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RUSSIA'S INTRA-INDUSTRY TRADE IN AGRICULTURAL PRODUCTS: THE EXTENT AND MAJOR TRENDS

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Abstract
This paper studies specialization of Russia's foreign trade in agricultural products and foodstuffs in terms of inter-industry and intra-industry trade. The objective of this study is to consider the extent of intra-industry trade in Russia's foreign trade in agricultural products and to identify significant changes in trade patterns at the industry level over the transition period.
Thereby, in this paper we provide a systematic decomposition of Russia's foreign trade into three trade types: inter-industry, intra-industry in horizontally and vertically differentiated products, over the period 1996–2012. The analysis is performed in relation to the whole world, individual regions and in relation to selected countries (Ukraine, USA, Brazil, Egypt, China, Germany and Hungary).
The analysis is performed using the traditional methodology provided by Grubel-Lloyd indices, proposed by Fontagné and Freudenberg methodology (1997) as well as the method of Greenaway et al. (1995).
Results show that the extent of Russia's intra-industry trade varies significantly depending on the geographical region. The lowest level of intra-industry trade is observed in relation to Egypt and Brazil, the highest - in relation to Ukraine.
Intra-industry trade growth simultaneously with the process of trade liberalization was not observed.
Therefore, the empirical results support recent trade theory, which predicts an increasing level of intra-industry trade with between neighboring countries with a similar level of economic development.

Keywords: *Russia, agricultural products, inter-industry trade, vertical and horizontal intra-industry trade.*

JEL Code: *F12; F14; Q17.*

Introduction

The process of economic transformation and trade liberalization in Russia that started with the collapse of the Soviet Union continues to this day.

Currently Russia has the foreign trade surplus mainly based on the advantages of possessing natural resources (natural fuel and metals). The raw materials orientation of Russia's export

overshadows the development of exports of other sectors such as manufacturing and agriculture. Russia plays a significant role in the international market of agricultural products as importer rather than as an exporter.

Nevertheless, from the point of view of food security and long-term development (taking into account the exhaustibility of fuel resources) agriculture is of great importance for Russian economy. Unfortunately, from the beginning of the 90s, Russian agriculture has experienced a recession in all sectors.

The process of economic transformation is characterized, among other things, by significant changes of food consumption as well as foreign trade patterns. This paper is focused on the changes in the patterns of Russian foreign trade in agricultural products and foodstuffs during the transitional period. Specifically, we aimed to investigate in detail the specifics of intra- and inter-industry trade.

Intra-industry trade can be defined as the existence of simultaneous export and import flows within industries. It can be either associated with a specialization along quality ranges or associated with a specialization in varieties [Amador, 2009].

The concept of intra-industry trade was developed by Helpman and Krugman (1985), associating this phenomenon with factor endowments, product differentiation and increasing returns of scale. Afterwards, intra-industry trade has been divided by Falvey (1981) into two types: horizontal and vertical.

Horizontal IIT refers to homogenous products with the same quality but with different characteristics, while vertical IIT means products traded with different quality and price. Horizontal differentiation is more likely between countries with similar factor endowments, while vertically differentiated goods occurs because of factor endowment differences across countries [Jambor, 2013].

The analysis of intra-industry trade is important because it reflects the level and the nature of economic integration between countries. With trade liberalization and economic growth, trade theory suggests, that intra-industry trade will increase implying external market integration.

In terms of agribusiness strategies the prevalence of inter-industry trade for a product group indicates the relevance of cost efficiency, while the dominance of intra-industry trade reveals the importance of specialization, product differentiation and brand specific marketing. [Bojnec, 2004]

In the recent years, a number of empirical studies investigated the change in the level and structure of trade in transition economies. During the last decade a number of empirical studies investigated the change in the level and

Having conducted the review of previous researches on the intra-industry trade in Russia, we found following results.

On the basis of trade indicator analysis (revealed comparative advantages and Grubel-Lloyd index of intra-industry trade), Garanina (2009), argues that Russia is globally disadvantaged in manufactures trade vis-a-vis the EU and China, and advantaged in trade within the CIS. Russia is managing to expand its manufactured exports to other CIS countries. However, it is gradually losing its role of main supplier of capital goods in the post-Soviet space.

Using the Aquino and Grubel- Lloyd indices, Algieri (2004) examined the developments in the trade specialization patterns at the national level in post-Soviet Russia. The analyzed period was from 1993 to 2002. The results of his researches showed that Russia exhibits mainly specialized intra-industry trade, a tendency that appears to have increased over time.

Russia's exports highlights that exports are biased toward natural resources and at the same time the traded goods show a slight labour intensity and R&D intensity.

Gusev (2007) has found that the highest intensity level of intra-industry trade is characteristic of Russia's foreign trade exchange with the CIS countries and China. He also argues that despite the fact that the intensity of Russia's intra-industry trade with the CIS countries and China is the highest, compared to other countries, this factor under the period in question remains low. However, this study (as well as previous one) was carried out in relation to the whole foreign trade of Russia, without focusing on agricultural products and foodstuffs. The analyzed period was from 1995 to 2005.

