TRADE TYPES IN SLOVENIAN PRIMARY AND PROCESSED AGRICULTURAL TRADE

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Paper prepared for presentation at the XI[th] EAAE (European Association of Agricultural Economists) Congress, 'The Future of Rural Europe in the Global Agri-Food System', Copenhagen, Denmark, August 24-27, 2005

ABSTRACT

The significance of the processed food products in agricultural and food trade is increasing in Slovenia as well as in the other developed countries. The large share of agricultural and food trade is inter-industry trade. The significance of intra-industry trade (IIT) is increasing with the degree of processing. In particular, IIT is based on products differentiated in quality where low quality vertical IIT prevails. This kind of trade specialization and trade patterns, together with trade geography, imply some similarities in these trade developments with developing countries and countries with less competitive food processing rather than with more advanced European Union countries with the competitive food processing sector.

Key words: trade types, trade quality, intra-industry trade.
JEL classification: F10, F14, F15.

Acknowledgements

This paper is based on the research results of the research project "Analysis of trade flows and comparative advantages of Slovene agri-food products« financed by Slovene Ministry of Higher Education, Science and Technology, and co-financed by Perutnina Ptuj, d.d., Slovenia.

1. Introduction

Agricultural and food trade over the last few decades have been widely analysed for developed and developing countries by several studies. Attempts to explain agricultural and food trade flows have followed a number of different approaches of comparative advantage and intra-industry trade (IIT) (e.g. Balassa, 1965; Grubel and Lloyd, 1975). The WTO (2004) argued that the importance of processed agricultural products in the world trade with economic growth is increasing. The processed agricultural products prevail in trade of rich countries, while primary agricultural produce prevail in trade of poor and less developed countries. Although the relative importance of agricultural products in trade declines, there is a considerable structural change within agricultural and food trade. Trade in processed agricultural products tends to increase, while trade in primary agricultural products may even explore declining tendency across some countries and product groups.

The purpose of this paper is to examine IIT in Slovenia to study differences and similarities in trade specialization patterns between primary and processed agricultural and food products across product groups, over time and in comparison with some other countries. Bojnec and Hartmann (2004) conducted a study on Slovenian agricultural and food trade developments using IIT approach. However, their in-depth study does not cover the empirical analysis of horizontally and vertically differentiated products according to the level of processing. Therefore, the main objectives of our study are the following. First, we distinguish agricultural and food trade flows by the degree of processing on primary, processing and other agricultural and food products separately for direct household consumption and for industry processing. With this, we add to the existent literature for Slovenia as well as for other transition countries, where such approach so far has largely been neglected. Second, Slovenia is often considered as the new European Union (EU) member, which largely complies with the EU rules and competition standards. Does it hold also for agricultural and food trade? Is Slovenian agricultural and food trade structure in primary and processed products more consistent with findings for developed or for developing countries? Third, we want to investigate trade

structures, trade types and trade specialization patterns over time to derive implications of broader policy relevance.

The sections are organized as follows. In the next section, a brief overview of findings in the previous trade studies is presented. The third section presents the methodology and data used in this our study. The fourth and fifth sections explain and compare our empirical results with the similar results for the EU countries, while the final section concludes with policy implications.

2. Findings of the previous studies

In the general analysis of international and intra-regional trade specialization a main focus has been devoted to the evaluation of IIT. One important distinction in IIT is made between horizontal and vertical product differentiation. Greenaway *et al*. (1994) and Fontagné *et al*. (1997) introduced most widely accepted standard methods for measuring horizontal and vertical IIT, which are based on unit trade values. According to Fontagné *et al*. (1997), the sectoral adjustments while entering the economic integration may follow two different paths. On one side, the increased specialization along comparative advantages may rise in inter-industry trade with simultaneous exports and imports within industries, which may lead to more costly adjustments. On the other side, a convergence in production structures should increase IIT. The latter, based upon similarity of nations, may lead to cost-free adjustments, increased efficiency and welfare gains associated with variety.

