Perspectives of the Russian agricultural exports in terms of comparative advantage

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Abstract: The paper analyses the current position of the Russian Federation in the global market of agricultural products and foodstuffs with the accent on the comparative advantage of Russian agricultural exports in relation to specific regions and states. The key purpose of the research is to classify the most significant changes in the structure of Russian agricultural exports. The results show that the structure of Russian trade is changing continuously and evolving along with the process of economic transformation and trade liberalization. Exports become less diversified and are concentrated in a few segments. From the perspective of comparative advantage, cereals, fish and vegetable oils are the segments of Russian exports which become more significant. The comparative advantages of Russian exports are strengthening mostly in the case of African, Asian and CIS countries.

Keywords: foreign trade, foodstuff, Lafay index, product mapping scheme

The conditions of the Russian foreign trade are closely related to the World Trade Organization (WTO). Russia and the WTO have established the Working Party in June 1993 (Pomfred 2005), however, it took another 18 years for Russia to become the WTO member in August 2012. After joining the WTO, Russia faces a new round of the economic transformation associated with the increasing level of its integration into the world economy, which in practice means the elimination of trade barriers or lower possibilities of government interventions in foreign trade (Saggi and Yildiz 2010). In terms of the WTO accession, agriculture has been the most adversely affected industry in the Russian economy (Gubaidullina and Yakupov 2015). The reduction of budgetary support and custom tariff restrictions resulted in the lower competitiveness of the Russian agricultural and food product – on both the domestic and international level (Sedik et al. 2013). Gnidchenko and Saľnikov (2014) state that the price competitiveness of Russian food products is very low. To assess an impact of the Russia's accession to the WTO requires a deeper analysis of its position in the international market, its specialization and comparative advantages achieved in the process of the economic transformation (Wegren 2012). According to Connolly (2015), it is highly probable that the agricultural sector will remain uncompetitive. This is closely connected with the low level of investment in Russian economy (Connolly 2011). In general, the Russian foreign trade is dominated by fuels and primary products (Garanina 2009). Russia is not able to take advantage of the new trends influencing the global agricultural market (Pulkrábek et al. 2007; Řezbova and Škubna 2013). The Russian economy still did not finish its transformation process.

The current situation with economic sanctions has made the situation even worse (Neuwirth and Svetlicinii 2015). Even the products with a high comparative advantage cannot be sold to the USA, the EU or Canada. The theory of comparative advantage emphasizes the relative differences in productivity among countries as the reason for the international trade and hence for the gains from the trade. Revealed

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comparative advantage (RCA) is a theory created to provide an insight into the export activity of a country or industry, based on how that activity compares to the activity of one or more similar entities.

The current Russian trade is heavily affected by the trade and economy sanctions applied by the Western countries. (At the beginning of 2014, the conflict in Ukraine led to the aggravation of international relations. A series of disagreements and mutual political pressure influenced the economy, including the foreign trade cooperation between Russia and a number of countries. In order to put pressure on Russia in the field of its foreign policy, the USA, the countries of the European Union, Australia, Norway, Japan, Canada and some other countries has adopted sanctions towards Russia.). Russia also decided to apply its sanctions focused on the Western countries' economic activities. In response to the above mentioned sanctions, on August 6, 2014, president Putin issued the Decree No. 560 "On Special Economic Measures to Protect Russia's Security", authorizing the Russian government, that administered a 1-year ban on the import of agricultural products, raw materials and food from Australia, Canada, Norway, the USA and the EU (in 2015, some other countries were included into the list). The applied sanctions and anti-sanctions heavily affected agrarian trade between Russia and the above mentioned countries (Neuwirth and Svetlicinii 2015). As already mentioned, even products with a high comparative advantage cannot be sold to the USA, the EU or Canada (on the other hand the competitive products penetrating Russian market are also not allowed to import).

The paper contains the summarized results of a major study of specialization and comparative advantage of the Russian Federation in the international market of agricultural products and foodstuffs.[1]

MATERIALS AND METHODS

The paper aims at specifying the current position of the Russian Federation in the global market of the agricultural products and foodstuffs with an accent on the comparative advantage of the Russian agricultural exports in relation to the specific regions and countries.

The paper is focused on explaining especially the following problems:

(1) Is there any positive trend related to agricultural production and trade growth?
(2) Are there any positive changes in the Russian agrarian trade commodity profile?
(3) What is the impact of the last ten years' development impact on the Russian agrarian trade territorial structure?

The paper aims at specifying the current position of the Russian Federation in the global market of agricultural products and foodstuffs with an accent on the comparative advantage of Russian agricultural exports in relation to specific regions and countries.

According to the above mentioned questions, it is necessary to investigate the product and territorial structure of Russian foreign trade in agricultural products and foodstuffs, to disaggregate the total trade flows into individual segments and to identify the most important segments where Russian agricultural products have a comparative advantage. Furthermore, there is a need to determine to which regions and countries the existing comparative advantages of Russian agricultural products relate, and finally, to identify and describe significant changes over the analysed period.

In the course of the following analysis, the comparative advantages of Russian agricultural exports have been calculated:
– For 1096 agricultural commodities according to the 6-digit classification of the Harmonized System);
– For 24 commodity groups according to 2 digit codes of the Harmonized System;
– For the total group of agricultural products and foodstuffs (1–24 codes of the Harmonized System).

We have used some indices to analyse the "revealed" comparative advantage: the Balassa index, the Vollrath index and the Lafay index. These indices are used to analyse the Russia's current position in the international market of agricultural products and foodstuffs. The main advantage of these methods consists in the possibility to use the available trade flow data.

The Balassa index (Balassa 1977, 1991) determines the position of the different sectors (Bowen 1983) of the Russian foreign trade. It estimates the Russian export flows within the comparative advantage determined from the observed data by what is called the "revealed" comparative advantage (RCA). In practice,

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[1]More detailed analysis can be found in the previously published articles: Ishchukova and Smutka (2013a, b).

this is a commonly accepted method for analysing trade data. This index measures the export share rather than the sources of the comparative advantage. The RCA is based on the export performance and observed trade patterns. It measures a country's export of a commodity relative to its total export. Although it is widely used and considered as a cornerstone of the trade theory, its concept is rather weak (Beaudreau 2011).