However, there are a very limited number of studies conducted in relation to Russian trade in agricultural products and foodstuffs. This paper presents one such analysis.

Material and Methods

The objective of this study is to consider the extent of intra-industry trade in Russia's foreign trade in agricultural products and to identify significant changes in trade patterns at the industry level over the transition period.

Thereby, in this paper we provide a systematic decomposition of Russia's foreign trade in agricultural products into three trade types: inter-industry, intra-industry in horizontally and vertically differentiated products, over the period 1996–2012. The analysis is performed in relation to individual regions (European Union, Commonwealth of Independent States, Africa, Asia and North and South America) as well as in relation to selected important countries.

These are Germany, USA, Ukraine, Brazil, Egypt and China. The share of each of these countries is not less than 4% of the total value of Russian trade flows in agricultural products. So we selected the one the most important trading partner (according to its share in the total amount of exports and imports) from every continent. The analysis was conducted in relation to Hungary.

Disaggregated Russian and worldwide trade data have been collected from the UN Comtrade database. We used 4-digit level data classified according to the Harmonized System Classification (HS). The classification includes about 200 commodity groups.

The article adopts a range of methods for broader and more comprehensive analysis of the subject.

Firstly, we calculated the traditional Grubel-Lloyd index. Then we applied The Fontagne and Freudenberg (1997) methodology as well as Greenaway's method (1995) for the analysis of the bilateral trade with individual regions and countries. This methodology allows elementary trade flows to be broken down into three categories according to similarity in unit values and trade overlap: inter-industry trade (insignificant overlap between exports and imports); horizontal intra-industry trade (significant overlap and limited differences in unit values); vertical intra-industry trade (significant overlap and large differences in unit values).

The Grubel-Lloyd Index

To measure the extent of intra-industry trade (IIT), this study uses the most widely preferred traditional Grubel-Lloyd (G-L) index.

This index measures intra-industry trade as a percentage of a country's total trade which is assumed to be balanced, that is exports equal imports. For an individual product group or industry i the share of IIT is formulated as

$$GL_j = 1 - \frac{|X_j - M_j|}{(X_j + M_j)} \qquad (1)$$

where X_i and M_i stand, respectively, for the exports and imports of industry *i*. If all trade was balanced GL_i would equal 1. On the other hand, if all trade was one-way, GL_i would equal zero. Thus, the closer GL_i is to 1 (that is, $X_i = M_i$), the more trade in industry *i* is intra-industry trade. The closer GL_i is to zero (that is, either $X_i = 0$ or $M_i = 0$), the more trade in industry i is interindustry trade. Therefore, the index of intra-industry trade takes values from 0 to 1 as the extent of intra-industry trade increases, that is, $0 \leq GL_i \leq 1$ [Koçyiğit, 2007].

The GL index in this equation can be modified to obtain the average level of intra-industry trade for a country j. In this case, the Grubel-Lloyd index may be written as follows:

$$GL_j = 1 - \frac{\sum_{j=1}^{N} |X_j - M_j|}{\sum_{j=1}^{N} (X_j + M_j)} \qquad (2)$$

for N set of industries.

However, several authors criticised the GL-index, for five main reasons: aggregate or sectoral bias, trade imbalance problem, geographical bias, inappropriateness to separate horizontal and vertical intra-industry trade, inappropriateness for treating dynamics [Jambor, 2013].

To avoid inaccuracies associated with the shortcomings of this method, in this paper we also used other methods of intra-industry trade analysis.

Fontagné and Freudenberg method

There is another method in the literature to distinguish inter- and intra-industry trade. Fontagné and Freudenberg (1997) categorized trade flows and computed the share of each category in total trade. They defined trade to be intra-industry when the value of the minority flow represents at least 10% of the majority flow. Formally:

$$\frac{Min(X_j, M_j)}{Max(X_j, M_j)} \geq 10\% \qquad (3)$$

If the value of the minor flow is below 10%, trade is classified as inter-industry in nature. If the opposite is true, the FF index comes formally as:

$$FF_k^p = \frac{\sum_j (X_{jk}^p + M_{jk}^p)}{\sum_j (X_{jk} + M_{jk})} \qquad (4)$$

where X and M denote export and import, respectively, while p distinguishes intra-industry trade, j is for the number of product groups and k is for the number of trading partners [Wang Jing, 2010].

According to Fontagné and Freudenberg (1997), the FF index tendentiously provides higher values compared to GL-type indices.

Horizontal and vertical intra-industry trade: Greenaway's method

Intra-industry trade can take two forms: horizontal (HIIT) and vertical (VIIT). The latter considers the exchange of similar goods of different quality, while the former comprises exchange of similar commodities differentiated by characteristics instead of quality [Algieri, 2004].

Abd-el-Rahman (1991) and Greenaway (1995) argue that making such a distinction is important as the determinants of each type of IIT differ: vertical IIT is more likely to be driven by differences in endowments, while horizontal IIT is more likely to be driven by scale economies and imperfect competition. Several applied economists have demonstrated that most IIT is vertical (Aturupane et al. 1997; Kaitila, 1999; Blanes and Martín, 2000). As a result, it is usually assumed that the level of quality is positively associated with the intensity of capital used in production [Algieri, 2004].