The tendency towards more processed goods in world exports of agricultural and food products, has been observed by Gehlhar and Coyle (2001) who argue that an important factor in the changing structures of world agricultural trade is the dominant role of developed countries. They import a much greater share of processed consumer goods than developing countries, while the opposite is true for bulk commodities. The growth in imports of processed food products by developed countries is not necessarily a reflection of increased per capita consumption or diet upgrading but rather diversification of consumption towards foreign varieties. Surry *et al.* (2002) also presented the increasing tendency in agricultural and food trade towards processed goods. Some issues arising in the application of the Armington model to trade in processed food products were explained in their econometric investigation for France, using a differentiated-product approach. According to the WTO (2004), the empirical evidence of a shift from unprocessed to more processed agricultural and food products is consistent with a well-known trend in world trade capturing the shift towards an increased share of manufactures at the expense of primary products. Two factors favour the expansion of processed goods over unprocessed goods. First, processed goods have a larger potential for IIT and offer more possibilities for product differentiation than unprocessed goods. Second, the potential to increase value added for a given consumer food product is, in general, far larger for processed than for unprocessed foods. As per capita income levels increase, consumers appreciate a larger variety of similar products and increasingly buy goods with a brand label. In developed countries, there is a general tendency towards a smaller household size with an increase women participation in the labour force, which causes and strengthens consumption trends towards more processed food at the expense of unprocessed food. Having observed a global trend towards an increased share of processed goods in agricultural trade, the question arises as to whether all regions and countries shared in this described development patterns. The general answer to this question is affirmative, with some noticeable exceptions. About three quarters of the countries for which data were available in the United Nations (UN) Comtrade database recorded an increase in the share of processed goods in their agricultural

trade between 1990-91 and 2001-02. This observation holds for both exports and imports. It appears that all countries with a very low share of processed goods in their agricultural exports (15 per cent or less) are low or low middle-income countries (e.g. Cameroon, Ethiopia, Honduras, Pakistan, Sri Lanka, Uganda and Zimbabwe). To summarize, processed agricultural products have been a more dynamic component of international agricultural trade in the 1990s than unprocessed and semi-processed goods. This is true for a large majority of developed and developing countries across a wide range of products. Agricultural exports of developing countries to high-income markets also experienced this structural change. However, with respect to agricultural exports of low-income countries to the three major high-income markets, no shift towards an increased share of processed goods could be observed.

In spite of a fact that several studies on trade structures, nature of IIT and comparative advantage have been conducted for Central and Eastern European (CEE) transition countries (e.g. Hoekman and Djankov, 1997; Eiteljörge and Hartmann, 1999; Bojnec, 2001; Fertö and Hubbard, 2003), so far very rare studies differentiated between processed and unprocessed agricultural products in the analysis of agricultural and food trade for CEE transition countries. Another strand emphasizes the role of foreign direct investments on IIT patterns in agricultural and food products and their implications for East-West integration and agricultural and food trade flows (Van Berkum, 1999; 2002). Bojnec and Hartmann (2004) analysed static and dynamic IIT measures considering only Standard International Trade Classification (SITC). In this paper we analyse the extent and nature of IIT for primary and for processed agricultural products, respectively, using Grubel and Lloyd's (1975) index and an extended Greenaway at al. (1994), Fontagné et al. (1997) and Díaz Mora (2002) methodological approach. At the same time we applied differently classified agricultural and food trade data.

3. Methodology and data used

The export (import) shares of product group *i* are given by:

$$(1) \qquad X_i\% = \frac{X_i}{\sum_i X_i} \cdot 100 \quad \text{or} \quad M_i\% = \frac{M_i}{\sum_i M_i} \cdot 100 \,,$$

where $X_i\%$ denotes export share of product group *i* in total exports and $M_i\%$ denotes import share of product group *i* in total imports.

To measure IIT, we use Grubel-Lloyd's (1975) IIT index (GLIIT): it reflects the proportion of balanced trade of the country in a given product group *i* in the year *t*:

$$(2) \qquad GLIIT_i = \left(1 - \frac{\sum_j \left| X_{ij} - M_{ij} \right|}{\sum_j (X_{ij} + M_{ij})} \right) \cdot 100 \,,$$

where X represents value of exports and M value of imports, *i* and *j* represent product groups. The GLIIT index is equal to 100 if all trade of the country is IIT and it is equal to 0 if all trade is inter-industry trade. Since integration increases a share of IIT, the GLIIT index is often considered as an indicator for economic integration among countries with similar factor endowments.

The methodology to measure the nature of IIT was proposed by Abd-el-Rahman (1991) and later by Greenaway *et al*. (1994) and some others. It is often assumed that differences in prices reflect quality differences. So, to measure trade quality differences, we use differences in unit values of exports and imports. A threshold of 15 per cent for trade overlap is introduced (see also Abd-el-Rahman, 1991; Greeneway *et al*., 1994; Fontagne *et al.*, 1997). When the minority flow represents at least 15 per cent of majority flow, that overlap is considered IIT. Below that threshold, the trade overlap is not significant and it is defined as inter-industry type. The ratio export-to-import prices within a 15 per cent threshold in a given year is considered as similar or horizontally differentiated (Fontagné *et al.*, 1997):

$$(3) \qquad 1.15 \leq UV_{kk'pt}^{X} / UV_{kk'pt}^{M} \leq 1.15,$$

where UV refers to unit value and X and M refer to exports and imports, respectively, at the 6-digit Combined Nomenclature (CN) level. When equation (3) does not hold, products are considered as vertically differentiated. So, IIT is divided into horizontally (HIIT) and vertically (VIIT) differentiated products:

$$(4) \qquad IIT = HIIT + VIIT.$$

It is assumed that VIIT has two components, high quality (HQVIIT) and low quality (LQVIIT) (Díaz Mora, 2002). A high share of LQVIIT implies that a country is specializing into relatively low-price export goods in the vertically differentiated product groups or sectors. A high share of HQVIIT implies that VIIT is in the former of high-value added exports. Therefore, trade flows can be classified into three trade types according to the similarity in unit values (UV) and to the overlap in trade flows. Table 1 summarizes the criteria for decomposition of trade flows and trade flows' classification, as it is used in the empirical part of this paper.