The Balassa index is calculated as follows:

$$RCA_j^A = \frac{X_{ij}/X_{it}}{X_{nj}/X_{nt}} = \frac{X_{ij}/X_{nj}}{X_{it0}/X_{nt}}$$

where x represents exports, i is a country, j is a commodity and n is a set of countries, t is a set of commodities.

The Balassa index varies between 0 and infinity; the values in the range 0 and 1 indicate that the analysed country does not have any comparative advantage and the values in the range 1 and infinity signalize that the country achieves a comparative advantage in a given sector. The RCA has been under critique for its alleged incomparability and inconsistency. Shortcomings of the Balassa index are described by many economists (Hinloopen and Van Marrewijk 2001). The paper does not want to dwell on this account, but will try to circumvent the shortcomings of the index using another two indices, each of which covers the weaknesses of the RCA and allows to conduct a comprehensive study of the above-mentioned issues.

One of these indices is the Vollrath index. The Vollrath index (1991) allows to assess the trade flows not only in term of the export values, but also taking into account the values of import. Furthermore, in contrast to the Balassa index, the Vollrath index is symmetric, with positive values indicating a revealed comparative advantage and negative ones indicating a revealed comparative disadvantage (Vollrath 1991). The revealed competitiveness is calculated as a difference between the relative export advantage (RXA), which is the equivalent to the original Balassa index (RCA), and its counterpart, the relative import advantage (RMA).

$$RMA = \frac{M_{ij}/M_{it}}{M_{nj}/M_{nt}} \qquad (2)$$

where M accounts for imports.

$$RXA = RCA = \frac{X_{ij}/X_{it}}{X_{nj}/X_{nt}} \qquad (3)$$

The measure of the Vollrath index is the revealed competitiveness (RC), expressed as:

$$RC = \ln RXA - \ln RMA \qquad (4)$$

The Lafay index (LFI) is the next indicator used. The index considers a difference between each item of the normalized trade balance and the overall normalized trade balance (Lafay 1992). Unlike the above mentioned indices, the Lafay index does not take into account the he world variables. The LFI enables focusing on the bilateral trade relations among countries and regions. Moreover, it is more reliable on the over-time comparison of sectors within a country. While the Balassa and Vollrath indices only illustrate an existence or absence of the comparative advantage, LFI helps to understand, how the comparative advantages have been developed over time and to compare its strengths for the individual products and product groups in the individual regions and countries.

For a given country i, and for any given product j, the Lafay index is defined as:

$$LFI_j^i = 100 \left(\frac{x_j^i - m_j^i}{x_j^i + m_j^i} - \frac{\sum_{j=1}^{N}(x_j^i - m_j^i)}{\sum_{j=1}^{N} x_j^i + m_j^i} \right) \frac{x_j^i + m_j^i}{\sum_{l=1}^{N} x_j^i + m_j^i} \qquad (5)$$

where x_j^i and m_j^i represent exports and imports of product j of country i, towards and from a particular region or the rest of the world, respectively, and N is the number of items. Positive values of the Lafay index indicate the existence of comparative advantages in a given item; the larger the value the higher the degree of specialization (Zaghini 2005).

The next part of the analysis presented in this paper uses the "product mapping" analytical tool. It provides a graphical representation of different categories (Babbar et al. 2002), in this case the trade-balance and international competitiveness are used. The following Figure 1 represents a matrix of the distribution of the entire set of exported products into 4 groups according to two selected indicators.

Figure 1. Product mapping scheme

Source: Widodo T. (2009)

The Revealed Symmetric Comparative Advantage (RSCA) by Dalum and Laursen indicates a comparative advantage, while the Trade Balance Index (TBI) by Lafay indicates the export-import activities. The RSCA is more symmetric and gives a range of values from –1 to +1 ($-1 \leq RSCA_{ij} \leq 1$) (Kilduff and Chi 2007). The RSCA index can be calculated as follows:

$$RSCA = (RCA_{it} - 1)/(RCA_{ij} - 1) \qquad (6)$$

The values of the $RSCA_{ij}$ index can be found between the interval (–1, 1), where:

$RSCA_{ij} > 0$ = country i achieves comparative advantage in product group j

$RSCA_{ij} < 0$ = country i is in situation of comparative disadvantage in product group j (Widodo 2008)

The Trade Balance Index (TBI) indicates the net export/net import position for a specific group of products:

$$TBI_{ij} = \frac{x_{ij} - M_{ij}}{x_{ij} + M_{ij}} \qquad (7)$$

where TBI_{ij} denotes the trade balance index of the country i for product j; x_{ij} and m_{ij} represents exports and imports of product group j by country i, respectively (Lafay 1992). A country is referred to as "net-importer" in a specific group of product if the value of the TBI is negative, and as "net-exporter" if the TBI reaches positive values (Widodo 2009).

The analysis is performed in relation to the individual regions: the European Union (EU), the Commonwealth of Independent States (CIS), Africa, Asia and North and South America.

RESULTS AND DISCUSSION

Russian foreign trade in agricultural products

According to the dynamics of the Russian foreign trade in agricultural products and foodstuffs, following the trends, we can verify that its foreign trade is growing significantly on both sides – export and import. After the decline of the agri-food foreign trade value that was connected with the negative trend dynamics by the end of the last century, we have witnessed a significant growth.

As presented in the Table 1, the average growth rate of exports (average annual rate 24%) is higher than the imports growth (average annual rate 12%). This situation was caused by an increasing demand together with a very slow growth of the Russian capacities. On the other side, the growth of the production of wheat and sunflower oil led to an increase of agricultural exports. The foreign trade coverage ratio shows that while only 18.6% of the total imports were covered by exports in 2000, it was already 46.2% in 2014. This is an evidence of positive changes in the structure of Russian foreign trade in agricultural products and foodstuffs.

