Competition and Dynamics in Trade Patterns: Hungarian and Slovenian Agri-Food Trade with the European Unions' Trading Partners

Štefan Bojnec[A1] and Imre Fertő[A2]

[A1] Associate Professor of Economics, University of Primorska, Faculty of Management, Cankarjeva 5, 6000 Koper, Slovenia. E-mail: stefan.bojnec@fm-kp.si
[A2] Senior Research Fellow, Institute of Economics, Hungarian Academy of Sciences, Budaörsi u. 45, H-1112 Budapest, Hungary. E-mail: ferto@econ.core.hu

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1.   INTRODUCTION

Limited research is available to investigate trade types classifying them into various components. This is particularly relevant for the new European Union (EU) member countries, which during the last fifteen years have undergone transition from central planning to a market economy and rapid adjustments to the EU membership. While one might expect that trade opening, free trade and association agreements, and the EU membership have induced substantial changes in structures of trade flows, there is limited evidence on the magnitude and patterns in trade types potentially caused by these processes. The agricultural sector was one of the most sensitive issues in the EU enlargement process for Central European countries. Therefore, the aim of this paper is to investigate magnitude and dynamics of trade types in agri-food bilateral trade of the selected two new EU member countries (Hungary and Slovenia) with their main trading EU-15 member countries (Austria, Germany and Italy) during accession period. More specifically, we investigate whether there is any catching up in these processes to derive policy implications. Our country's selection is based on the following stylized facts. First, Hungary is a net agri-food exporter, while Slovenia is a net agri-food importer against the EU. Consequently, we can compare the agri-food trade performance of two different countries in the EU markets. Second, three EU countries are the most important trading partners for both Hungary and Slovenia.

The combination of export unit values and import unit values has been used for assessing trade types, product qualities and price competitiveness in trade data (Abd-el-Rahman, 1991; Aiginger, 1997; Ulff and Nielsen, 2000). Relative prices might be combined with some other variables. Gehlhar and Pick (GP) (2002) simultaneously combine unit values as proxies for price with trade balances as proxies for direction of trade to classify price competition and non-price competition in trade data. We extend the GP approach to disentangle the one-way directions of trade either the one-way exports or the one-way imports from the non-price quality competition in the matched two-way bilateral trade. Moreover, we employ insights

from other empirical trade literature, particularly literature on intra-industry trade and literature on intra-sectoral distribution to identify whether there is any catching up in agri-food trade between the new and the old EU members.

The second section presents methodology. In the third section we present empirical results in the following steps: First we classify agri-food trade flows as the one-way or the two-way trade. Second, we employ extended GP approach to investigate catching up in the successful price and non-price competition categories in the matched two-way trade flows. Finally, we analyze the mobility in trade patterns over time using Markov's probability transition matrix. The final section concludes.

2.   METHODOLOGY

Unit values of exports and imports by products have been often used for assessing price competitiveness and product quality in two-way matched trade data. GP employ the unit value difference and the trade balance by product to categorize trade flows in four categories:

Category 1. $TB_{(i,j)} > 0$ (or $V_{(i,j)}^x > V_{(i,j)}^m$) and $UVD_{(i,j)} < 0$ (or $UV_{(i,j)}^x < UV_{(i,j)}^m$)

Category 2. $TB_{(i,j)} < 0$ (or $V_{(i,j)}^x < V_{(i,j)}^m$) and $UVD_{(i,j)} > 0$ (or $UV_{(i,j)}^x > UV_{(i,j)}^m$)

Category 3. $TB_{(i,j)} > 0$ (or $V_{(i,j)}^x > V_{(i,j)}^m$) and $UVD_{(i,j)} > 0$ (or $UV_{(i,j)}^x > UV_{(i,j)}^m$)