Table 1: Criteria for decomposition of trade flows and trade flows classification.

Degree of Overlap between Export (X) and Import (M) Values**:** Does the minority flow represent at least 10% of the majority flow?	Similarity of Export and Import Unit Values: Do X and M unit values differ less than 15%?	
	Yes (horizontal differentiation)	No (vertical differentiation)
Yes	*Two way trade in similar products*	*Two – way trade in vertically differentiated products* LQVIIT: if $UV_{kk'pt}^{X} / UV_{kk'pt}^{M} < 1/1.15$: low export prices (indicates low export quality) and high quality of imports HQVIIT: if $UV_{kk'pt}^{X} / UV_{kk'pt}^{M} > 1.15$: high export quality and low import quality
No	*One – way trade*	

Source: Fontagné et al., 1997; Díaz Mora, 2002; and own set conditions for trade flows classification.

In this study for Slovenia, the trade indices for agricultural and food products have been calculated at the 6-digit CN level, Chapters from 1 to 24, on the basis of the trade data obtained from the Statistical Office of the Republic Slovenia. The data comprised exports and imports of agricultural and food

products for the year 1992 and for the years from 1996 to 2003 for all trading partners. Later, the data was aggregated from the individual 6-digit CN level into 10 product groups: *cereals, fruits and vegetables, meats, dairy products, sugar, oilseeds, beverages, spices, fish, and other.* The products were aggregated based on the CN classification, with the contribution of technologists of the INRA (Chevassus-Lozza and Gallezot, 1998).

Moreover, data from the individual 6-digit CN level was divided into 6 agricultural and food products groups according to their degree of processing (or value added content) rather than by product groups or sectors. In this aggregation process the classification of Broad Economic Categories (BEC) of UN was used. According to this classification of the nature of commodities, we distinguish the following 6 groups of agricultural and food products: 111 - food and beverages (F&B), primary, mainly for industry processing; 112 – F&B, primary, mainly for household (HH) consumption; 121 – F&B, processed, mainly for industry use; 122 – F&B, processed, mainly for HH consumption; 21 - industrial supplies not else specified-primary, and 22 - industrial supplies not else specified-processed.

4. Empirical results

The general finding argued in literature on trade patterns for agricultural and food products is that developed countries largely specialize towards exports in high value-added processed products, while developing countries towards exports in primary agricultural products (Gehlhar and Coyle, 2001; WTO, 2004). According to relative income per capita for 1995, Slovenia together with Israel and Singapore is classified as the high-income non-OECD country (WTO, 2004, p. 197). On this basis one may expect, that if structures in the economy are approximately equally developed, including in agriculture and the food sector, then Slovenia should be among those countries specializing in exports of high value-added processed agricultural and food products. However, an examination of the trade structures and trade patterns suggest that low value-added products prevailed among trade structures and only minority of agricultural and food trade is in higher value-added products. This suggests comparative disadvantage in agricultural and food trade for Slovenia. The finding is consistent with some previous studies using comparative advantage approaches (e.g. Eiteljörge and Hartmann, 1999) implying that different agricultural and food country's-specific factors such as agricultural land, capital and labour, and constraints in food processing are among those factors hindering agricultural and food sector efficiency and their international competitiveness (see also Greenaway *et al*., 1994 and Díaz Mora, 2002 for an overview of general literature; Van Berkum 1999 and 2002, Gehlhar and Coyle, 2001, WTO, 2004, for more specific literature on structures and patterns in agricultural and food trade).