The normalized foreign trade balance is measured as the foreign trade balance related to the total trade. The trade balance was recorded negative during the entire surveyed period, but the ratio of the negative balance to the whole trade has declined, which may be evaluated as a favourable trend

During the analysed period, significant changes in the Russian export structure were observed (Figure 2). The share of oil seeds in the total exports decreased

Table 1. Russia – Agricultural products and foodstuffs trade

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	GM*
Export (bn USD)	1.3	1.5	2.2	2.7	2.5	3.9	4.8	8.2	8.4	9.3	7.6	11.3	16.7	16.2	18.4	–
Import (bn USD)	7	8.7	9.8	11.2	12.7	16.1	20	26	33.2	28.3	33.6	39.2	40.6	43.2	39.9	–
Balance (bn USD)	–5.7	–7.2	–7.6	–8.5	–10.2	–12.2	–15.2	–17.8	–24.8	–19	–26.0	–27.9	–23.8	–26.9	–21.4	–
Normalized trade balance	–68.7	–70.6	–63.3	–61.2	–67.1	–61.0	–61.3	–52.0	–59.6	–50.5	–63.1	–55.3	–41.6	–45.4	–36.8	–
Foreign trade coverage ratio	18.6	17.2	22.4	24.1	19.7	24.2	24.0	31.5	25.3	32.9	22.6	28.8	41.3	37.6	46.2	–
Chain index of export flows	170	115	147	123	93	156	123	171	102	111	82	149	148	97	114	124
Chain index of import flows	91	124	113	114	113	127	124	130	128	85	119	117	103	106	92	112

*GM – the geometric mean of chain indices shows the average change in the value of export or import over the analysed period

Sources: UN Commodity Trade Statistics Database, authors' calculations (2015)

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significantly (from 15 to 2%), as well as shares of dairy products (from 7 to 2%) and sugar (from 5 to 1%). On the other hand, a significant increase in the exports of cereals from 7 to 38% and fats and oils (primarily sunflower oil) from 7% to 12% was detected. The same trend was already predicted in the previous analysis (Ishchukova and Smutka 2013). The Russian agricultural export gradually concentrated in the narrow segments (wheat, fish and sunflower oil), with increasing volumes within the segments.

Analysing the commodity structure of Russian imports (Figures 3), the following trends can be iden-

tified. The share of sugar in the total agricultural imports decreased from 20 to 4%, cereals shrunk from 12 to 2% and tobacco products from 16 to 5%. Conversely, a significant increase was observed in the shares of dairy products and eggs (from 5 to 17%), as well as edible fruits (from 14 to 24%) and vegetables (from 7 to 13%).

The transformation processes of the Russian economy, which started in early 1990s, have led to a decline in all sectors, especially in the livestock industry. This fact has largely determined the current state of Russia in the international market as one of the
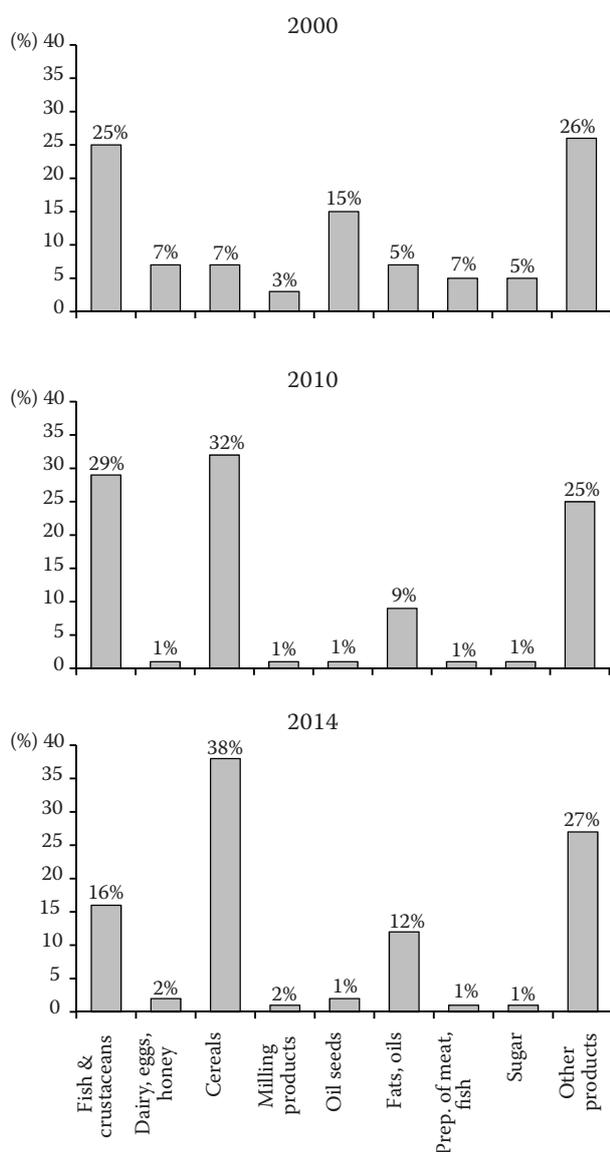
Figure 2. Comparison of the product structure of the Russian agricultural export (%)

