

## Comparative Advantage: Products Mapping of the Russian Agricultural Exports

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### Anotace

Tento článek obsahuje analýzu ruského zahraničního obchodu s agrárními a potravinářskými sektory ze dvou hledisek: mezinárodní konkurenceschopnosti a obchodní bilance.

Cílem analýzy je charakterizovat specifické skupiny produktů z celkového vývozu, z hlediska jejich komparativní výhody (nebo nevýhody) a obchodní bilance; a zároveň určit změny, které nastaly v těchto charakterizovaných skupinách během období 1998-2010 a vysvětlit, proč došlo k těmto změnám.

Analýza je založena na kombinaci dvou indexů, tj. Revealed Symmetric Comparative Advantage, a Trade Balance Index, které byly použity ke znázornění analytických nástrojů „products mapping“.

V průběhu studie byla z celkových vývozních toků vyčleněna skupina výrobků (skupina A), která zahrnovala 5 % z vyváženého zboží, ale dosahovala přibližně 50 % z celkové hodnoty zemědělského vývozu. Položky v této skupině měly komparativní výhodu a pozitivní obchodní bilanci. Největší význam ve skupině A měla pšenice.

Byla také určena skupina D, v níž 80 % položek představovalo pouze 30 % z celkového vývozu, ale 95-99 % z celkového dovozu. Tyto položky měly komparativní nevýhodu a záporné saldo obchodní bilance. Ale došlo ke snížení hodnot skupiny D, zatímco skupina A měla růst stabilní. Tyto trendy lze považovat za posílení komparativních výhod ruského zemědělského vývozu.

### Klíčová slova

Komparativní výhoda, obchodní bilance, Rusko, obchod se zemědělskými produkty, products mapping.

### Abstract

This paper contains an analysis of the Russian foreign trade in agricultural products and foodstuffs from the two points of view: international competitiveness and country's trade balance.

The aim of the analysis is to distinguish from the total agricultural export flows specific groups of products according to their comparative advantage (or disadvantage) and trade balance, to trace changes that have occurred in this groups over the period and to explain why these changes have taken place.

The analysis is based on the combination of two indices i.e. Revealed Symmetric Comparative Advantage, and Trade Balance Index that were used to represent an analytical tool named “products mapping”.

During the study, from the total export flows we distinguished a group of products (Group A) that includes 5% of the exported goods, but accounts for about 50% of the value of total agricultural exports. Items in this group have a comparative advantage and positive trade balance. The greatest weight in the group A has wheat.

There was also identified the group D where 80% of items account for only about 30% of total exports, but 95-99% of the total imports. These items have comparative disadvantage and negative trade balance. But there was a reduction in the value of group D, while the group A has been steadily growing. These trends can be considered as a strengthening of the comparative advantages of Russian agricultural export.

### Key words

Revealed Comparative Advantage, Trade Balance, Russia, Agricultural Trade, Products Mapping.

## Introduction

Throughout its history, Russia was a major agrarian country. The essential role of agriculture in the Russian economy is determined by vast territory, natural environment, land suitable for agricultural production, national traditions and other factors. The dissolution of the Soviet Union in 1991 marked the beginning of a transition from a centrally-planned to a more market-oriented economy.

Due to the transformation processes, Russian agriculture has experienced a recession in all sectors. According to Federal State Statistics Service of Russian Federation, in the period from 1990 to 2007, size of cultivated areas has been steadily declining. (Rosstat, 2012)

Despite the steady growth of the Russian livestock sector in the last decade (especially in the segments of the poultry and pork), the overall level of production still has not reached the level of 1990, despite the government support.

In the past two decades Russia became a stable net importer of agricultural products and foodstuffs.

The economic reforms that have started in Russia in the early 1990s spurred major changes in the structure and volume of the country's agricultural production and trade.

In 2010, Russian President approved the Food Security Doctrine of the Russian Federation. The doctrine calls for extensive import substitution.

The Doctrine establishes the following minimum production targets as the share of domestic production in the total supply of commodities: 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 also claims to be a major exporter of agricultural products and foodstuffs. In the last decade, exports of agricultural products has been growing at fast pace.

However, in Russia, as in any other country, the different branches of agriculture have different efficiency, due to 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 comparative or absolute advantages

in the world market.

In the theories of international trade, comparative advantage is an important concept for explaining trade patterns.

The concept of comparative advantages was first developed by the classical economist David Ricardo (1817) building on Adam Smith's (1776) principle of absolute advantages.

Smith and Ricardo explained the occurrence of absolute and comparative advantages as the result of differences in labor productivity. Eli Heckscher (1919) and Bertil Ohlin (1933) developed the idea of comparative advantages in a model based on differences in factors endowments.

However, it is well known that measuring comparative advantage and testing the Heckscher-Ohlin theory have some difficulties (Balassa, 1989) since relative prices under autarky are not observable. Given this fact, Balassa (1965) proposes that it may not be necessary to include all constituents effecting country's comparative advantage. Instead, he suggests that comparative advantage is "revealed" by observed trade patterns, and in line with the theory, one needs pre-trade relative prices which are not observable.

