					Slovenia				
Export (in USD)	176,196	165,831	158,064	170,576	169,199	153,979	137,437	153,841	187,867
% bulk raw commodities	44	36	39	40	42	44	43	43	42
% processed intermediates	15	23	21	19	19	23	23	20	13
% consumer-ready food	36	36	36	38	36	30	32	35	42
% horticulture	5	5	5	4	3	4	2	2	3
Import (in USD)	567,507	547,532	518,025	521,676	510,318	466,902	453,287	481,432	546,502
% bulk raw commodities	11	13	14	13	15	16	16	16	14
% processed intermediates	16	13	16	15	13	14	16	17	15
% consumer-ready food	58	59	56	56	57	56	53	52	52
% horticulture	14	15	14	16	15	14	15	16	19

Source: Own calculations based on OECD dataset.

as for processed intermediates. For both these product groups there is also found the highest variations in the RXA indices as indicated by the standard deviations of the mean value of the RXA index. Hungarian horticultural products and consumer-ready food explored revealed comparative export advantages on the EU-markets as suggested by the RXA indices greater than one. On the other hand, the Hungarian agro-food product groups explored relative import specialization disadvantages from the EU-15 markets. The RMA index is greater than one for the each product groups, particularly for consumer-ready food where domestic Hungarian food processing faced difficulties to compete with the imported consumer-ready food either in variety for different consumer tastes or in their quality and different consumer preferences as a potential for development of intra-industry trade. The RTA indices indicate Hungarian relative trade advantages on the EU-15 markets for bulk of raw agri-

cultural, forestry and food products and processed intermediates as well as for horticultural products (e.g. paprika and onions), but not for consumer-ready food, where the RTA is of the negative sign suggesting the Hungarian relative trade disadvantages on the EU-15 markets in this product group.

Slovenia experienced revealed comparative export advantages on the EU-15 markets for bulk raw agricultural, food and forestry products as well as for processed intermediates, but not for consumer-ready food and for horticultural products. Slovenia experienced significant relative import specialization disadvantages particularly in consumer-ready food, processed intermediates and also for bulk raw agricultural, food and forestry products and to a lesser extent also for horticultural products. Finally, Slovenian relative trade disadvantages are found in each of the analysed product groups. Except of horticultural products (fresh apples and natural honey), the variations in the RMA

Tab. 2. Levels and Compositions of Relative Trade Advantages for Agro-Food Product

	Revealed comparative export advantage (RXA)		Relative import specialization advantage (RMA)		Relative trade advantage (RTA)	
	Mean	Share of RXA > 1	Mean	Share of RMA > 1	Mean	Share of RTA > 0
			Croatia			
1995	2.57	0.17	11.43	0.33	-8.85	0.23
1996	2.80	0.16	17.53	0.35	−14.73	0.20
1997	2.48	0.16	15.58	0.35	-13.10	0.20
1998	2.34	0.14	11.61	0.35	−9.27	0.20
1999	2.53	0.15	12.64	0.33	−10.11	0.20
2000	2.23	0.15	11.79	0.37	−9.56	0.18
2001	3.39	0.16	21.72	0.41	−18.33	0.20
2002	6.72	0.18	19.63	0.38	−12.91	0.22
2003	5.93	0.18	12.71	0.35	−6.78	0.22
			Hungary			
1995	9.96	0.29	2.86	0.25	7.10	0.38
1996	10.89	0.28	3.78	0.28	7.11	0.37
1997	9.72	0.28	3.05	0.27	6.67	0.36
1998	5.85	0.24	2.74	0.25	3.11	0.36
1999	5.04	0.22	3.84	0.22	1.20	0.37
2000	5.23	0.21	3.30	0.25	1.93	0.33
2001	5.39	0.23	7.75	0.25	-2.36	0.33
2002	6.34	0.22	7.59	0.25	-1.25	0.34
2003	5.02	0.23	4.87	0.28	0.15	0.31
			Slovenia			
1995	1.08	0.14	13.48	0.33	-12.40	0.22
1996	1.25	0.13	16.56	0.33	-15.31	0.20
1997	1.47	0.12	17.42	0.33	-15.96	0.18
1998	1.03	0.11	14.49	0.36	-13.46	0.19
1999	0.96	0.10	21.38	0.34	-20.43	0.17
2000	0.86	0.11	19.00	0.34	-18.14	0.18
2001	0.75	0.10	38.68	0.35	-37.93	0.14
2002	0.74	0.11	30.55	0.34	-29.82	0.16
2003	0.72	0.11	16.81	0.33	-16.09	0.15

Source: Own calculations based on OECD dataset.

and RTA indices are relatively high as suggested by the standard deviation of their mean values indicating instabilities over time.