The literature on intra-industry trade increasingly emphasizes the importance of differentiating between horizontal and vertical intra-industry trade.

As far as the GL index is given by the joint treatment of trade flows we can not use it to separate horizontal and vertical intra-industry trade. Literature suggests several possibilities for solving this problem.

According to the method of Greenaway et al. (1995), a product is horizontally differentiated if the unit value of export compared to the unit value of import lies within a certain range. Formally, this is expressed for bilateral trade of horizontally differentiated products as follows:

$$1 - a \leq \frac{UV_{ijt}^{X}}{UV_{ijt}^{M}} \leq 1 + a \qquad (5)$$

where UV means unit values, X and M means exports and imports for goods i.

The most of studies use a unit value dispersion of 15 percent, i.e. $\alpha = 0{,}15$. (Abd-el-Rahman (1991), Greenaway et al. (1995), Aturupane et al. (1999), Blanes et al. (2000), Algieri (2004), etc.)

It should be noted that the coefficient is initially applied to 5-digit SITC classification. It seems possible to apply this coefficient value for our calculations with the four-digit HS classification, as it does not contradict the aims of the study and will not distort the results.

Thereby, horizontal intra-industry trade is defined when the unit value index (UV) was inside the range of ±15%. If this is not true, the method is talking about vertically differentiated products [Jambor, 2013].

Unit value indexes are considered as a proxy for prices, assuming that prices properly reflect quality differences. Thus, vertical IIT is defined as two-way trade of item whose per kilogram unit value of exports relative to its per kilogram unit value of imports falls outside a specific range of $\pm\alpha$.

Results and discussion

Before start analyzing intra-industry trade, it is necessary to say a few words about the current situation in Russia's foreign trade in agricultural products and food.
Food and agricultural products amount about only 2% of Russian agricultural export. The share of agricultural products in Russian import is more significant and amounts to 14%. However in 2000s, there is the significant growth of foreign trade turnover due to the expansion of both imports and exports.
In the early 2000s Russia became one of the major suppliers of wheat in the world market. Since then, Russia holds its position in this market. According to the Food and Agriculture Organization, in 2010, the value of wheat exported by Russian Federation was $2.069 billion that is 35.4% of total exports of the country and a fifth position in the world export of wheat [Gaidar, 2011]. Besides, traditional items of Russia's food export are fish, sea products, alcoholic beverages, etc.
Briefly describing the territorial structure of Russian foreign trade in agricultural products, following can be said. At the end of the 90's most of the country's agrifood exports went to EU countries. However, in the last years the largest importers of Russian agricultural products and foodstuffs are Asian and CIS countries (25.3% and 36.6% of total agrifood exports respectively).
In terms of imports, EU countries are the largest suppliers of agricultural and food products to Russia throughout the whole period. Imports from EU amount more than a third of total imports. Then it is followed by countries of North and South Americas (predominantly USA and Brazil).
A more detailed development of trade relations with these partners will be described in the course of the study.
We started our analysis with the traditional Grubel-Lloyd indicator (1975) in computing the degree of intra-industry trade in relation to the whole world.
The calculation of the Lloyd–Grubel Index for the industries of Russia's economy (Figure 1) has shown the intra-industry specialization movements for the period of 1996–2012 in the Russia's trade in agricultural products and foodstuffs with the world's rest.

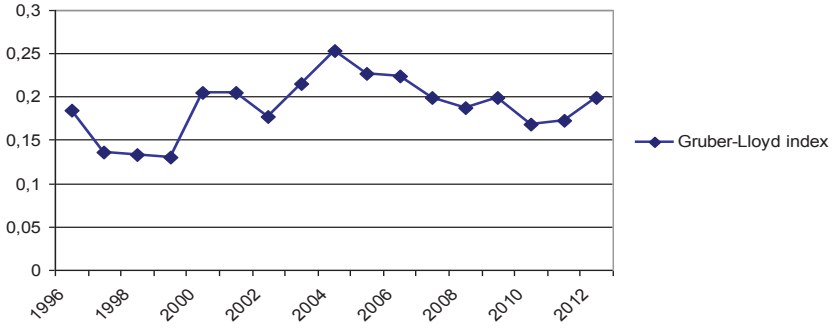

Figure 1- Gruber-Lloyd index for Russian foreign trade in agricultural products and foodstuffs

Sources: UN Commodity Trade Statistics Database, author's calculations (2013)

During the analyzed period, there are noticeable fluctuations of the index value. International trade in agricultural products is sensitive to factors such as government policies, fluctuations of tariffs and quota rates, import restrictions for sanitary reasons and other factors.

There is no any clear trend in the index value. Before 2004 the index increased, reaching its maximum and then started to decline steadily. The maximum value of G-L index was 0.25 in 2004; the minimum was 0.13 in 1999.

Further, using the methodology proposed by Greenaway et al. (1995), we divided trade flows into three trade types: one-way trade, inter-industry, intra-industry trade.