Looking from the trade perspective, Slovenian agriculture is certainly not a driving force of the Slovenian economy. Even brief look at the agri-food trade developments, which performed with traditionally negative trade balance (Table 2), gives us a superficial picture of the Slovenian agricultural and food sector. The negative balance on all but former Yugoslav states' market provides first indication that Slovenia lacks competitiveness in the agricultural and food sector vis-à-vis the majority of its trading partners. Of course the status of net-importer country may be to some extent justified by the fact that for farming in Slovenia the conditions are unfavourable and that the supply cannot follow the demand. But for the trade structures with relatively low level of value added no such justification is to be seen, and the need for deeper structural reforms of the agricultural and food sector is the future necessity. To continue with patterns of trade geography, they are influenced by different

factors, such as political and economic factors, but also with historical and cultural linkages. Slovenia started to diversify its trade during the 1980s with the economic decline of the former Yugoslav economy, but reorientation was more substantial for other manufactured goods rather than for agri-food products. Agricultural and food imports from other than former Yugoslav market were hindered by high level of special import levies, and due to these protectionist measures inter-republic agri-food trade remained dominant. Slovenia imported mainly primary products (cereals) from Croatia and Serbia, while exporting processed products to former Yugoslav markets (Bojnec and Hartmann, 2004). So, with all this in mind, Slovenian export of agri-food products in last decade still reveals rather unexpected picture. Instead of orienting more towards the EU markets (due to the expected accession), Slovenian exporters have still focused mainly to the traditional markets of former Yugoslav republics and even expanded their exports to these markets up to the Slovenian accession into the EU. This can be explained by bilateral free-trade agreements between Slovenia and the former Yugoslav states (Bosnia and Herzegovina, Croatia and the Former Yugoslav Republic of Macedonia), particularly in the second half of the 1990s and thereby increased attraction of Slovene agri-food products in these markets. With the EU entry the Slovenian preferential trade status is abolished. Since the Slovenian accession to the EU on 1st May 2004, Slovenian agricultural and food exports to those traditional former Yugoslav markets has declined (UMAR, 2005).

Table 2. Slovenian trade balance (X-M) by geographical repartition (in mio €).

	EU-15	Ex-Yugoslav markets	Central European Free Trade Agreement (CEFTA) countries	Other	Total
	1996				
Export (X)	65.58	175.52	8.25	33.04	282.38
Import (M)	316.93	82.11	89.76	145.15	633.96
Balance (X-M)	-251.36	93.41	-81.51	-112.12	-351.57
	1999				
Export	90.36	179.43	11.02	36.37	317.17
Import	349.73	66.75	110.39	117.79	644.66
Balance	-259.36	112.68	-99.37	-81.43	-327.48
	2002				
Export	83.19	269.30	11.35	43.65	407.49
Import	413.96	80.23	129.67	135.28	759.14
Balance	-330.77	189.07	-118.33	-91.63	-351.65

Source: Own computations based on data from Slovene Statistical Office.

The delays in the Slovenian agricultural and food trade export reorientation towards the EU markets have been obvious during the last yeas. In 2002, Slovenia exported only 23% of its agri-food exports to the EU, and almost three quarters to the other countries, namely the traditional ex Yugoslav markets (see also KIS, 2003 and OECD, 2001). The deterioration in exports of agricultural and food products to the traditional former Yugoslav markets, lack of export competitiveness in the EU markets, and the increased import competition in the Slovenian markets have created considerable pressures on food processing sector, while price reductions in agriculture have largely been compensated with direct government transfers to agriculture on the basis of area and headage payments.

Table 3. Slovenian trade balance (X-M) and degree of processing* and by regions (in mio €) in the year 2002.

	Primary products (mio €)	Primary products (%)	Processed products (mio €)	Processed products (%)
	EU-15			
Exports (X)	26.78	31.61	56.41	17.48
Imports (M)	155.01	50.79	258.95	57.05
Balance (X-M)	-128.22		-202.55	
	Ex-Yugoslav markets			
Exports	51.25	60.49	218.04	67.55
Imports	13.58	4.45	66.65	14.68
Balance	37.67		151.39	
	Central European Free Trade Agreement (CEFTA) countries			
Exports	3.08	3.64	8.26	2.56
Imports	67.14	22.00	62.53	13.78
Balance	-64.06		-54.26	
	Other			
Exports	3.60	4.25	40.05	12.41
Imports	69.48	22.76	65.79	14.49
Balance	-65.88		-25.75	
	Total			
Exports	84.72	100.00	322.77	100.00
Imports	305.21	100.00	453.93	100.00
Balance	-220.49		-131.16	

* In table 3, we do not distinguish among the final consumption of products, but just the stage of processing. Therefore, we refer to primary and processed groups of products. Primary group of products includes the following three BEC categories: 111, 112 and 21. In the processed group of products are included the remaining of BEC categories (121, 122, and 22).
Source: Own computations based on data from Slovene Statistical Office.