3.4 Levels and patterns in intra-industry trade

Inter-industry trade prevails in agro-food trade for Croatia, Hungary and Slovenia, respectively, with the EU-15 (Table 4). The share of IIT is relatively low. Their different IIT levels and patterns in development over time imply the degree of integration that is related to trade liberalization and adjustments to the EU membership as well as the impacts of economic growth on trade developments.

Croatia experienced first decline in the share of IIT in the matched two-way agro-food trade from 13% in 1995 to 9.5% in 1998, but the increasing patterns since then to around 18.8% in 2002 or 17.1% in 2003. Within the structure of IIT, low vertical IIT tends to decline and high vertical IIT tends to increase as an implication arising from restructuring of Croatian agro-food sectors. Horizontal IIT varies considerably by individual years with some recovery after 1998.

The degree of the Hungarian agro-food trade integration with the EU-15 is the highest among the analysed countries in the analysed period. Over the analysed years, the share of IIT in the matched two-way trade increased from 23.1% in 1995 to 30.1% in 2003. This increase is consistent with greater mutual Hungarian-EU-15 agro-food trade integration, Hungarian improvements in agro-food sector restructurings and thus improved export abilities, and economic growth that encouraged imports of similar agro-food products by the increased consumers' incomes. Low vertical IIT tends to decline and high vertical IIT tends to increase, which started to prevail in the bilateral matched two-way trade. The proportion of horizontal IIT oscillates over time, but explores downward tendency.

Comparatively with Croatia and even Hungary, the degree of the initial Slovenian agro-food trade integration with the EU-15 markets in the mid-1990s was relatively high, but tends to decline slightly over time from 23.9% in 1995 to 20.8% in 2003. Moreover, at the same time in the structure of IIT, high vertical IIT was being replaced by the increasing importance of low

	Mean			Standard deviation		
	RXA	RMA	RTA	RXA	RMA	RTA
Croatia						
Bulk raw commodities	11.36	2.08	9.28	5.13	1.90	6.03
Processed intermediates	1.11	16.93	−15.82	0.27	7.43	7.61
Consumer-ready food	2.01	21.64	−19.63	1.40	10.23	9.22
Horticulture	1.41	1.25	0.16	0.90	0.15	0.97
Hungary						
Bulk raw commodities	15.45	1.65	13.79	5.70	0.75	5.61
Processed intermediates	9.88	3.72	6.17	3.80	1.36	3.26
Consumer-ready food	1.86	6.53	−4.67	0.49	4.75	5.01
Horticulture	3.40	2.36	1.04	1.04	3.78	3.88
Slovenia						
Bulk raw commodities	1.91	6.15	−4.25	0.26	6.22	6.22
Processed intermediates	1.27	21.37	−20.10	0.67	8.84	8.47
Consumer-ready food	0.49	30.67	−30.18	0.09	20.19	20.22
Horticulture	0.22	1.05	−0.83	0.07	0.09	0.13

Note: RXA - revealed comparative export advantage,
RMA - relative import specialization advantage, and RTA - relative trade advantage.
Source: Own calculations based on OECD dataset.

vertical IIT. Yet, horizontal IIT oscillates over time, but tends to decline.

4 Conclusions

We investigate the revealed comparative export advantage, relative import specialization advantage, relative trade advantage, intra-industry trade and its quality types in agro-food trade of Croatia, Hungary and Slovenia with the European Union (EU) market.

Hungary initially performed the best in agro-food exports on the EU-15 markets, but its export performances have deteriorated over time. On the contrary, the Croatian agro-food revealed comparative export performances on the EU-15 markets have improved over time when Croatia after the war has joined to the preferential trade agreements with the EU-15 markets. The Slovenian agro-food revealed comparative export performances on the EU-15 markets have been found as the worst among the analysed three neighbouring countries. Croatia and Hungary maintained revealed comparative export advantages on the EU-15 markets for about one-fifths to one-fourths of their agro-food exports to the EU-15 markets, whereas for Slovenia this proportion is only around one-tents of the Slovenian agro-food exports to the EU-15 markets. Export orientation of these new emerging market economies with bulk of agricultural, food and forestry products to the EU-15 markets has not been supported enough by improvements in food processing to improve revealed comparative export advantages in higher processed consumer-ready foods.