Category 4. $TB_{(i,j)} < 0$ (or $V_{(i,j)}^x < V_{(i,j)}^m$) and $UVD_{(i,j)} < 0$ (or $UV_{(i,j)}^x < UV_{(i,j)}^m$)

where the trade balance ($TB_{(i,j)}$) is calculated as $TB_{(i,j)} = V_{(i,j)}^x - V_{(i,j)}^m$ where $V_{(i,j)}^x$ is the value of the *i*-th product exports from a home (domestic) country to the *j*-th partner country and $V_{(i,j)}^m$ is the value of the *i*-th product imports to the home country from the *j*-th partner country. In other words, one country's exports are another country's imports, and vice versa. The unit value difference ($UVD_{(i,j)}$) is calculated as $UVD_{(i,j)} = UV_{(i,j)}^x - UV_{(i,j)}^m$ where $UV_{(i,j)}^x$ is the export unit value, which is calculated as $UV_{(i,j)}^x = V_{(i,j)}^x / Q_{(i,j)}^x$ and $UV_{(i,j)}^m$ is the import unit

value, which is calculated as $UV^m_{(i,j)} = V^m_{(i,j)}/Q^m_{(i,j)}$. In these calculations, $Q^x_{(i,j)}$ and $Q^m_{(i,j)}$ are quantities of exports and imports, respectively, between the home country i and the partner country j. Trade balances indicate successful or unsuccessful competition in trade and export-import unit values determine price or non-price competition. We additionally disentangle the one-way trade from the two-way matched trade. When the one-way trade occurs then the net direction of trade is either surplus, which consists only from exports or deficit, which consists only from imports. For the *one-way* trade we distinguish the two possible one-way categories, i.e. only one-way export category or only one-way import category, that occur when holds the following conditions:

Only export category: $TB_{(i,j)} > 0$ (or $V^x_{(i,j)} > 0$, $V^m_{(i,j)} = 0$) and $UV^m_{(i,j)} = 0$

Only import category: $TB_{(i,j)} < 0$ (or $V^x_{(i,j)} = 0$, $V^m_{(i,j)} < 0$) and $UV^x_{(i,j)} = 0$

The GP approach of four competition categories is applied only on the matched *two-way* trade flows satisfying the simultaneous conditions of the unit value difference and the trade balance by product. In the matched two-way trade flows in the first and third categories the home country i is successful in price and non-price competition, respectively, and vice versa in the second and fourth categories where the home country is unsuccessful in price and non-price competition.

We study catch up in trade patterns focusing on the stability of the trade type categories for particular product groups. This is analyzed in two ways. First, we employ Markov's transition probability matrices to investigate the changes in the price competition and quality competition categories over the time. Second, the degree of mobility in trade type patterns is summarized using indices of mobility. These formally evaluate the degree of mobility throughout the entire distribution of price competition and quality competition categories and facilitate direct cross-country comparisons. The Markov index (M_1), following Shorrocks (1978), evaluates the trace (tr) of the transition probability matrix. This M_1 index thus directly

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captures the relative magnitude of diagonal and off-diagonal terms, and can be shown to equal the inverse of the harmonic mean of the expected duration of remaining in a given cell:
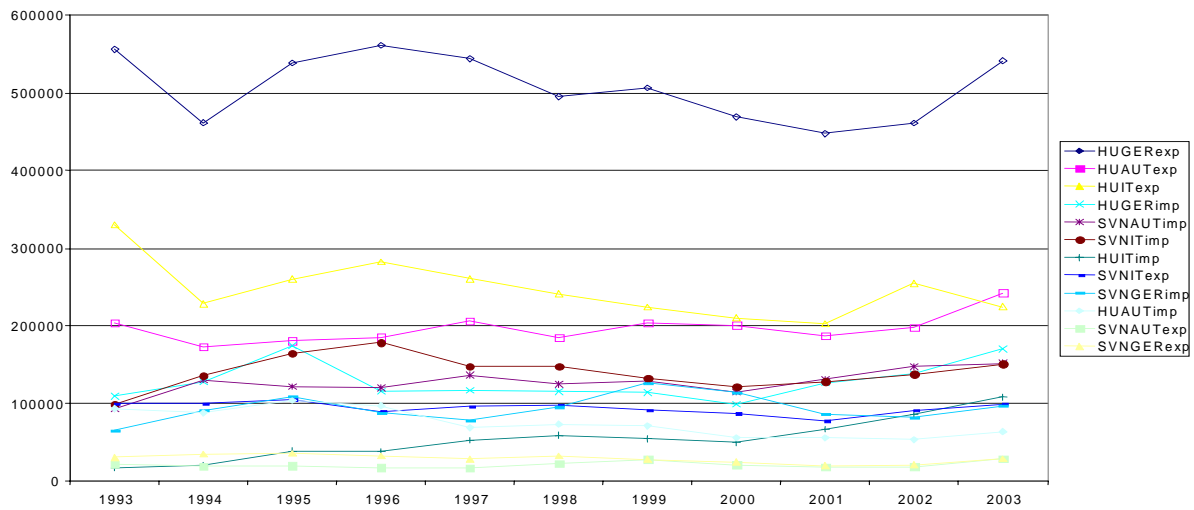
$$M_1 = \frac{K - tr(P)}{K - 1},$$

where K is the number of cells, and P is the transition probability matrix. In M1 indices, a higher value indicates greater mobility, with a value of zero indicating perfect immobility.