The hypothesis we investigate further is whether in the Slovenian agri-food trade is prevalence either on primary or on processed products. Due to this we have split trade flows by the degree of processing on primary and processed products by defined geographical areas (Table 3). We assume that greater proportion of value added pertain to processed products and lower value added to primary products. Despite the fact that greater percentage of trade is with processed than primary products (almost 80 per cent of export and 60 per cent of import in 2002), the chronically negative trade balance is revealed (on all markets except the traditional former Yugoslav markets) implying that in general imports of agri-food products is greater than exports. Regarding the groups of products, positive trade balance in 2002 is observed for dairy products, meat and beverages (detailed computations available by authors). More than obviously, geographical patterns indicate strong orientation towards the former Yugoslav markets. So the legacy of common past still remains strong. The impact of disintegration on trade was more in details described by Fidrmuc and Fidrmuc (2003), when investigating the surpassing trade

intensities of three demised centrally planned federations in CEE region, among which also the case of Yugoslavia. One should expect that while preparing to enter the EU, Slovenian exporters would focus more on other but Yugoslav markets, where after 2004 enlargement favourable bilateral trade agreements ceased to be valid. Moreover, on the export side, the share of the ex-Yugoslav markets even raised at the expense of other countries during the last years. This implies that Slovenian agriculture and the food processing sector lack the competitiveness by not being able to penetrate the Single European Market (SEM).

In the late 1970s, Pelzman (1977) denoted that trade between centrally planned economies was characterised by inter-industry specialization, which, as we present further, has remained strong even after the decades passing. An examination of the significance of IIT (Table 4) suggests the prevalence of inter-industry trade in Slovenian agricultural and food trade flows. This finding is consistent with the previous empirical results by Bojnec and Hartmann (2004) at the SITC level. Nevertheless, some differences across product groups can be observed. The GLIIT is relatively higher and tend to increase over time for sugar and other products, and vice versa for fruit and vegetables, fish and oilseeds. While still at relatively low levels, the GLIIT increased over the period analysed also for cereals, meat, dairy products, and spices, while declined for beverages. This diversity and relatively low degree of IIT again confirmed trade structures and patterns more typical for countries with protectionist policies rather than for open developed economies. The results are rather inconsistent with theoretical expectations, since one would expect that the envisaged EU membership encouraged an increase of IIT at the expense of inter-industry trade. For example, this was the case with Spain and Portugal, whose rise of IIT began well before their entry to the EU. However, there are some circumstances that explain the situation deeper (by Bojnec and Hartmann, 2004). Firstly, the level of protection in the Slovenian agricultural and food sector remained high over the period and thus hampered trade. Secondly, Slovenian agri-food producers have not been successful in reaping economies of scale in the production but also in food processing due to the fragmented structures in agriculture and in the food processing sector caused also by rather slow privatisation and restructuring process in the latter.

Table 4. GLIIT (in %) by ten product groups.

	1996	1997	1998	1999	2000	2001	2002
Cereals	24.1	24.8	31.5	30.5	29.0	30.1	32.1
Fruits & vegetables	16.2	14.8	16.8	17.8	17.4	14.6	13.6
Meat	14.9	13.2	16.3	15.3	13.4	13.8	20.0
Dairy products	23.4	25.3	23.1	21.9	24.8	24.0	30.2
Sugar	33.4	33.4	38.2	36.0	42.6	45.1	42.3
Oilseeds	6.5	6.6	8.6	15.1	12.2	12.5	12.7
Beverages	38.5	34.7	43.9	48.8	36.1	29.4	27.6
Spices	26.2	25.4	23.8	22.3	24.9	28.4	31.7
Fish	20.0	17.5	15.3	13.5	16.7	14.2	9.2
Other	44.5	38.1	38.1	44.7	40.8	49.6	50.8

Note: Classification of product groups according to the INRA (Chevassus-Lozza and Gallezot, 1998).
Source: Own computations based on data from Slovene Statistical Office.

The prevalence of inter-industry trade is confirmed also for agricultural and food products classified by the BEC sector's classification according to their degree of processing, but the significance of IIT varies by BEC sectors and over time (Table 5). On average, processed agricultural and food products experienced greater GLIIT index values than non-processed, primary ones. This is consistent with

theoretical expectations. Less clear are patterns over time. Although at the relatively lowest level, an increase in GLIIT indices is observed for primary food and beverages both for intermediate industry and for final household consumption. The significance of IIT is relatively higher for processed food and beverages, particularly in the case of their household consumption, but the dynamic patterns are reversed than expected. The significance of IIT for processed food and beverages for industrial use with some variations over time tends to increase suggesting a greater degree of trade integration. The significance of IIT for processed food and beverages for direct household consumption was relatively the greatest in the initial analysed year, but deteriorated over time. This is inconsistent with theoretical expectations arguing an increase in the degree of IIT with trade liberalization and economic growth. The reasons are likely in the Slovenian geographical trade asymmetry during the analysed years with net importing agricultural and food products from the EU countries on one side and net exporting agricultural and food products towards traditional former Yugoslav markets (Bojnec and Hartmann, 2004). The striking differences are recorded for primary and processed other industrial supplies. Initially, the significance of IIT was greater for primary than for processed industrial supplies. While for processed ones the significance is a steadily increasing, for primary one it has declined since 1999, when Slovenia has been adjusting their agriculture and the food sector closer in line to be consistent with the principles and rule of the SEM of the EU.