We have found relative import specialization disadvantages in agro-food products for each of the analysed countries from the EU-15 markets. More than one-fourth of agro-food imports from the EU-15 markets to Hungary and around one-third to Croatia and Slovenia are found with relative import specialization disadvantages. The share of agro-food products' imports from the EU-15 markets to Hungary, Croatia and Slovenia is higher than the share of total merchandise imports. The agro-food imports from the EU-15 countries to Hungary, Croatia and Slovenia increased also because production of these agro-food products is either not existent or very low and less internationally competitive. The EU-15 markets are also much wider by varieties of agro-food products that are produced and much deeper by their sizes of agro-food production. Several agro-food products that are produced in the EU-15 countries are not produced or are produced on a relatively low level or only seasonally in Croatia, Hungary, and Slovenia such as some fruits and vegetables. However, the major difficulties in relative import specialization disadvantages in Croatia, Hungary and Slovenia from the EU-15 markets are in consumer-ready foods and processed intermediaries, but less so for bulk of agricultural, food and forestry products, and horticultural products. Some agro-food productions in Croatia, Hungary and Slovenia during the pre-enlargement period were facing difficulties in successful relative import specialization and thus difficulties to compete with the imports from the EU-15 markets due to structural and restructuring problems or lack of some other factors of international competitiveness as well as possible use of EU-15 export subsidies.

The initial Croatian less promising position in relative trade advantages in agro-food products on the EU-15 markets was also constrained by the difficulties, which the Croatian economy and the agro-food sector faced after the war destructions. Later developments indicate a slight improvement in relative trade advantages, but the agro-food trade with the EU-15 markets continued to face relative trade disadvantages as only around one-

Tab. 4. Levels in Intra-Industry Trade

	Total IIT	Share in Total IIT (%)		
		Horizontal IIT	Low VIIT	High VIIT
Croatia				
1995	13.0	6.8	55.9	37.2
1996	11.5	12.5	58.9	28.6
1997	9.7	9.7	69.6	20.7
1998	9.5	4.3	68.1	27.6
1999	9.8	7.4	65.8	26.8
2000	12.0	8.0	46.2	45.8
2001	14.9	14.6	31.1	54.3
2002	18.8	24.7	27.7	47.7
2003	17.1	11.9	36.7	51.4
Hungary				
1995	23.1	19.6	43.7	36.8
1996	21.9	26.2	45.2	28.7
1997	24.4	24.4	43.1	32.4
1998	25.0	14.9	49.5	35.6
1999	21.3	16.6	46.1	37.3
2000	27.4	5.9	39.2	54.9
2001	29.8	26.4	31.2	42.4
2002	29.6	13.5	31.3	55.2
2003	30.1	12.6	37.0	50.4
Slovenia				
1995	23.9	8.8	39.3	51.9
1996	20.0	10.5	52.8	36.7
1997	19.2	7.8	49.1	43.1
1998	22.1	10.4	48.3	41.4
1999	20.3	9.5	53.9	36.6
2000	19.4	7.8	49.6	42.6
2001	18.5	3.9	56.1	40.0
2002	21.0	5.9	59.2	34.9
2003	20.8	7.1	59.3	33.6

Source: Own calculations based on OECD dataset.

fifth of agro-food trade with the EU-15 markets is classified with relative trade advantages. Only bulk of agricultural, food and forestry products and to a lesser extent horticultural products are found with relative trade advantages. Considerable relative trade disadvantages are found for processed intermediaries and for consumer-ready foods indicating difficulties of the Croatian food processing sector in trade with the EU-15 markets. Hungary experienced deterioration in relative trade advantage in agro-food products on the EU-15 markets with a shift from initial relative trade advantages to relative trade disadvantages. This deterioration of relative trade advantages is also revealed by the deterioration of the relative proportion of agro-food trade with relative trade advantages from more than one-third to less than one-third of agro-food trade between Hungary and the EU-15 markets. The initial results of Hungarian agro-food sector restructurings were more promising in agro-food trade with the EU-15 markets, but seem to be less sustainable with the EU-15 markets over time. Among agro-food product groups with considerable relative trade disadvantages between Hungary and the

EU-15 markets are identified consumer-ready foods, whereas relative trade advantages are found particularly for bulk of agricultural, food and forestry products and processed intermediaries. Slovenian agro-food trade with the EU-15 markets in terms of relative trade advantages has performed the worst with further deterioration of unfavourable relative trade disadvantages and reduction of the proportion of agro-food trade with relative trade advantages with its stabilization at around 15 percent of total agro-food trade between Slovenia and the EU-15 markets. We have not also identified any broader Slovenian agro-food product group by the degree of processing with relative trade advantages on the EU-15 markets.