Next, following the method adopted by Abd-el-Rahman (1991), Greenaway et al. (1995), Fontagne and Freudenberg (1997), we distinguish three trade types: inter-industry, intra-industry trade in horizontally and vertically differentiated products.

Table 1 - Evolution of intra-industry trade in Russian foreign trade in agricultural products and foodstuffs (as a percentage of total trade)

	1996	**1998**	**2000**	**2002**	**2004**	**2006**	**2008**	**2010**	**2012**
Inter-industry	74.54	79.35	69	72.23	64.38	59.49	68.61	72.85	63.55
One-way trade	0.01	0.04	1.22	1.61	0.90	0.80	0.64	1.24	0.37
Intra-industry	25.46	20.65	31.00	27.77	35.62	40.50	31.39	27.14	36.45
Horizontal IIT	7.34	6.57	14.12	7.67	12.90	19.44	16.33	16.12	17.16
Vertical IIT	18.12	14.08	16.89	20.10	22.72	21.06	15.06	11.03	19.29

Sources: UN Commodity Trade Statistics Database, author's calculations (2013)

As can be seen in the Table 1, inter-industry trade dominates in Russian foreign trade in agricultural and food products. Intra-industry trade accounts for about a third of all trade flows.

The results for Russia show that intra-industry trade increased from 25.46% in 1996 to 40.5% in 2006 and decreased during the following years. We can observe a growth of the share of HIIT relative to VIIT. Fluctuations in the level of intra-industry trade are primarily related to changes in the structure of exports as well as changes in unit values of individual products.

For better visibility, it will better to depict the results on the Figure 2.

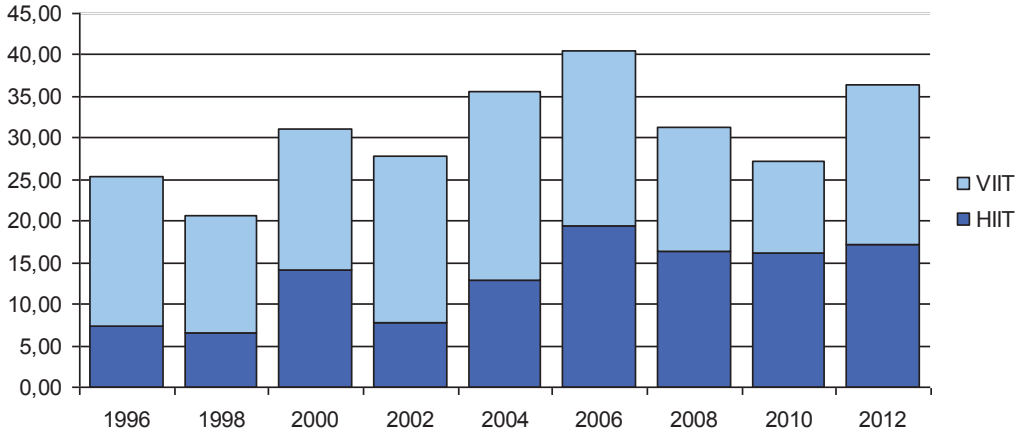

Figure 2 - The intra-industry trade in Russian foreign trade in agricultural products and foodstuffs with the world rest (as a percentage of total trade)

Sources: UN Commodity Trade Statistics Database, author's calculations (2013)

Table 1 and Figure 2 display the evolution of the share of IIT in total Russian trade flows in agricultural products and foodstuffs. In Russian foreign trade in agricultural and food inter-industry trade dominates.

Vertical IIT is greater than horizontal IIT in Russia over the analyzed period. Mainly fluctuations in the level of intra-industry trade due to variations of horizontal intra-industry trade while vertical type of intra-industry trade is quite stable.

Table 2 - Fontagne and Freudenberg index of intra-industry trade in relations to individual regions

	1996	**1998**	**2000**	**2002**	**2004**	**2006**	**2008**	**2010**	**2012**
CIS	0.528	0.375	0.476	0.436	0.497	0.636	0.564	0.542	0.684
EU	0.478	0.152	0.606	0.365	0.197	0.437	0.724	0.550	0.161
Asia	0.366	0.239	0.296	0.282	0.345	0.344	0.224	0.183	0.210
North America	0.019	0.055	0.044	0.043	0.110	0.061	0.058	0.077	0.074
South America	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Africa	0.015	0.001	0.000	0.002	0.000	0.001	0.002	0.002	0.012

Sources: UN Commodity Trade Statistics Database, author's calculations (2013)

Fontagne and Freudenberg index (FF) showed a significant and growing share of intra-industry trade with the CIS countries. The largest fluctuations were observed in relation to the EU countries. For the countries of South America and Africa, the index is close to zero.

From 1996 to 2012, there was an increase of the share of IIT in Russian international trade, from 52.8 to 68.4 per cent according to the FF in relation to CIS countries.

Next, we consider the issue of intra-industry trade by individual countries.