Table 5. GLIIT by Broad Economic Categories (BEC)

	1996	1997	1998	1999	2000	2001	2002
Primary F&B - industry	4.1	3.9	4.5	4.5	2.4	4.8	11.0
Primary F&B – HH	8.1	8.0	10.1	10.5	9.2	8.6	9.0
Processed F&B - industry	23.2	19.9	21.2	30.7	29.4	30.2	32.5
Processed F&B – HH	42.2	40.0	40.2	39.1	38.2	37.9	38.0
Industrial supplies - primary	26.6	24.0	39.2	50.6	42.1	39.5	21.9
Industrial supplies - processed	17.7	18.5	25.2	25.5	24.6	24.9	26.1

Note: F&B - food and beverages and HH - household consumption.
Source: Own computations based on data from Slovene Statistical Office.

To investigate trade types by groups of products, besides decomposing total trade flows on IIT and inter-industry trade, we disentangled total trade flows into one- and two-way trade, and two-way trade flows additionally on horizontal and vertical IIT. IIT is associated with two-way trade flows. For comparison, the disentangling the intra-EU trade types indicated that agriculture, food and beverages are an industry, which is characterized by a high share of one-way trade (50% or more), suggesting a specialization of EU member states along lines of comparative advantages (Fontagné *et al.*, 1997).

Our results for Slovenian agricultural and food trade in Table 6 show prevailing one-way trade flows for meat, fruit and vegetables, dairy, and oilseeds. Moreover, two-way trade flows are disentangling into two components with similar products or HIIT, and with different quality products or VIIT. The prevailing HIIT in Slovenian agricultural and food trade is not significant. Finally, we disentangle VIIT into two components with high quality (HQVIIT) and low quality (LQVIIT) products. VIIT can be considered as HQVIIT or LQVIIT according to the export-to-import price ratio or the relative unit values of exports and imports. The combination of high export quality products with the same time low import quality products is not significant, except for some individual years for fruit and vegetables, beverages, and spices. The combination of low export quality products with the same time high import quality products is found for sugar.

Table 6. Trade types by groups of products in Slovene trade with agricultural and food products from 1992-2002.

	1992	1996	1999	2002
Cereals	HIIT	One way	HIIT	HIIT
Fruits & vegetables	HQVIIT	One way	One way	One way
Meat	LQVIIT	One way	One way	HIIT
Dairy products	One way	One way	One way	One way
Sugar	HIIT	LQVIIT	LQVIIT	LQVIIT
Oilseeds	One way	One way	One way	One way
Beverages	HQVIIT	One way	One way	HQVIIT
Spices	One way	HQVIIT	HQVIIT	HQVIIT
Fish	LQVIIT	HIIT	One way	One way
Other	HQVIIT	LQVIIT	LQVIIT	LQVIIT

Note: HIIT – horizontal IIT, high quality vertical IIT (HQVIIT) and low quality vertical IIT (LQVIIT).
Source: Own computations based on data from Slovene Statistical Office.

As Table 7 presents, the prevalence on one-way trade flows is also revealed when Slovenian agricultural and food trade is analysed by degree of processing according to the BEC classification. The significance of one-way trade flows is more often found for primary agricultural and food products. In the case of processed agricultural and food products, the results are more mixed with some variations by individual years, but the degree of two-way trade flows, and thus the significance of IIT, is greater, particularly for processed food and beverages for household consumption. If the Slovenian inter-industry specialization will continue in the future, this can cause high adjustment costs and the specialization of economic activities on a very limited number of industries, while abandoning the others. So greater adjustments might take place along the industries. As also Fontagne et al. (1997) reports, the intra-industry trade increased since the mid of 1990s in intra-EU flows and became the pivotal type of trading of EU-15. When the disentangled results at the industry level, one-way trade type accounted for 61% for food and beverages, while for agriculture the share remained even higher (almost 74%) in the year 1994 and the shares being relatively stable through the analysed period 1980-1994. Our results show that for Slovenian agricultural and food trade these shares are substantially higher, which is partly caused by small-sized country specializing in production and trade with the limited number of products.

Table 7. Trade types in Slovene trade with agricultural and food products by BEC from 1992-2002.

	1992	1996	1999	2002
Primary F&B – industry	One way	One way	One way	One way
Primary F&B – HH	One way	One way	One way	LQVIIT
Processed F&B – industry	HQVIIT	HQVIIT	LQVIIT	HIIT
Processed F&B – HH	HQVIIT	HIIT	HIIT	HIIT
Industrial supplies - primary	LQVIIT	LQVIIT	LQVIIT	One way
Industrial supplies - processed	LQVIIT	LQVIIT	HQVIIT	LQVIIT

Note: F&B - food and beverages, HH - household consumption, HIIT – horizontal IIT, high quality vertical IIT (HQVIIT) and low quality vertical IIT (LQVIIT).
Source: Own computations based on data from Slovene Statistical Office.