Sources: UN Commodity Trade Statistics Database, authors' calculations (2015)
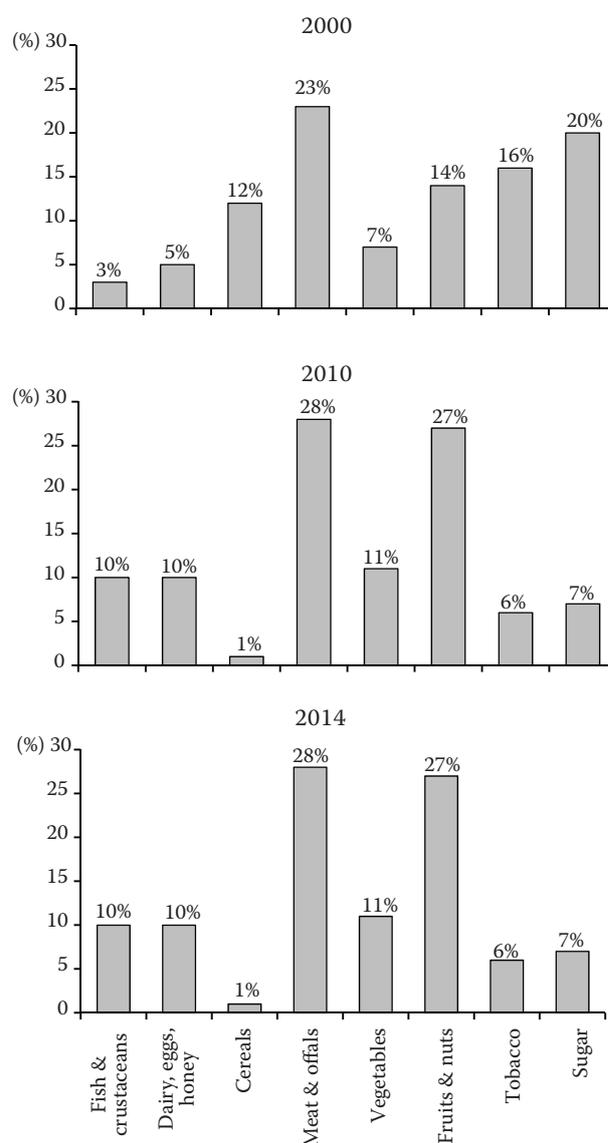
Figure 3. Comparison of the product structure of the Russian agricultural import (%)

Sources: UN Commodity Trade Statistics Database, authors' calculations (2015)

largest importer of meat and meat products, and as a feed wheat exporter, simultaneously. Russia just does not have enough livestock which would be fed by the domestic wheat. Therefore, the path of the increasing crop products exports and meat and meat products imports was established. These results are similar to Mikhailushkin and Barannikov (2013) that the highest level of the import dependency is observed for meat, vegetables and fruits.

Comparative advantage index analysis

In the course of the following analysis, the comparative advantages of Russian agricultural exports have been calculated for 1096 agricultural commodities (according to the 6-digit classification of the

Harmonized System). Due to a huge variety of commodities, the paper represents just the summarized results for 2 digit groups.

The shaded cells in the Table 2 represent product groups, where the Balassa (RCA) and Vollrath (RC) indices have identified comparative advantages. Both indices for the same set of data were used to reduce the likelihood of the random error. The results of calculations by the Balassa and Volrath indices were almost the same. The Balassa index takes into account only the export trade flows, while the Volrath index includes both exports and imports. Nevertheless, the total number of products achieving a comparative advantage by the Volrath index analysis is higher than by the Balassa one.

The groups of products with the revealed comparative advantage show the growth from 88 to 123

Table 2. Values of Balassa (RCA) and Vollrath (RC) index by product groups of Russian agricultural foreign trade (according to their origin)

HS Code	Commodity	2000		2002		2004		2006		2008		2010		2012		2014	
		RCA	RC	RCA	RC	RCA	RC	RCA	RC	RCA	RC	RCA	RC	RCA	RC	RCA	RC
01	Live animals	0.0	−2.1	0.0	−2.6	0.0	−2.7	0.0	−5.1	0.0	−5.0	0.0	−4.7	0.0	−4.6	0.0	−2.9
02	Meat & edible meat offal	0.0	−6.7	0.0	−7.7	0.0	−8.0	0.0	−7.4	0.0	−6.7	0.0	−6.0	0.0	−5.4	0.0	−4.8
03	Fish & crustaceans	0.5	−0.1	0.6	−0.5	0.3	−1.5	0.3	−1.5	0.2	−1.9	1.1	−0.4	0.9	−0.4	0.9	−0.4
04	Dairy, eggs, honey	0.2	−2.1	0.1	−2.8	0.1	−3.0	0.1	−2.5	0.1	−2.3	0.1	−3.6	0.1	−3.0	0.1	−3.2
05	Products of animal origin	0.2	−1.7	0.1	−1.8	0.1	−1.8	0.2	−1.6	0.1	−1.5	0.1	−2.4	0.2	−1.4	0.2	−0.7
06	Live trees & other plants	0.0	−5.8	0.0	−6.1	0.0	−6.1	0.0	−6.7	0.0	−7.1	0.0	−7.0	0.0	−7.2	0.0	−6.0
07	Edible vegetables	0.1	−3.9	0.1	−3.0	0.1	−3.1	0.1	−3.4	0.1	−3.7	0.0	−4.1	0.2	−2.5	0.1	−3.1
08	Ed, Fruits & nuts	0.1	−3.9	0.1	−3.9	0.1	−3.6	0.1	−4.0	0.0	−4.7	0.0	−6.0	0.0	−4.5	0.0	−4.8
09	Coffee, tea, mate & spices	0.0	−4.7	0.0	−4.5	0.1	−3.4	0.1	−3.0	0.1	−2.7	0.1	−3.1	0.1	−2.7	0.1	−2.6
10	Cereals	0.2	−2.8	**1.1**	**1.0**	**0.7**	**−0.5**	**1.1**	**0.6**	**1.3**	**1.4**	**1.5**	**1.9**	**1.1**	**1.9**	**1.1**	**1.6**
11	Milling industry products	0.5	−2.6	0.2	−3.0	0.3	−2.6	0.3	−1.2	0.6	−0.2	0.2	−0.9	0.3	−0.7	0.3	−0.7
12	Oil seeds/misc, grains	0.6	−0.3	0.1	−2.2	0.1	−1.9	0.1	−1.9	0.1	−2.6	0.1	−3.0	0.1	−1.5	0.1	−2.2
13	Lac, gums, resins, etc,	0.0	−4.3	0.0	−6.4	0.0	−4.3	0.0	−4.9	0.0	−5.3	0.0	−5.6	0.0	−4.5	0.0	−3.9
14	Vegetable plaiting materials	0.0	−4.9	0.0	−4.3	0.0	−5.1	0.3	−0.4	0.4	0.4	0.3	0.2	0.6	1.3	0.5	1.2
15	Animal or vegetable fats, oils	0.3	−2.7	0.1	−3.3	0.2	−2.3	0.4	−1.1	0.3	−1.2	0.3	−1.3	0.7	0.0	1.1	0.5
16	Ed, prep, of meat, fish, etc	0.3	−1.4	0.2	−1.7	0.1	−1.7	0.2	−1.5	0.2	−1.3	0.1	−2.0	0.1	−1.8	0.1	−2.0
17	Sugars & sugar confectionery	0.3	−3.8	0.3	−3.4	0.2	−3.1	0.2	−3.2	0.1	−2.8	0.1	−3.3	0.2	−1.5	0.2	−2.0
18	Cocoa & cocoa preparations	0.3	−2.5	0.3	−2.5	0.4	−2.1	0.4	−1.8	0.4	−1.7	0.3	−2.2	0.4	−1.5	0.7	−1.0
19	Preps, of cereals, flour, starch	0.1	−2.0	0.2	−1.8	0.2	−1.4	0.3	−1.2	0.3	−1.1	0.2	−1.9	0.3	−1.4	0.3	−1.3
20	Preps of vegs, fruits, nuts, etc,	0.0	−4.3	0.0	−4.3	0.1	−3.7	0.1	−3.4	0.1	−3.3	0.0	−4.0	0.1	−2.8	0.1	−2.5
21	Misc, edible preparations	0.2	−2.9	0.2	−2.7	0.3	−2.2	0.3	−2.0	0.3	−1.7	0.2	−2.4	0.3	−1.7	0.3	−1.7
22	Beverages, spirits & vinegar	0.1	−3.0	0.2	−2.6	0.1	−3.0	0.2	−2.4	0.2	−2.3	0.1	−2.6	0.2	−2.3	0.0	x
23	Residues, animal feed	0.1	−2.8	0.1	−3.1	0.2	−2.1	0.2	−2.2	0.2	−1.9	0.2	−1.6	0.4	−0.9	0.5	−0.8
24	Tobacco & substitutes	0.1	−4.8	0.2	−3.2	0.3	−2.6	0.4	−2.1	0.4	−1.6	0.4	−1.8	0.6	−1.1	0.8	−0.9