Individual countries

The next step of our analysis is to investigate the characteristics of intra-industry trade in the Russian bilateral level with the most important countries (both from the export and import sides). We have chosen six countries making the largest segment in the Russian international trade in agricultural products and foodstuffs in recent years (one country from each region). In 2012, the share of each of these countries is not less than 4% of the total value of Russian trade flows in agricultural products.

Table 3 - The share of individual countries in the total value of Russia's foreign trade in agricultural products and foodstuffs

	1996	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Brazil	1.4	5.0	8.1	4.5	8.8	10.4	10.1	8.2	10.5	10.5	10.4	9.7	8.8	9.3	7.9	4.9
China	3.6	3.7	2.6	2.7	2.8	3.6	3.6	3.6	3.7	4.0	3.8	3.6	5.0	5.5	5.3	4.6
Germany	6.0	6.8	6.7	5.8	7.3	6.4	5.4	5.5	4.9	5.0	4.5	5.0	4.8	5.5	4.9	4.1
Ukraine	14.6	4.9	6.8	8.6	8.0	6.7	9.5	9.4	9.2	5.6	6.4	6.5	5.2	6.2	5.6	4.9
Egypt	0.1	0.1	0.0	0.2	0.2	1.1	0.9	1.2	2.1	1.8	3.5	2.1	2.9	2.7	3.5	3.6
USA	9.2	11.0	10.1	9.2	9.8	6.4	5.0	5.1	4.5	4.4	4.2	5.3	4.9	3.5	3.4	3.8

Sources: UN Commodity Trade Statistics Database, author's calculations (2013)

Thereby, we have chosen Germany, USA, Ukraine, Brazil, Egypt and China as Russia's most important partners in the international trade in agricultural products and foodstuffs.

The major trade partner of Russia among African countries is Egypt. The main trade flows between Russia and Egypt are made up of wheat exports, which in 2010 accounted for 41.5% of Russian exports of wheat respectively.

Russia's largest trading partner in the EU is Germany (18% of the total agricultural exports from EU in 2010). Germany supplies Russia with meat and meat products (pork, cattle meat, chicken meat, fat of pigs, offals), cheese of whole cow milk and other products.

The main supplier of food to Russia from the South America is Brazil; from the North America is USA.

Considering the development of the trade flows between Russia and these countries, we can observe the following trends. The largest growth was observed in relation to Egypt due to the growth of exports of cereals (wheat). Lowest growth was detected regarding Ukraine and USA (2-3% per year in current prices).

Table 4 - Fontagne and Freudenberg index of intra-industry trade in relations to individual countries

	1996	1998	2000	2002	2004	2006	2008	2010	2012	Average
Ukraine	0.04	0.17	0.24	0.35	0.35	0.57	0.33	0.47	0.52	0.34
Germany	0.11	0.09	0.12	0.09	0.10	0.16	0.08	0.09	0.12	0.11
USA	0.02	0.04	0.04	0.04	0.10	0.07	0.06	0.04	0.10	0.06
China	0.01	0.00	0.01	0.04	0.06	0.05	0.04	0.02	0.05	0.03
Egypt	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Brazil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Sources: UN Commodity Trade Statistics Database, author's calculations (2013)

The difference in the IIT levels between Russia and its main trading partners are summarized in the Table 4. Among the considered trading partners, the Ukraine enjoys the highest level of IIT. The average value of FF index during the 17 years studied was 0.34. Growth trends in index values are observed in relation to Ukraine and USA.

In relation to Brazil and Egypt results showed that inter-industry trade amounts 100% of the total Russian foreign trade in agricultural products and foodstuffs.

We can display the results for China, Germany, Ukraine and USA on the charts.