The relatively low degree in the significance of IIT among the BEC sectors is shown in the vertical dimension of Figure 1, which is at the level less than 50 per cent. If a product is in the bottom quadrants, as it is in our case, inter-industry is predominant, whereas IIT is predominant if the product is in the top quadrants. There was not any BEC sector, which was characterized by a high share of IIT. Thereby, this prevalence on inter-industry trade is depicted in the bottom quadrants. The low share of IIT in traditional sectors may be related to lower degree of differentiation by kinds, quality and characteristics of goods. The significance in IIT tends to increase with the degree of processing as revealed by an upward trend line. In the nature of IIT, VIIT is the most important component of IIT. In Figure 1, it is illustrated in the right bottom quadrants, where there is an IIT of vertical nature. While in Figure 1 are four possible alternatives of the pairs' combination, our results are concentrated in the bottom right quadrant. In this quadrant trade is manly inter-industry trade, and their lower percentage of IIT is based on products with different qualities or with prevailing VIIT. Yet, we did not find that the results vary considerably when a threshold of 25 per cent is used to distinguish HIIT and VIIT.

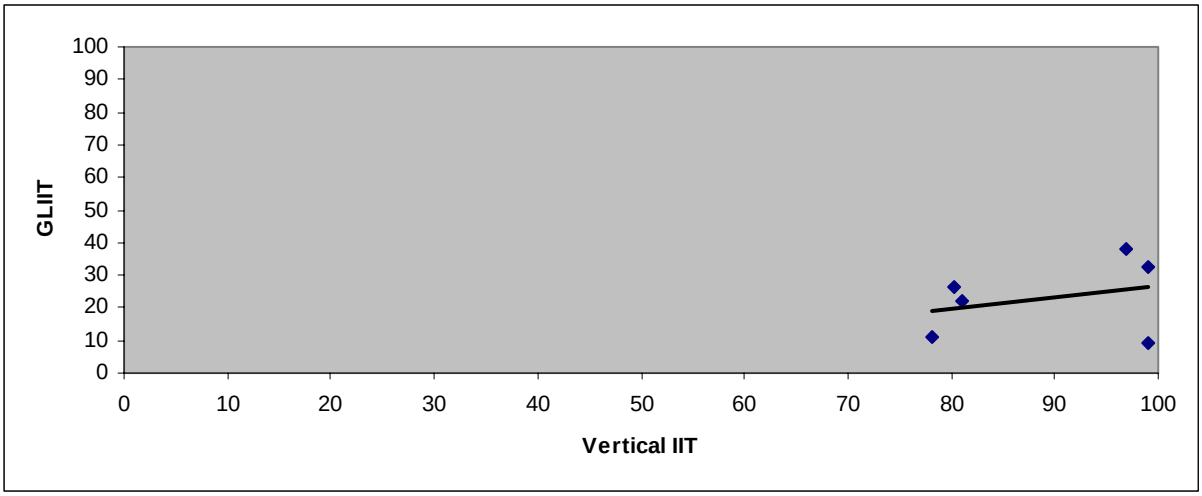

Figure 1. Trade Types in IIT by BEC sectors, 2002.
Source: Own computations based on data from Slovene Statistical Office..

5. Some international comparisons of our results

Díaz Mora (2002) presents results on nature of IIT within the EU by countries and by the NACE-CLIO R25 industries, linked Eurostat trade data to a production nomenclature. The industries are distinguished on advanced, intermediate, and traditional ones. Among traditional industries, the results are presented for food, beverages and tobacco in 1996. These results are compared in Table 7. The significance of IIT for food, beverages and tobacco prevailed only for Belgium and to a little extent for Germany. The relatively low significance of IIT for these products less than 30 per cent is recorded for Greece, Portugal, Italy, Ireland, and Denmark. Bojnec and Hartmann (2004) present similar results for Slovenia by the individual years in the period 1992-2001. According to their results, the significance of IIT for agricultural and food products is relatively low, ranging between 12.7 per cent in 1997 and 22.6 per cent in 1992. Unlikely with theoretical expectations, they found that the significance of IIT tends to declines, but with some variations across individual analysed years. In 1996 the significance of IIT for Slovenia is recorded at the level of 13.4 per cent, which is greater than in case of Greece, but

less than in the other EU countries. However, our result in Table 7 indicates the significance of IIT, which is even less than for Greece.