Source: Comtrade database and Federal Custom statistic Services of Russian Federation (2015)

(according to the Volrath index), and from 33 to 67 items (according to the Balassa index) for 1096 items surveyed during the analysed period.

Based on the above facts, we can make a statement that the competitiveness of the Russian agricultural export is improving and it could also indicate an increasing export diversification.

There are detected individual products having a comparative advantage despite the fact that the whole group has not. As an example, there can be named the group 12 "Oil seeds/misc, grains", where the product 120600 Sunflower seeds achieved a strong comparative advantage over most of the analysed period.

The top 3 items with a highest value of the Balassa index

2000:
 – 030332 – Frozen plaice (RCA = 27.6)
 – 110319 Groats and meal of rye or barley (RCA = 15.4)
 – 120600 Sunflower seeds, whether or not broken (RCA = 11.7)

2010:
 – 030311 – Sockeye salmon (RCA = 9.7)
 – 030380 – Frozen fish livers and roes (RCA = 12.3)
 – 030332 – Frozen plaice (RCA = 6.9)

2014:
 – 120760 – Safflower seeds, whether or not broken (RCA = 23.3)
 – 030311 – Sockeye salmon (red salmon) (RCA = 14.9)
 – 030332 – Frozen plaice (RCA = 13.9)

Primary and processed products

Based on the level of processing, we have created three groups of products to be able to conduct another analysis. Each group contains both products with a comparative advantage and a comparative disadvantage. The objective at this stage is to identify common patterns and shifts in the comparative advantage among the groups.

Comparative advantage was detected in the group of bulk commodities. During the analysed period, the index value was close to 1, but only in 2007 the Balassa indicated a comparative advantage of the group (see Table 3). However, in comparison with other product groups, this group achieves a relatively high index values. The calculations have also indicated that Russia has a comparative disadvantage in the processed products.

The results indicate that primary products have a significant comparative advantage in the EU, the CIS and in Asia. On the contrary, the processed products achieve comparative advantages in trade with countries of the North, Central and South America, while most of the primary products indicate a comparative disadvantage.

Over the last few years, the Russian Federation has employed the import-substitution policy in relation to agriculture. In 2010, the Russian president approved the Food Security Doctrine of the Russian Federation. The Doctrine sets the following goals regarding the minimum share of domestic production in the total supply of basic food products: grain – 95%, sugar – 80%, vegetable oil – 80%, meat and meat products– 85%, milk and dairy products – 90%, fish products – 80%, potatoes – 95%, edible salt – 85%. These goals should be achieved by 2020 (Doctrine of Food Security of RF 2009).

Furthermore, Russia is seeking not only to achieve a high level of self-sufficiency in basic agricultural products, but it also claims to be a major exporter of agricultural products and foodstuffs (Gaidar et al. 2011). To achieve all these goals, Russian agricultural products must be competitive both in the domestic and global market (Stupak 2012).

However, in Russia, as in any of the other countries, different branches of agriculture have a different efficiency, due to the historical or natural geographical factors. Therefore, for the effective development of Russian exports it is necessary to focus on the areas of agriculture that are competitive and have com-

Table 3. Values of Balassa index by product groups in relation to the degree of processing

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Bulk commodities	0.3	0.3	0.9	0.9	0.4	0.7	0.7	1.2	0.6	0.9	0.5	0.7	0.9	0.7	0.9
Produce/horticulture products	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
Semiprocessed products	0.3	0.4	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.5	0.4	0.4	0.6	0.6	0.7
Processed products	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.2	0.2

Source: Comtrade database and Federal Custom statistic Services of Russian Federation (2015)

parative advantages in the world market or at least in relation to the selected regional markets (Potapov 2007). That is why the issue of the competitiveness of the Russian agricultural products is becoming so important in the current situation.