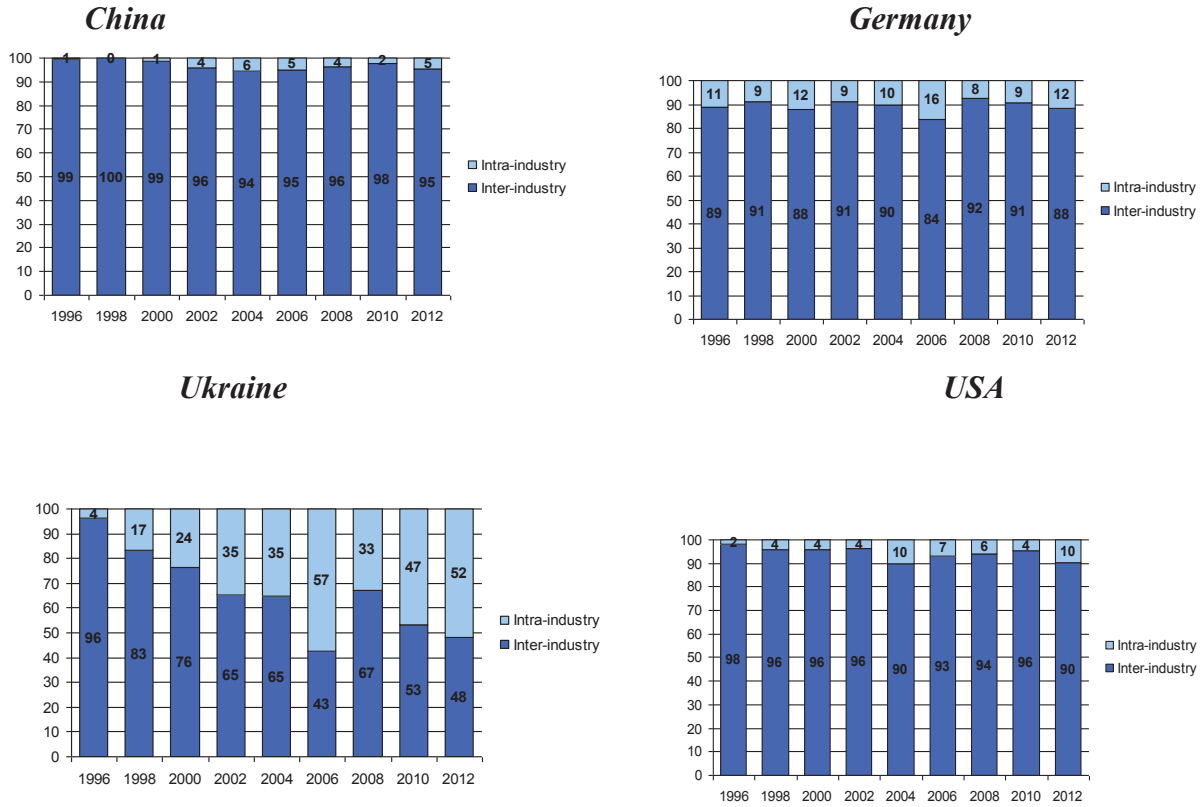

Figure 3 - Inter- and intra-industry trade in agricultural products and foodstuffs between Russian Federation and individual countries (as a percentage of total trade)

Sources: UN Commodity Trade Statistics Database, author's calculations (2013)

How can be seen in the Figure 3, inter-industry trade is the dominant type in the Russian trade in agricultural products and foodstuffs in relation to all considered countries.

However, the intensity of Russia's intra-industry trade in agricultural products with the CIS countries is the highest and has a distinct upward trend.

Further, using the same methods as before, we divided intra-industry trade in horizontal and vertical types.

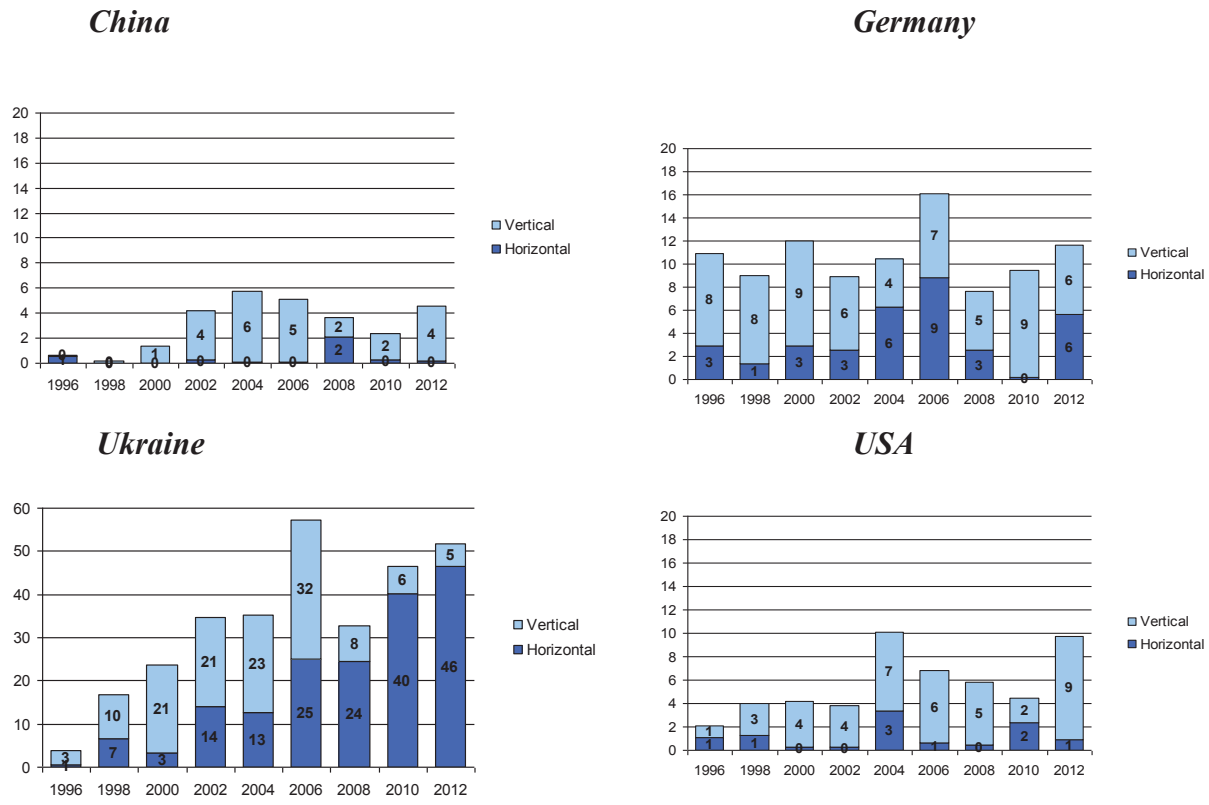

Figure 4 - Horizontal and vertical intra-industry trade between Russian Federation and main trade partners (as a percentage of total trade)