3.   DATA AND EMPIRICAL RESULTS

We use detailed trade data from OECD by the years 1993-2003. Agri-food trade is defined by EU-Commission (1999). Sample consists of 255 items at four-digit level in Standard International Trade Classification (SITC) system. When simultaneously comparing trade balance by a product as a proxy for successful competition in trade and unit values as proxies for price competition by the same product, we identify in the pairs of bilateral agri-food trade data by products the one-way trade flows (only exports or only imports) and the matched two-way trade flows. Within the matched two-way trade flows we identify categories of price competition and categories of quality competition where simultaneously exist trade balance by a product and unit export-import values for the same product. Figure 1 presents the value of Hungarian and Slovenian bilateral agri-food trade with Austria, Germany and Italy. Hungary experiences surplus in agri-food trade with Austria, Germany, and Italy, while Slovenia experiences deficit in agri-food trade with Austria, Germany, and Italy. Moreover, Figure 2 shows that the two-way trade dominates between trading partners. The proportion of the two-way matched agri-food trade is particularly great in the bilateral agri-food trade between Hungary and Germany, while for the bilateral agri-food trade between Hungary and Italy there is the significant increase from the prevailing one-way trade to the prevailing matched two-way trade flows. The proportion of the two-way matched trade for the Slovenian agri-food trade with Austria, Germany and Italy is within these two boundaries, which are found for the Hungarian two-way agri-food trade.

Figure 1: Agri-Food Trade (thousands dollars)

Figure 2: Proportion of Two-Way Agri-Food Trade (%)
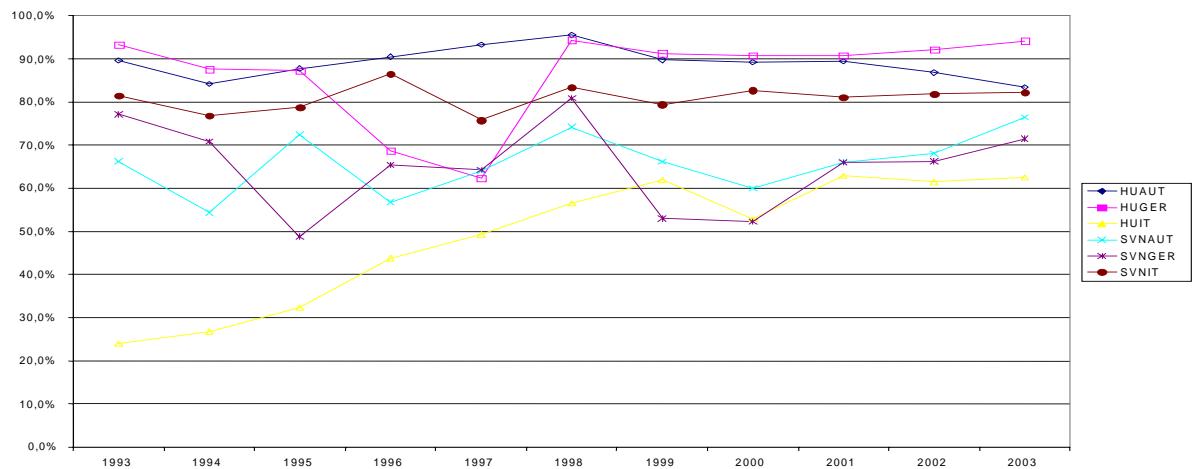
In the Hungarian one-way trade flows the one-way export flows are more significant than the one-way import flows, suggesting Hungarian net agri-food export position in the one-way trade with Austria, Hungary and Italy (Table 1). On the contrary, in the Slovenian one-way trade flows the one-way import flows are much more significant than the one-way export

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flows, suggesting Slovenian net agri-food import position in the one-way trade with Austria, Hungary and Italy, respectively.