Comparative advantage in relation to individual regions

A detailed analysis has shown that there are huge differences in the comparative advantage among different groups of products. This depends on the geographic region and its position in the international trade. The LFI was determined for each product/aggregation in relation to 6 regions: the EU, the CIS, Africa, Asia and the Americas (Table 4), and in relation to the selected countries.

The Commonwealth of Independent States, Africa and Asia are important trading partners for Russia and due to this, there is a strong comparative advantage of Russia. Factors influencing c the comparative advantage of Russia can be summarised as follows: the geographic location connected with a low cost of transport. In the case of the CIS, it is also necessary to mention the historical development of the trade relations. Taking into account the Russian bilateral trade with the individual selected regions, many products achieve the comparative advantage despite of the comparative disadvantages in relation to the world. For example, rapeseed has a comparative disadvantage in relation to the African and American countries as well as to the world, nevertheless, rapeseed has a strong comparative advantage in relation to the EU, since the European countries use rapeseed for the bio-fuel production. Africa is in a different situation. As some of the African countries are net food importers, the key role is played by cereals and their preparations. These groups of products create the comparative advantage of the Russian foreign trade and significantly improve the Russian position.

Comparative advantage in relation to the individual countries

Germany, China, Ukraine, Brazil, the United States and Egypt were selected for a more detailed analysis. The countries were chosen by their share in the structure of foreign trade in agricultural products. Therefore, some of these countries are more important to Russia in the terms of exports, some in the terms of imports. Thus, it turns out that Russia has less strong comparative advantages in relation to the Ukraine, but it concerns more products. At the same time, comparative advantages are more intense in relation to Egypt and China, however, exports are less diversified. In the case of Brazil, none of the investigated products have a comparative advantage. This indicates that Russian agricultural products are completely uncompetitive in the Brazilian market. This is quite understandable, since Brazil is a large country with a developed agricultural sector and has more favourable conditions for agricultural production than Russia. With respect to Egypt, comparative advantages exist in two major product groups, namely in cereals and vegetable oils and oil crops. These results are similar to Rau (2015) that analysed the grain sector of the Russian Federation. This can be explained by the large volume of wheat exports from Russia to Egypt (mainly feed wheat). The comparative advantage of wheat in relation to Egypt significantly increased since 2002. Positive values of the LFI have been also observed in relation to such products as the sunflower oil and wastes of food industry or animal fodder. A large number of product groups have comparative advantages in relation to Ukraine (but less strong as mentioned above). Milling products, fish, molluscs, aquatic invertebrates, coffee, tea, mate and spices, edible preparations, wastes of food industry, animal fodder, tobacco and tobacco products can be mentioned among others. The highest comparative advantages in relation to Germany were found in the

Table 4. LFI in relation to individual regions

	1996	1998	2000	2002	2004	2006	2007	2008	2009	2010	2011	2012	2013	2014
Africa	0.03	0.16	3.16	1.10	1.93	3.67	2.16	6.35	2.81	3.50	3.44	5.33	4.92	4.87
Asia	6.79	6.69	5.36	6.68	3.46	4.03	4.24	4.63	4.23	9.84	8.83	8.49	10.43	9.82
CIS	2.04	4.17	3.92	6.29	6.90	7.81	10.12	9.34	10.59	8.17	4.08	4.50	6.00	5.07
EU	−2.79	−3.81	−3.57	−5.66	−5.14	−5.59	−5.93	−8.17	−6.74	−8.82	−7.43	−8.26	−9.60	−8.88
North America	−2.96	−2.90	−2.53	−1.97	−1.65	−1.91	−2.07	−2.39	−2.80	−3.06	−1.59	−2.22	−3.43	−1.84
South America	−3.11	−4.32	−6.33	−6.44	−5.48	−8.01	−8.52	−9.76	−8.09	−9.62	−7.33	−7.84	−8.33	−9.03

Source: Comtrade database and Federal Custom statistic Services of Russian Federation (2015)

Table 5. Top 10 countries in terms of comparative advantage of Russian agricultural products in 2014 (according to LFI)

	Country	Export	Import	LFI
1	Turkey	2358	1765	3.62
2	Kazakhstan	1592	278	3.43
3	Egypt	1386	444	2.77
4	Rep. of Korea	1192	139	2.65
5	Azerbaijan	750	304	1.43
6	Iran	599	248	1.14
7	Saudi Arabia	361	1	0.85
8	Uzbekistan	294	54	0.63
9	Yemen	256	0	0.60
10	Sudan	250	1	0.59

Source: Comtrade database and Federal Custom statistic Services of Russian Federation (2015)

product groups of fish, molluscs, aquatic invertebrates, beverages, spirits and oil seeds (due to the exports of rapeseed). In the case of China, only one group achieves a significant comparative advantage. This is a group of fish, molluscs, and aquatic invertebrates. Within this group, the export of codfish reaches the

highest competitiveness. Other products are not competitive (this concerns the whole surveyed period).

The LFI for an extended sample of selected countries is presented in the Table 5. This part of the analysis was conducted in 2014 and it shows that Russian agricultural products are more competitive in relation to Turkey, Kazakhstan, Egypt, Korea, etc.

The "product mapping" of Russian agricultural exports is used as a next analytical tool. It disaggregates the total trade flows into several groups and identifies the most competitive items and products which do not have any comparative advantage at all.