Sources: UN Commodity Trade Statistics Database, author's calculations (2013)

In relation to Ukraine, within the intra-industry trade, the horizontal type of IIT dominates. In other cases the vertical intra-industry trade is higher than horizontal intra-industry trade. In the case of Ukraine, there is also a steady growth in the intensity of horizontal intra-industry trade. In the cases of other countries such growth was not observed.

Intra-industry trade in agricultural products between Russia and Hungary

Main products imported into Russia from Hungary are electrical machinery and equipment, pharmaceuticals, machinery and mechanical appliances. The most important exported products (over 98%) are mineral fuels, oil distillation products, salt, sulfur, cement, ore, slag, inorganic and organic chemicals.

Import of agricultural products is about 10% of total imports from Hungary to Russia.

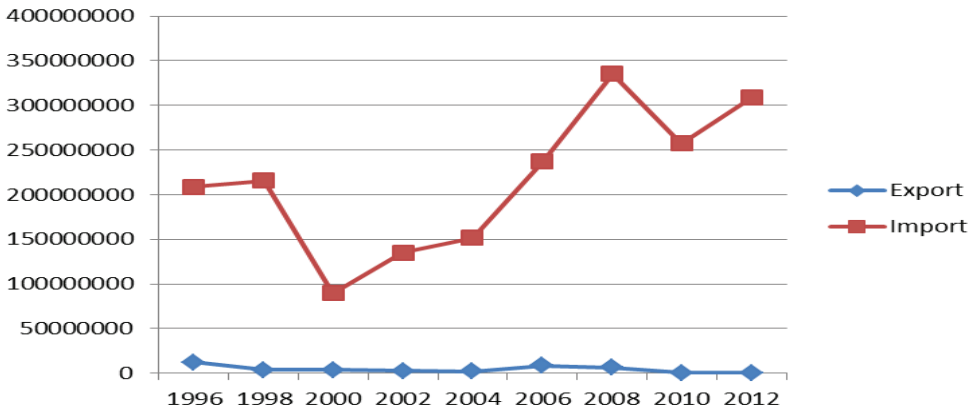

Figure 5 – Agricultural trade flows between Russian Federation and Hungary (USD)

Sources: UN Commodity Trade Statistics Database, author's calculations (2013)

The value of agricultural and food imports from Hungary to Russia has tripled since the early 2000s. In 2012, agricultural imports from Hungary to Russia amounted to more than $ 245 million.

Russian agricultural exports to Hungary is insignificant. Furthermore, it has a clear downward trend. So if in the early 2000s, Russia exported cereals and cerials preparations to Hungary, by the end of the study period the export of these products was not observed.

Table 5 - Product structure of Russian agricultural imports from Hungary

	1996	1998	2000	2002	2004	2006	2008	2010	2012
Live animals	0.3	0.1	0.7	0.5	1.0	4.6	11.9	13.7	5.0
Meat and edible meat offal	12.2	15.2	16.8	3.1	4.1	3.9	4.3	9.3	16.8
Dairy products, eggs, honey	0.5	0.9	0.6	2.2	5.9	4.1	0	1.9	4.1
Products of animal origin, nes	0	0	0.4	0	0	0	0	0	0
Live trees, plants, bulbs, roots	0.1	0.2	0.5	0.6	0.3	0.5	4.0	3.9	3.7
Edible vegetables and tubers	0.4	0.7	3.1	0.4	0.8	1.1	4.4	1.6	2.0
Edible fruit, nuts, melons	3.3	0.3	0.4	0.3	0.4	1.9	9.8	5.7	3.7
Coffee, tea, mate and spices	0.4	0.1	0.4	0.6	1.7	1.0	1.3	0.2	0.2
Cereals	11.6	2.0	14.4	18.7	1.9	7.7	6.3	7.3	8.4
Milling products, malt	5.0	1.7	9.9	6.9	1.3	0.7	0.5	0.4	0
Oil seed, oleagic fruits, etc.	1.2	0.3	0.4	0.9	0.6	0.7	1.5	2.2	3.2
Lac, resins, vegetable extracts	0.1	0	0	0.1	0	0	0	0	0
Animal, vegetable fats, oils	3.2	21.0	8.4	3.3	11.6	1.0	0.1	0.3	0.3
Meat, fish and seafood prep	1.8	1.1	0.9	1.7	1.5	2.4	3.1	6.5	6.8
Sugars	0.4	1.8	0.7	0.4	0.7	0.6	1.2	1.6	1.7
Cocoa and cocoa preparations	1.1	0.5	0.2	0.3	0.3	0.3	0.2	0.1	0.2
Cereal, milk preparations	8.7	4.4	0.4	1.2	2.2	1.2	0.1	0.3	2.7
Vegetable, fruit, food prep.	34.4	24.9	18.9	39.9	42.4	39.2	30.3	19.0	18.1
Miscellaneous edible prep.	2.3	6.5	6.9	4.1	5.3	6.5	5.9	9.4	9.0
Beverages, spirits and vinegar	6.8	17.4	5.8	4.1	3.7	3.6	2.9	1.9	2.7
Residues, wastes of food	0.9	0.9	10	10.6	13.8	18.5	12.0	14.0	10.9
Tobacco and tobacco subst.	5.5	0.1	0.1	0.1	0.6	0.4	0.2	0.8	0.6