Table 1: Classifying Trade Flows (in %)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Hungary-Austria											
One-way trade	10.4	15.8	12.2	9.5	6.7	4.4	10.2	10.8	10.6	13.2	16.5
Two way trade	89.6	84.2	87.8	90.5	93.3	95.6	89.8	89.2	89.4	86.8	83.5
Category 1	58.7	35.7	34.6	22.1	36.4	31.7	39.7	40.2	34.2	34.0	43.3
Category 2	15.9	14.8	21.7	15.9	5.9	10.9	6.7	4.8	15.8	11.0	15.2
Category 3	11.7	36.5	34.5	51.2	43.2	40.4	41.1	39.9	40.7	44.2	38.1
Category 4	13.7	13.0	9.2	10.7	14.5	17.0	12.5	15.1	9.3	10.8	3.4
Hungary-Germany											
One-way trade	6.7	12.4	12.7	31.3	37.7	5.7	8.7	9.2	9.2	7.9	5.8
Two way trade	93.3	87.6	87.3	68.7	62.3	94.3	91.3	90.8	90.8	92.1	94.2
Category 1	44.8	41.8	28.6	44.7	51.5	35.5	33.2	32.3	33.4	29.4	29.8
Category 2	5.3	10.5	19.4	8.5	7.3	5.6	7.7	8.9	9.9	12.7	11.4
Category 3	41.1	39.6	47.7	39.0	29.9	50.4	52.4	54.3	51.7	50.6	48.6
Category 4	8.8	8.1	4.3	7.9	11.3	8.5	6.7	4.5	5.0	7.4	10.2
Hungary-Italy											
One-way trade	76.0	73.2	67.7	56.2	50.7	43.5	38.1	47.1	37.1	38.5	37.5
Two way trade	24.0	26.8	32.3	43.8	49.3	56.5	61.9	52.9	62.9	61.5	62.5
Category 1	82.2	62.8	40.8	34.9	34.5	48.2	58.0	46.9	37.4	40.6	27.0
Category 2	2.2	6.6	14.6	8.8	14.0	14.2	7.6	6.8	7.1	6.6	16.7
Category 3	15.3	24.5	32.7	50.5	44.7	32.3	27.2	32.5	38.6	42.7	43.2
Category 4	0.3	6.1	11.9	5.8	6.7	5.3	7.2	13.8	16.8	10.1	13.1
Slovenia-Austria											
One-way trade	33.7	45.7	27.5	43.2	36.0	25.8	33.8	40.0	33.9	31.9	23.6
Two way trade	66.3	54.3	72.5	56.8	64.0	74.2	66.2	60.0	66.1	68.1	76.4
Category 1	17.3	12.4	10.1	9.9	9.6	15.8	14.9	17.7	14.5	12.8	15.5
Category 2	54.4	41.4	51.4	50.5	58.4	43.8	56.1	62.7	66.2	65.5	67.2
Category 3	2.0	7.1	3.5	7.6	3.3	0.5	2.5	0.4	2.7	4.8	4.1
Category 4	26.3	39.2	35.0	32.0	28.7	39.9	26.4	19.2	16.6	16.9	13.2
Slovenia-Germany											
One-way trade	22.8	29.2	51.2	34.5	35.8	19.1	47.0	47.8	34.0	33.7	28.5
Two way trade	77.2	70.8	48.8	65.5	64.2	80.9	53.0	52.2	66.0	66.3	71.5
Category 1	22.0	27.7	23.2	22.0	27.8	27.1	27.2	15.6	18.7	18.3	18.9
Category 2	38.4	19.6	19.2	26.1	23.2	47.8	19.3	22.0	23.4	26.2	28.5
Category 3	15.1	7.9	21.9	16.0	11.6	0.9	10.3	14.5	6.5	8.5	11.9
Category 4	24.6	44.7	35.6	35.9	37.3	24.1	43.3	47.9	51.4	47.0	40.7
Slovenia-Italy											
One-way trade	18.5	23.1	21.2	13.5	24.2	16.5	20.6	17.3	18.9	18.2	17.8
Two way trade	81.5	76.9	78.8	86.5	75.8	83.5	79.4	82.7	81.1	81.8	82.2
Category 1	43.8	44.6	40.7	34.0	42.5	33.8	42.3	42.6	38.4	41.1	34.9
Category 2	20.8	21.5	30.1	39.2	27.5	29.0	31.7	32.1	30.5	26.4	27.6
Category 3	12.0	8.3	7.6	4.8	3.8	9.6	4.5	3.8	5.0	4.7	10.3
Category 4	23.4	25.6	21.7	22.0	26.2	27.6	21.4	21.4	26.2	27.8	27.2

Source: Own calculation based on OECD database.