The results of "products mapping" (Figure 4) clearly illustrate that the majority of the Russian agricultural export merchandise is categorized within the quadrant D. Products placed in this area have no revealed comparative advantage and sustain a negative trade balance. From the standpoint of economic development and trade balance, it seems to be a bad situation. However, it is evident that Russia cannot be efficient and fully self-sufficient in all agricultural products due to its natural and climatic conditions, particularly with regard to agricultural products of
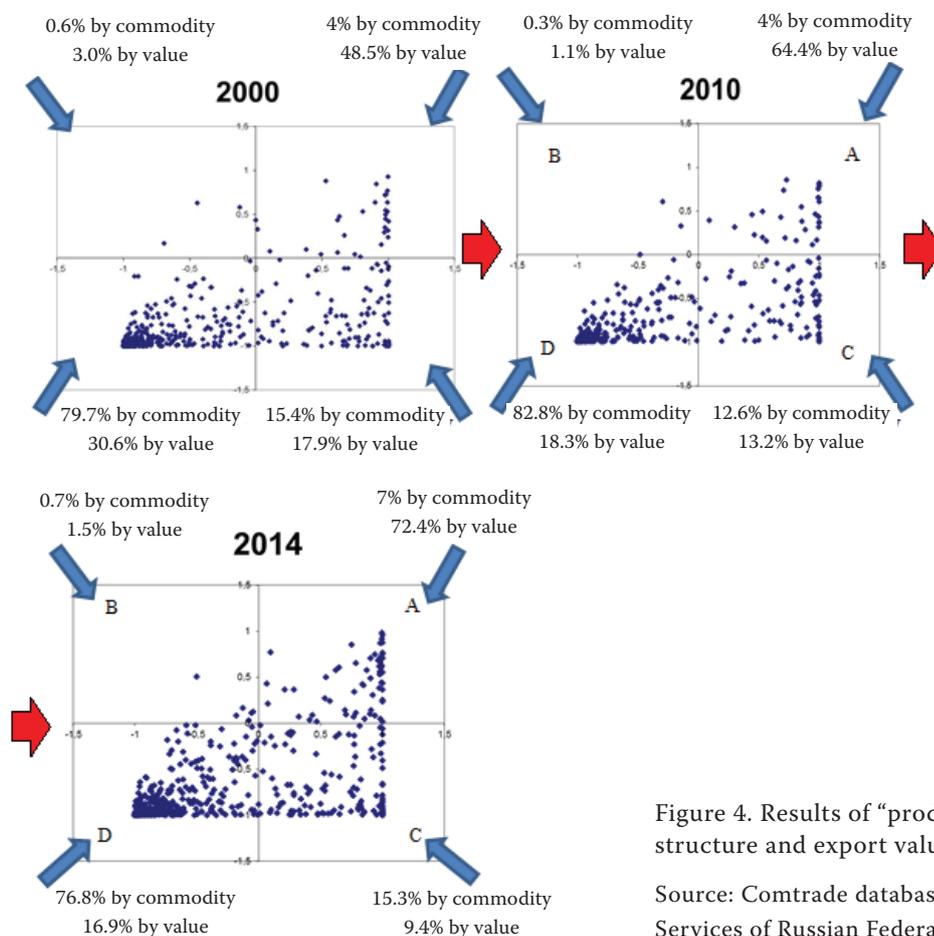
Figure 4. Results of "product mapping", changes in the structure and export values of each group

Source: Comtrade database and Federal Custom Statistic Services of Russian Federation (2015)

other climatic zones as tropical fruits, tea, coffee etc. Just such products represent a substantial part of the group D. Besides the aforementioned products, this group includes the commodities that Russia is able to produce on its own, but does not produce them for some reason. The above mentioned results indicate support of the idea of Liefert and Liefert (2012) about the support to the agriculture sector to reach a high level of self-sufficiency. Russian authorities are extremely sensitive in relation to the constant growth of the agrarian trade negative balance value. This idea is being proved by Gudoshnikov (2008), who mentioned the necessity of the growth of production based on national sources. Second part of the problem is related to the regional structure of the trade and the idea of future regional cooperation. Our results specify the close regional cooperation between the former Soviet Union countries in compliance with Cooper (2008).

A different situation appears for the quadrant B. Even when this quadrant represents the group of products with a comparative advantage, most of them have been imported to Russia. The share of this group of products in the global trade with these commodities is very low. Even due to this low share, Russia plays a key role in this small-scale market (for both export and import). This fact determines the Russian comparative advantages in these items; however, their imports exceed the exports volumes. According to this, we can describe this quadrant as an infrequent for the whole system. This group can also be considered as a transitional group. Its comparative advantage is fluctuating over the monitored period.

The quadrant C contains products with the RSCA < 0 indicating a comparative disadvantage, however, the trade balance of these products is positive. An analysis of this situation outlines the differences between different regions. The above mentioned statement about the RSCA is true just on the world level. It was not proved for the regional or country level. In the case of the bilateral trade, the comparative advantage exists.

Such a phenomenon has been observed in the analysis of the LFI in the above section. To test this hypothesis, the LFI was used once more to analyse the bilateral trade flows between Russia and the individual regions. A detailed analysis shows that each product of the surveyed group (with few exceptions) has a comparative advantage in relation to at least one region. For example, the comparative advantage of cigarettes was found in relation to Africa and the CIS countries; the flour of wheat in relation to Asia,

the rapeseed and rapeseed oil in relation to the EU. In most cases, the products have comparative advantages in relation to the CIS, the EU or Asian countries, while the trade in these products with the countries of Africa and Americas often does not exist.

The most important is the group A. Products included in this group are the most important for the Russian foreign agricultural trade with a high RCA and also trade balance. According to our calculation, Russia has a positive trade balance for this quadrant. Taking into consideration just the traded value of groups situated in this quadrant, the highest proportion of the export value appears to be concentrated within the group A. Four percent of the exported goods (categorized within the group A) create about fifty percent of the value of the total agricultural exports.

It can be compared with the D quadrant that has thirty percent of the trade value of the export together with nearly ninety-five present of the total import

According to our analysis, we can state that the quadrant A represents the key commodities for the Russian agricultural and food trade. During the analysed period, we have found indicative changes in both the volume and structure of the trade.

There was a significant fluctuation in the total value of each segment. Such changes have occurred not only due to the fluctuations in the quantity and value of the trade flows, but also largely due to the changes in the structure of each group and the transition of individual items from one group to another one. A shift of the cattle hides from the group A to the group D was caused by the persisting weakening of the position of the livestock sector. As an important factor, there can be considered licensing for the export of hides and skins of cattle, sheep and other animals. To protect home producers, the Russian government imposed export restrictions on leather products. However, the Russian government reduced their competitiveness in the world market at the same time. Another example may be represented by the decline in the comparative advantage of sunflower seed caused by an increase in the production capacity for the oilseed processing. Consequently, Russia has increased its export of sunflower oils at the expense of the raw materials (sunflower seeds).