Therefore, the results for Croatia are somehow in between: closer to Hungary for some bulk crop-based product groups (maize and oilseeds), and closer to Slovenia for some animal and food products (live bovine animals, sheep and goats). Moreover, the IIT measures confirmed improvements in the degree and quality of Hungarian and to a lesser extent Croatian agro-food integration with the EU-15 markets, but a slight worsening in the Slovenian agro-food sector integration with shifts from high quality vertical IIT towards low quality vertical IIT.

The empirical results on relative trade advantages suggest larger scope for an efficient agro-food sector development in Hungary and to a lesser extent in Croatia, but except some individual and niche products, less likely in Slovenia considering the levels and patterns in development of relative trade advantages and types of IIT developments that reflect competitive constraints more likely from natural factor endowments and current less competitive agro-food structures in an open trade on the SEM. This implies that there is also a scope for possible efficiency improvements by transformation and restructuring of the agro-food sectors, investments in technology improvements, food processing and upgrading of product qualities, commercial agro-food trading and marketing. The changes in the agro-food sector and in the rural economy are seen in synergy with new approaches of competitive agro-food production, food processing and marketing within a food chain as a part of multi-sector sustainable rural economy development in the SEM that can be also supported by EU policies. The improvements in economic efficiency and international agro-food trade competitiveness are particularly important for several rural households, which are directly or indirectly engaged in agriculture, with agriculture related socio-economic and other activities in rural areas.

References

1 **Abd-el-Rahman K**, *Firms' Competitive and National Comparative Advantages as Joint Determinants of Trade Composition*, Weltwirtschaftliches Archiv **127** (1991), no. 1, 83-97.

2 **Balassa B**, *Trade Liberalization and Revealed Comparative Advantage*, The Manchester School of Economic and Social Studies **33** (1965), no. 1, 99-123.

3 **Bojnec Š**, *Trade and Revealed Comparative Advantage Measures: Regional and Central and East European Agricultural Trade*, Eastern European Economics **39** (2001), no. 2, 72-98.

4 **Bojnec Š, Fertő I**, *Hungarian and Slovenian Agro-Food Trade with Three Main European Union Partners*, Ekonomický Časopis Journal of Economics **55** (2007), no. 4, 345-358.

5 ―――, *The Catching-Up Process of European Enlargement: Hungarian and Slovenian Agricultural, Food and Forestry Trade*, Eastern European Economics **46** (2007), no. 5, 5-34.

6 **Chen K, Xu L, Duan Y**, *Ex-Post Competitiveness of China's Export in Agri-Food Products: 1980-1996*, Agribusiness **16** (2000), no. 2, 281-294.

7 **Eiteljörge U, Hartmann M**, *Central and Eastern European Food Chain Competitiveness*, The European Agro-Food System and the Challenge of Global Competition. Rome: The International Food and Agribusiness Management Association (ISMEA), 1999, pp. 187-224.

8 *EU-Commission The Agricultural Situation in the European Community 1998*, Brussels: European Commission, 1999. Report.

9 **Fertő I, Hubbard LJ**, *Revealed Comparative Advantage and Competitiveness in Hungarian Agri-Food Sectors*, The World Economy **26** (2003), no. 2, 247-259.

10 **Fertő I**, *Vertically Differentiated Trade and Differences in Factor Endowment: The Case of Agri-Food Products between Hungary and the EU*, Journal of Agricultural Economics **56** (2005), no. 1, 117-134.

11 ―――, *Intra-Industry Trade in Horizontally and Vertically Differentiated Agri-Food Products between Hungary and the EU*, Acta Oeconomica **57** (2007), no. 2, 191-208.

12 **Greenaway D, Hine RC, Milner CR**, *Country-Specific Factors and the Pattern of Horizontal and Vertical Intra-Industry Trade in the UK*, Weltwirtschaftliches Archiv (1994), no. 1, 77-100.

13 ―――, *Vertical and Horizontal Intra-Industry Trade: A Cross-Industry Analysis for the United Kingdom*, Economic Journal **105** (1995), no. 5, 1505-1518.

14 **Grubel HG, Lloyd PJ**, *Intra-Industry Trade: The Theory and Measurement of International Trade in Differentiated Products*, Macmillan, London, 1975.

15 **Liesner HH**, *The European Common Market and British Industry*, Economic Journal **68** (1958), 302-316.

16 **Vollrath TL**, *A Theoretical Evaluation of Alternative Trade Intensity Measures of Revealed Comparative Advantage*, Weltwirtschaftliches Archiv **130** (1991), no. 2, 263-279.