The two-way matched trade flows are presented for the four competition categories with Hungary and Slovenia, respectively, as the base trade destinations. The first and second

categories relate to price competition. The third and fourth categories relate to non-price (quality) competition. Within the matched two-way trade flows, the first category, where Hungary (Slovenia) has the positive agri-food trade balance with the trading partners (Austria, Germany and Italy) at the lower export unit value than import unit value. The first category is more significant in the initial stage of transition than at the end of the analyzed period, and is less significant in the Slovenian than in Hungarian agri-food trade. These deteriorations of the price competition category in bilateral agri-food trade from Hungary and Slovenia, respectively, suggest that their agri-food exports to their EU trading partners over time have been less in a position to achieve positive trade balance from the Hungarian or Slovenian low-price location to the higher-price location in EU. Within the Hungarian two-way matched agri-food trade with Austria, Germany and Italy there is a shift from price competition (i.e. shift from the first category) towards quality competition (i.e. shift towards the third category). The rapid decline in the first category is found in trade between Hungary and Italy, but also in Hungarian trade with Austria and Germany. The second category comprises products where Hungary (Slovenia) has the negative agri-food trade balance with the EU trading partners (e.g. Austria, Germany and Italy) at the higher export unit value than import unit value. The Hungarian (Slovenian) agri-food trade deficit in the second category of products is consistent with the price competition assumption as the net direction of trade is from the low price partners' locations (Austria, Germany and Italy) to high price location (Hungary and Slovenia). The second category is less significant for Hungary, but increases in Hungarian trade with Germany and Italy, respectively. The second price competition trade categories for the Slovenian agri-food trade across the analyzed trade partners vary. The importance of the second price competition category further increased in agri-food trade between Slovenia and Austria, but declined in agri-food trade between Slovenia and Germany. The significance of the second price competition category increased in bilateral

agri-food trade between Slovenia and Italy. Therefore, the second price competition category is much more significant in the Slovenian agri-food trade particularly with Austria, where this category represents the most significant component in the matched two-way trade.

These results confirmed that the significance of the price competition categories has declined for the Hungarian matched agri-food trade, while for Slovenia results vary by individual trading partners. Within the matched two-way trade for Hungary only in agri-food trade with Austria the first and second price competition categories remain more significant than the third and fourth quality competition categories. For Slovenia, the first and second price competition categories remain the most significant in agri-food trade with Austria and Italy, but not with Germany where the price competition become less significant than the third and fourth quality competition categories within the matched two-way trade flows.

The third category comprises products where Hungary (Slovenia) has the positive agri-food trade balance with the selected EU partners at the higher export unit value than import unit value. For Hungary, the third quality competition category has increased over time and thus has strengthened its significance in matched two-way agri-food trade with Austria, Germany and Italy. This development pattern can be described as successful quality competition where the Hungarian agri-food trade surplus was achieved under a price disadvantage. In behind of higher export unit value than import unit value can be embodied new varieties and quality of products as a reflection of agri-food restructuring as well as consumer preferences and their willingness to pay for varieties and qualities. While the significant increase in the third category is found for Hungarian agri-food trade, much more diversified development patterns are found for the third quality competition category for Slovenian agri-food trade. It is relatively less significant in Slovenian agri-food trade with Austria, but also has declined slightly in agri-food trade with Germany and Italy indicating difficulties in the Slovenian agri-food sector to find quality and niche export products for the EU markets.

The fourth quality competition category contains products where Hungary (Slovenia) has the negative agri-food trade balance with the EU partners (Austria, Germany and Italy) at the lower export unit value than import unit value. This fourth quality competition category is the least significant category in Hungarian matched two-way agri-food trade with Austria, Germany and Italy. On the contrary, the fourth quality competition category is more significant than the third quality competition category in Slovenian matched two-way agri-food trade with Austria, Germany and Italy. The fourth quality competition category for Slovenia deteriorates with Austria, but increases with Germany, and Italy. The negative Slovenian agri-food trade balance at the lower export than import unit value with Germany is the most significant in the matched two-way agri-food trade flows.