The results of the "product mapping" thus do not conflict with the previous analyses, but they expand the observations, allowing to draw conclusions about the structure and the most important trends in the development of Russian agricultural exports and their competitiveness.

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Our findings follow the results of Svatoš et al. (2014) revealing that the value of imports was growing much faster comparing to the value of exports. The result is a constantly increasing negative trade balance. The inter-annual growth rate of exports is higher than that of imports (the result of this development is the stabilization of the agrarian trade balance). The Russian agrarian export commodity structure became more concentrated (The majority of export transactions is represented by only a limited number of items. The significant portion of those items are semi-finalized or even finalized agrarian and foodstuff products.). The commodity structure of agrarian imports became more heterogeneous (but the current political and economy tension existing between Russia and its Western partners heavily affected the structure, volume and value of the mutual agrarian trade transactions). In the recent years, the Russian Federation has strengthened the comparative advantages of its agricultural export (those advantages are strengthened especially in relation to the traditional partners represented by the Central Asian countries, the Eastern European countries, the African countries and the Latin American countries. Russia is encouraging especially the cooperation between itself and its former satellites.).

During the monitored period, we have witnessed some oscillation, however, the tendency for the agricultural foreign trade can be described as a steadily growing share of the group A in the total value. A very strong position within this group has wheat, accounting for 41% (2010) and 40% (2014) of the total A group value, whereas wheat was categorized as C group in 2000. The group A represented 48.5%, 64.4% and 72.4% of the total exports in 2000, 2010 and 2014.

The quadrants D and C have decreased their share during the same time. Based on these findings, we can conclude that the comparative advantage of the Russian export is increasing. In the recent years, Russia has launched an active policy of import substitution in many areas, including agriculture and food production. Results of the analysis show that such policy can be successful. O'Neal (2014) highlighted the same problem of the government intervention in agriculture. If the Russian government keeps this approach for the future, a further strengthening of the Russia's position as an exporter of agricultural products and an increasing number of products with comparative advantage can be expected.

It must be highlighted that at present, Russia plays a significant role in the current redistribution of the political and economic power structures (Kašáková 2012). Changes in the economy, the processes of globalization and internationalization have led to structural changes in the Russian agriculture and Russian agricultural foreign trade. The profile of agricultural trade has been changing significantly and very fast. On the base of the applied product mapping approach, we can find a group of products that includes only 7% of the exported items, but accounts for over 70% of the value of the total agricultural exports. Items in this group have a comparative advantage and a positive trade balance (Ishchukova and Smutka 2013a, b). The transformation process of Russian agrarian sector and trade activities is still not finished. This is a long-term problem that has been already mentioned by Tabata (2006). The current Russian policy, even if the Russian Federation is the WTO member, is still protectionist. There is an ongoing pressure on the protection of the Russian market (Erokhin et al. 2014), to be directed on the decrease of the negative consequences of globalization, on the support of agrarian sector, on the use of competitive advantages of domestic manufacturers of the foodstuffs (Potapov 2007) and on the reaching food security (Mikhailushkin and Barannikov 2013). The only countries getting a preferential access to Russian market are the Russia's close political partners or the countries of Russian special interests.

CONCLUSION

The global environment brings many changes in established trade flows. These changes are caused by both the economic development in different countries, as well as the ongoing trade liberalization and progress in the trade policies. However, the prevalent schemes often persist in our minds, although the reality may be changed. Russia is a country where an analysis of comparative advantages in agricultural and foodstuffs trade may offer another perspective than it is generally assumed.

As evident from the analysis done by the Balassa index, the comparative advantage is achieved mostly by crops (wheat, barley), their by-products (bran of wheat) and products of their processing, such as the barley pearled, pot barley, barley flour and grits, cereal preparations, etc. in the current Russian agricultural exports.

The Russian comparative advantage is based on large cultivated areas producing grains. In this case,

the Russian potential is really big. On the other hand, the land area is not the only source of comparative advantage. An equal share can be explained by the increase in the production capacities, a suitable climate situation and the enhancement of transport facilities. All these factors contribute to the growing importance of cereals as the Russian strategic resource intended for export. The structure of Russian exports of agricultural products is not completely formed yet. It is changing and evolving along with the process of economic transformation and trade liberalization. Strengthening the competitiveness of some products (wheat, sunflower oil), and weakening of the others (sunflower seeds, hides and furs) was observed throughout the analysed period. The export becomes less diversified, concentrated in a few segments. From the perspective of the comparative advantage, cereals and vegetable oils are the segments of the Russian exports which became the most significant. Strengthening comparative advantages of Russian exports in relation to the countries of Africa, Asia and the CIS states can be observed as well. Russia has less strong comparative advantages in relation to the Ukraine, but with regard to more products. At the same time, comparative advantages are more intense in relation to Egypt and China, however, the export to these countries is less diversified.

We can conclude that there exists a general trend of strengthening comparative advantages of Russian agricultural exports. This conclusion is based on the fact that the number of products that have a revealed comparative advantage grew gradually according to the Balassa and Vollrath index. In addition, the results of the "product mapping" identify a growing share of the group A (comparative advantage and positive trade balance) in the total value of Russian agricultural exports and, at the same time, a reduction in the proportion of the group D (comparative disadvantage and a negative trade balance).

Based on the analyses performed, the following assumptions about the future development of Russian foreign trade in agricultural products can be concluded. The accession of Russia to the WTO will increase the level of its integration into the world economy within the next years. Rules and regulations related to this accession limit the government's ability to support the agricultural sector and to intervene in the foreign trade. In such circumstances, only the most competitive segments of agriculture will expand. This will lead to a narrowing of the Russia's

specialization in the international market of agricultural products, the prerequisites of which can be observed at the moment.

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