Another interesting finding is that except for France, VIIT prevailed in IIT for food, beverages and tobacco. Greater diversity is recorded within VIIT. Relatively the greater importance of high quality or the HQVIIT is recorded particularly for Denmark and France, while the greater importance of low quality or the LQVIIT suggests results particularly for Greece, Germany, and Spain. The results for Slovenia indicate significant importance of VIIT in the total IIT (77.2 per cent), while the proportion of high quality exports in VIIT (42.8 per cent) within relatively low degree of IIT is comparable to Belgium and exceeds Germany, Greece and Spain's performance in qualitative aspect of trade in the sector.

Table 8. IIT in the European Union for food, beverages and tobacco, 1996

	GLIIT	VIIT*	HQVIIT**
France	46.5	44.8	70.9
Belgium	52.2	55.9	43.8
Netherlands	37.0	56.3	71.6
Germany	50.7	55.7	31.3
Italy	24.0	76.6	64.3
United Kingdom	38.8	68.9	48.0
Ireland	25.2	64.8	58.5
Denmark	28.0	55.0	72.3
Greece	9.1	91.9	14.5
Portugal	20.2	62.5	64.3
Spain	35.6	55.4	36.2
Slovenia	6.84	77.2	41.2

GLIIT = Grubel-Lloyd IIT index.
*VIIT as a percent of IIT. The rest to 100% represents HIIT.
**HQVIIT as a percent of VIIT.
Source: Díaz Mora (2002, pp. 302-303) and own calculations for Slovenia.

6. Conclusions

In this paper we have analysed trade structures, trade types and the nature of IIT focusing on primary and processed agricultural and food products in Slovenia. The results are compared with the EU countries. We find that processed agricultural products prevailed in the Slovenian agricultural and food trade. The significance of processed food products in the Slovenian agricultural and food trade has slightly increased. Inter-industry trade takes the greatest significance in Slovenian agricultural and food trade. We have not find any investigated agricultural and food product group where the share of IIT is greater than 51 percent. If we neglect some variations by individual years, the significance of IIT in general is increasing with the degree of product processing, being the lowest for primary agricultural products and being the highest for processed food products for household consumption. Majority of IIT is in vertically differentiated products, largely specialized in low-quality exports in their vertical IIT. This type of agricultural and food trade specialization on lower value-added products raise the question of the Slovenian agricultural and food sector competitiveness, the finding consistent

with some previous studies on international competitiveness and comparative advantage, which were used different methodological approaches (for example, Eiteljörge and Hartmann, 1999).

The efficiency in the Slovenian integration into EU market depends on the extent of future structural changes, which will occur in Slovenian agriculture and the food sector. Perhaps this could partially be explained by the size of the market: the larger the market, more favours for varieties and qualities; and Slovenian domestic market is small. For inter-industry trade, the country size (and differences in size) does matter. In corroboration of likely occurrence of high adjustment costs, the predominance of vertically differentiated intra-industry trade over trade with horizontally differentiated products indicates sizeable costs that might occur due to the specialization over the quality levels (high or low) within industries. If the future development of Slovenia, as well as other new EU member states (NMS) would follow such a path, the increase of inter-industry trade (or keeping the large proportion of such trade types, as in case of Slovenia), might be seen not just in the traditional light of comparative advantages, but also from the agglomeration (EU) economy point of view, where states and regions in NMS would exhibit a high degree of industrial specialization. But, as Diaz-Mora (2002) explained, the progress in European integration promotes an IIT commercial specialization, with mentioning the case of Greece, Spain and Portugal in previous enlargement, where their shift to IIT was even greater than the one among old member states. But, on the other hand, it should be stressed that these results were aggregated to the economies as a whole, while the nature of solely the agricultural (and in lots of cases in big proportion dependent food industry) sector is more complex because we are dealing with the relatively immobile production factors such as land (e.g., Lerman, 2004). In Slovenia the frequency of land transaction is around 1%, with production processes, which are in the large scale influenced by external, often unpredictable factors (weather conditions and disease occurrences) and the labour force, which is (especially in agricultural sector) often less qualified.

It is clear that Slovenia, if wants to develop an efficient agricultural and the food sector, needs greater efforts to upgrade the relative quality of agricultural and food exports. This can be induced by internal restructuring at industry and firm level and by new investment activities to improve quality. So far, many efforts have been devoted to insiders-based privatisation and ownership changes of traditional domestic firms, but with the Slovenian membership in the EU, the increasing competition in the enlarged EU markets is forcing the previously more protected agricultural and food markets to response to a greater competition. While some horizontally and vertically cooperation and mergers between firms and supermarkets at the Slovenian markets are emerging, the deepening of Slovenian integration into the EU markets is more likely to lead to a more substantial changes due to presented shortcomings in Slovenian agricultural and food trade, which are the reflection of different constrains for efficient and internally competitive sector development. Among possible drivers of higher-quality vertical IIT are improvements in human, physical and technological capital endowments. These are areas for further research on determinants of trade specialization and for an increase in the quality of exports.

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