Table 2: Changes in Dynamics of Two-Way Trade Patterns (in %)

PARTNER	CATEGORY	Hungary		Slovenia	
		1993	2003	1993	2003
Austria	1	58.7	43.3	17.3	15.5
Austria	2	15.9	15.2	54.4	67.2
Austria	3	11.7	38.1	2.0	4.1
Austria	4	13.7	3.4	26.3	13.2
Germany	1	44.8	29.8	22.0	18.9
Germany	2	5.3	11.4	38.4	28.5
Germany	3	41.1	48.6	15.1	11.9
Germany	4	8.8	10.2	24.6	40.7
Italy	1	82.2	27.0	43.8	34.9
Italy	2	2.2	16.7	20.8	27.6
Italy	3	15.3	43.2	12.0	10.3
Italy	4	0.3	13.1	23.4	27.2

Source: Own calculations based on OECD database.

Table 2 compares results for the matched two-way trade between 1993 and 2003. For both Hungary and Slovenia, the values for the first price competition category declined suggesting deterioration of agri-food price competitiveness in these EU markets. Except for Hungarian two-way agri-food trade with Italy, the significance of the first price competition category for Hungary remains more significant than for Slovenia suggesting that the Hungarian agri-food sector explores greater price competitiveness than Slovenian one. The proportion of the

second competition category for Hungary is less than for Slovenia suggesting that the Hungarian agri-food sector seems to perform better in import price penetration.

The significance of the third quality competition category for Hungary is greater than for Slovenia suggesting Hungarian comparative agri-food trade advantages over Slovenia in these EU markets. The share of the third quality competition category for Hungary further increased, but declined for Slovenian two-way trade with Germany and Italy. The relatively high role of the third quality competition category for Hungary indicates that its agri-food trade specialization in matched two-way trade flows is on high-quality product varieties typical for export-oriented countries with more developed food processing and demands by consumers in trading partners (Austria, Germany and Italy) with higher incomes for high-quality agri-food products.

The fourth quality competition category in two-way agri-food trade flows is less for Hungary than for Slovenia. This is consistent with higher consumer incomes in Slovenia than in Hungary and thus it is likely to be associated with a greater preference by Slovenian consumers for imported product varieties. The share of the fourth quality competition category for Hungary and Slovenia, respectively, declined in two-way agri-food trade with Austria, but increased in two-way agri-food trade with Germany and Italy.

Finally, except for Hungarian agri-food trade with Austria, the decline in successful price competition has been greater than the increase in successful quality competition indicating an absence of catching up in the successful price and successful quality competition in the two-way matched trade flows.

Table 3 reports for each country pairs the five items of top export shares at the beginning of sample period and corresponding export shares at the end of time interval, and respective competition categories. At the beginning of period the meat and wood products played the most important role in Hungarian agri-food exports to its trading partner. The share of the top

five products has decreased at the end of period for all partners, indicating a relative high mobility in the top five items. The competition categories show also varying pattern across time and country pairs. At the beginning of period the first category was dominant between Hungary and Austria, the third category between Hungary and Germany, and the one-way exports between Hungary and Italy. At the end of period some product groups moved from the first category and one-way exports to the third category.