Sources: UN Commodity Trade Statistics Database, author's calculations (2013)

Products forming the basis of agricultural imports from the Hungary to Russia are preserved vegetables, corn, meat and meat products.
Residues and wastes of food are also important that accounted up to 18.5% of all exports.
The product structure of Hungarian imports to Russia changed significantly. During the whole analyzed period, the most significant growth was observed in relation to live animals and the products used in animal nutrition (residues, wastes of food). The share of live animals increased from 0.3% in 1996 to 13.7% in 2010, but then fall again to 5% in 2012.

The noticeable trends are also the decline in the shares of cereals, vegetable preparations.

Table 6 - Evolution of intra-industry trade in Russian foreign trade in agricultural products and foodstuffs in relation to Hungary (as a percentage of total trade)

	1996	1998	2000	2002	2004	2006	2008	2010	2012
Inter-industry	95.8	97.0	99.3	99.6	98.5	98.3	100.0	99.9	99.3
Intra-industry	4.2	3.0	0.7	0.4	1.5	1.7	0.0	0.1	0.7
Horizontal	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0
Vertical	4.2	3.0	0.7	0.3	1.5	1.7	0.0	0.0	0.8

Sources: UN Commodity Trade Statistics Database, author's calculations (2013)

In the Table 6 we can see a tendency to decrease the share of intra-industry trade in the structure of Russia's foreign trade with Hungary. During the analyzed period it declined from 4.2% to 0.07% of the total trade flows.

In 1996 intra-industry trade comprised 4.2% of all trade flows, and consisted of products such as milk and cream sugar, cocoa powder, chocolate and other foods containing cocoa. All these products are examples of vertical type of intra-industry trade.

In 2012, intra-industry trade includes only the following products: dried leguminous vegetables, oil seeds and oleaginous fruits straw and fodder and undenatured ethyl alcohol.

Reduction of intra-industry trade is primarily associated with a reduction in Russian exports of agricultural products (milk and milk products, sunflower seeds) to Hungary compared to the beginning of the analyzed period.

Results show that the extent of intra-industry trade in agricultural products in Russia varies significantly depending on the geographical region. The lowest level of intra-industry trade is observed in relation to Egypt and Brazil, the highest - in relation to Ukraine.

Conclusion

The analysis presented in this paper provides a systematic decomposition of Russia's foreign trade in agricultural products into three trade types: inter-industry, intra-industry in horizontally and vertically differentiated products, over the period 1996–2012. The analysis is performed in relation to the whole world, to individual regions as well as in relation to selected important countries.

In Russian foreign trade in agricultural and food inter-industry trade dominates. Vertical IIT is greater than horizontal IIT in Russia over the analyzed period. Mainly fluctuations in the level of intra-industry trade due to variations of horizontal intra-industry trade while vertical type of intra-industry trade is quite stable.

Results for selected countries showed that in relation to Brazil and Egypt inter-industry trade amounts 100% of the total Russian foreign trade in agricultural products and foodstuffs. Moreover, the inter-industry trade is the dominant type in the Russian trade in agricultural products and foodstuffs in relation to all considered countries. The highest level of intra-industry trade was observed in relation to Ukraine.

We also found out that in the case of Russia's foreign trade in agricultural products increase in intra-industry trade simultaneously with the process of trade liberalization was not observed. Significant increase in the level of IIT occurred only in relation to Ukraine and other CIS countries. However, in the case, it is meaningless to talk about effects of trade liberalization, because relations between these countries were close enough throughout their history.

These results are consistent with existing literature at the point that the higher the degree of integration among countries and the low in trade barriers, the higher its associated IIT index (Fontagne, 1997; Brulhart and Hine, 1999; Lovely and Nelson, 2002; Brulhart and Elliott, 2002; Diaz-Mora, 2002).

Results also confirm Gusev's (2007) assertion about the highest intensity level of intra-industry trade is characteristic of Russia's foreign trade exchange with the CIS countries. However, in relation to China, there not found a significant extension of intra-industry trade towards agricultural products.

Therefore, on the basis of this analysis, we can assume that geographic distance is the main factor determining the intensity of intra-industry trade in agricultural products between the two countries. We can also suppose that upon foreign trade liberalization the intra-industry trade intensity growth in countries with a similar level of economic development. It also confirms the fact that the higher the degree of integration among countries and the low in trade barriers, the higher its associated IIT index

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