Table 3: Changes in Dynamics of Trade Patterns in Top Five Products

	export share (per cent)		competition categories	
Hungary-Austria	**1993**	**2003**	**1993**	**2003**
0123: Meat and edible offal of the poultry of 0014	14.8	7.7	1	3
2475: Wood. non-coniferous. in the rough. not treated	9.7	5.5	1	1
0545: Other fresh or chilled vegetables	5.6	6.2	1	3
2474: Wood. coniferous species. in the rough. not treated	4.2	3.7	1	1
2450: Fuel wood (excluding wood waste) and charcoal	4.0	2.2	0	0
Hungary-Germany				
0123: Meat and edible offal of the poultry of 0014	15.4	23.9	3	3
0567: Vegetables. prepared or preserved. n.e.s.	7.8	6.5	1	3
0172: Sausages and similar. of meat. meat offal or blood	7.0	4.9	3	3
0122: Meat of swine. fresh. chilled or frozen	5.7	1.6	3	2
2919: Materials of animal origin. n.e.s.	5.2	3.1	3	3
Hungary-Italy				
0012: Sheep and goats. Live	17.5	18.2	0	0
0129: Meat and edible meat offal. n.e.s.	14.6	4.2	0	3
0123: Meat and edible offal of the poultry of 0014	8.7	6.9	0	3
2475: Wood. non-coniferous. in the rough. not treated	8.3	6.5	0	0
0011: Bovine animals. Live	7.1	0.9	0	1
Slovenia-Austria				
2482: Wood of coniferous species. sawn. sliced.	21.9	6.7	2	2
2484: Non-coniferous wood. sawn lengthwise.	10.3	15.4	1	1
0371: Fish prepared or preserved. n.e.s.; caviar	8.0	9.5	1	1
0221: Milk and cream. not concentrated or sweetened	7.2	2.2	1	1
2474: Wood. coniferous species. in the rough. not treated	6.8	7.2	1	3
Slovenia-Germany				
0548: Vegetable products. roots & tubers. edible. N.e.s.	21.8	16.3	3	3
0622: Sugar confectionery (incl. White chocola.). no cocoa	12.0	19.1	1	1
0176: Meat. offal of bovine an. prepared. preserved.	11.5	0.2	1	1
0733: Other food preparations with cocoa. in blocks. Bars	5.3	2.1	4	2
0599: Juice of any single fruit or vegetable; mixtures	4.4	0.9	3	1
Slovenia-Italy				
2484: Non-coniferous wood. sawn lengthwise. thickness	20.5	28.2	1	1
0111: Meat of bovine animals. fresh or chilled	13.3	6.8	3	0
2475: Wood. non-coniferous. in the rough. not treated	10.2	11.6	1	1
2111: Bovine or equine hides and skins	8.4	9.7	1	3
0545: Other fresh or chilled vegetables	8.4	0.5	2	2

Source: Own calculations based on OECD database.

At the beginning of period the Slovenian agri-food trade pattern was rather different across trading partners in the top five product groups. The share of the top five products show a declining trend during the analyzed period for all partners, indicating a relative high mobility in top five items. Similarly to Hungary, the competition categories have changed over time and across country pairs. At the beginning of period the first category played the most important role between Slovenia and Austria, the first and third category have equal share between Slovenia and Germany, and the first category again between Slovenia and Italy. At the end of the period two product groups moved from the first category and one-way exports to the third category and one vice versa or to the one-way exports.

Table 4: Markov's Matrices between the Years 1993 and 2003.

	Hungary														
	Austria					Germany					Italy				
	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
0	84.5	4.2	4.2	4.2	2.8	81.4	7.9	5.0	1.4	4.3	83.8	7.8	1.5	5.9	1.0
1	33.3	38.9	5.6	16.7	5.6	14.0	40.0	8.0	24.0	14.0	11.8	38.2	17.6	11.8	20.6
2	44.4	16.7	22.2	11.1	5.6	33.3	0.0	25.0	8.3	33.3	25.0	0.0	25.0	25.0	25.0
3	38.1	14.3	4.8	38.1	4.8	22.2	18.5	22.2	29.6	7.4	27.3	36.4	9.1	18.2	9.1
4	45.0	5.0	40.0	0.0	10.0	30.8	15.4	7.7	3.8	42.3	50.0	0.0	0.0	0.0	50.0
	Slovenia														
0	89.7	1.5	4.1	0.5	4.1	92.6	2.1	1.1	0.0	4.2	91.0	1.8	2.4	0.0	4.8
1	28.6	42.9	14.3	7.1	7.1	20.0	26.7	13.3	6.7	33.3	21.7	43.5	0.0	17.4	17.4
2	12.5	0.0	50.0	6.3	31.3	52.6	0.0	31.6	0.0	15.8	27.3	9.1	36.4	4.5	22.7
3	50.0	16.7	16.7	0.0	16.7	33.3	22.2	11.1	33.3	0.0	62.5	12.5	12.5	12.5	0.0
4	33.3	8.3	25.0	4.2	29.2	45.5	9.1	18.2	0.0	27.3	31.4	2.9	25.7	0.0	40.0

Source: Own calculations based on OECD database.

Table 4 presents the Markov's matrices in more detail. At least four important findings are possible to derive from this table. First, the probability of remaining in the one-way trade (category 0) is very high (at least 81%) suggesting that one-way trade is likely to be significant also in the near future. Second, on the contrary, the results on the diagonal for the price and non-price competition categories 1 to 4 indicate that the probability to stay in the same competition category is relatively low (between 18% and 50%). Our focus is on successful price competition (category 1) and on successful non-price competition (category 3). The probability of remaining in the first category (between 26% and 44%) and in the third

category (between 0% and 38%) is relatively low. Third, the chance moving from successful price competition category 1 to successful non-price competition category 3 is less than vice versa in Slovenia, except with Italy, but the opposite holds for Hungary, except with Italy. This is consistent with our previous findings that for Hungary there is a shift from the first to the third category, and vice versa for Slovenia, but the exception being in both cases agri-food trade with Italy. Finally, the probability moving from less good (category 2 of non-successful price competition and category 4 of non-successful non-price competition) to better competitive positions (category 1 of successful price competition and category 3 of successful non-price competition) seems to be better for Hungary than for Slovenia. For Hungarian matched two-way trade with Austria there is an important move from the second to the first category and a bit less to the third category, but less significant is move from the fourth to the first category. In Hungarian matched two-way agri-food trade with Germany, there is a certain move from the second to the third category, as well as from the fourth to the first and a bit less to the third category. In Hungarian matched two-way agri-food trade with Italy, there is a shift from the second to the third category, but no any shift from the fourth to the first or to the third category. For Slovenian matched two-way agri-food trade with Austria, there is a little shift from the second to the third category and from the fourth to the first and third categories. In Slovenian matched two-way agri-food trade with Germany, there is no any shift from the second to the first or to the third category, but only a certain shift from the fourth to the first category. In Slovenian matched two-way agri-food trade with Italy, some shifts are from the second to the first and the third category, and from the fourth to the first category.

Table 5 presents summary on mobility indices, which are calculated for the patterns in bilateral agri-food trade flows. The size of the mobility indices for the first period (1993-1998) is greater than for the second period (1999-2003) indicating the decline and more stable trade patterns in the second period with fewer movements across categories. There are

differences in the size of the mobility indices across countries as well as when the comparison is made between the two sub-periods with the whole analyzed period 1993-2003. Only in the two cases (Hungary with Italy and Slovenia with Germany) the mobility indices are in the size within their values for the two sub-periods.

Table 5: Mobility Indices (M1)

	1993-2003	1993-1998	1999-2003
Hungary-Austria	0.766	0.749	0.620
Hungary-Germany	0.704	0.643	0.556
Hungary-Italy	**0.712**	0.762	0.568
Slovenia-Austria	0.721	0.685	0.633
Slovenia-Germany	**0.721**	0.795	0.603
Slovenia-Italy	0.692	0.671	0.562

Source: Own calculation based on OECD database.

4. CONCLUSIONS

Competition in trade data using export and import unit values and net directions of trade, and the mobility of trade patterns by Markov's probability transition matrix have been investigated. For both Hungary and Slovenia, the two-way trade flows with the selected main EU trading partners are more significant than the one-way trade flows. Within the two-way trade flows for Hungarian agri-food trade, the prevalence is on the first category of successful price competition and on the third category of successful non-price, quality competition. Except in Hungarian agri-food trade with Austria, we did not find catch-up in successful competition in the matched two-way trade as the sum of the successful price competition and successful non-price competition at the end of the analyzed period is less than at the initial analyzed year. For Slovenia, within the price competition categories, the second category of non-successful price competition is more significant than the first category of successful price competition. This suggests possible price disadvantages of domestic agri-food sectors vis-à-vis import price competition. Within the quality competition categories, the fourth non-successful non-price competition category is more significant than the third successful non-price competition category suggesting lack of Slovenian non-price competition in the

domestic agri-food sector based on comparative advantages. Similar as for Hungary, also for Slovenia we did not find catch-up in the successful price and non-price competition in the matched two-way agri-food trade with the selected EU markets. The patterns in bilateral agri-food trade flows show decline in trade flows mobility, which is consistent with more stable trade patterns across product categories over time. This greater stability indicates greater maturity in bilateral trade flows, which have been adjusted following trade liberalization. There is the increase of the two-way matched trade flows, which are likely to further increase upon the EU accession. This would be consistent with trade theory, which predicts that trade creation induced by economic integration and economic growth are more likely to be reflected by higher proportion of matched two-way trade to utilize economies of scale in production and to diversify product quality varieties, which are demand by the increasing consumers incomes.

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