Thereby, the analysis of Russian exports in terms of "revealed" comparative advantage allows us to identify basic segments where Russia is competitive in the global markets.

The methodology proposed Balassa is often used in empirical studies of specialization and comparative advantage of many countries, including Russia.

Tabata (2006) investigated changes in Russia's comparative advantage in 1994-2005 by Revealed Comparative Advantage index, Revealed Comparative Disadvantage index, and Trade Specialization Index. The results of his work show the increasing competitiveness of oil and gas exports (and secondarily those of armaments, selected base metals, roundwood, and fertilizers) and declining competitiveness in (and increasing imports of) meat, plastics, and automobile production and stagnation in the machinery sectors.

Westin (1998) has examined the pattern of revealed comparative advantage of Russia in its trade with the EU using the Balassa index, and an index based on import-export ratios. According to Westin, Russian exports are showing a healthy development in terms of a broader variety of goods being traded in 1995 compared to 1992. His findings show that Russia reveals a comparative advantage in primary

products and that there is no sign of change in terms of manufacturing export, which is still suffering from being unsalable on Western markets due to weakness in quality.

Ahrend (2004) argues that international competitiveness of Russian Federation - as measured by revealed comparative advantage remains limited to a small number of sectors that mainly produce primary commodities (particularly hydrocarbons) and energy-intensive basic goods.

A noted British economist Cooper (2006) compared Russia's scores in 2000 on the Balassa Index of Revealed Comparative Advantage with those of 2004, and also for that year with a selected list of international competitors (Brazil, India, China, Turkey, and the United States) as well. He argues that Russia possesses some very large non-competitive sectors, in particular the motor industry, civil aviation, shipbuilding, tractor and agricultural machine building, and light industry (i.e. textiles, clothing, and footwear).

Savin and Winker (2009) calculated Russian revealed and prospective comparative advantages, analyzed their dynamics during the last five years, and suggested that the Russian Federation has prospective advantages in some medium and high technological industries like pharmaceutical industry, electronic equipment, machinery building and railway transport as well as in some other industries like production of clothes.

However, there are a very limited number of studies concentrating directly on the issue of international trade in agricultural products and foodstuffs in Russian Federation. In this paper we present one such study.

The idea of this article is to examine the structure

of Russian foreign trade in agricultural products from the point of view of its specialization and the competitive performance over the period 1998-2010.

The aim of the analysis is to distinguish from the total agricultural export flows specific groups of products from the point of view of comparative advantage and trade balance, to trace the changes that have occurred in these groups over the period and to explain why these changes have taken place.

## Materials and methods

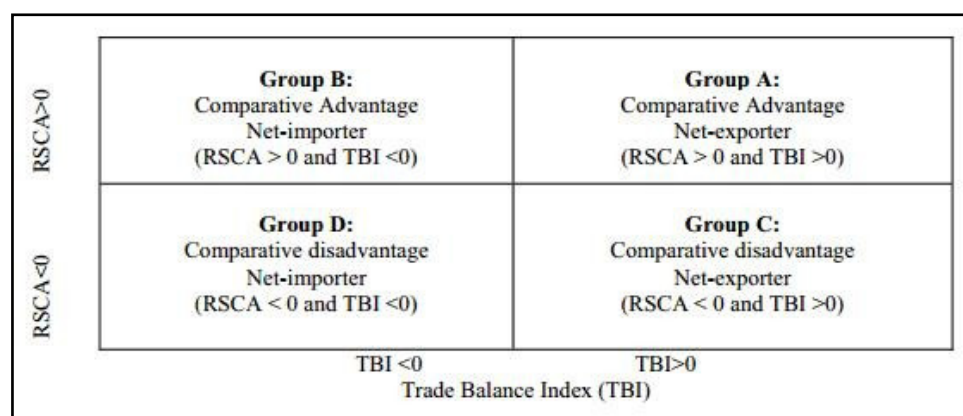
The analysis presented in this paper was conducted using the analytical tool, named "products mapping". This tool enables to assess leading exported products from two different points of view, i.e. domestic trade-balance and international competitiveness. (Widodo, 2009)

The classification of agricultural commodities used in the paper is the FAOSTAT Commodity List (FCL) that is originally based on the Standard International Trade Classification of the United Nations. It includes 683 commodities and covers crops and livestock, both primary and derived products. All value figures are calculated at current prices in USD.

There are two crucial variables for analyzing comparative advantage, i.e. domestic trade-balance and international competitiveness (Widodo, 2009).

The figure 1 represents a matrix for the distribution of the entire set of exported products into 4 groups according to the two selected indicators.

The Revealed Symmetric Comparative Advantage (RSCA) by Dalum et al.(1998) and Laursen (1998) is the indicator of comparative advantage and



Source: Widodo T. (2009)

Figure 1: Product mapping scheme.

Trade Balance Index (TBI) by Lafay (1992) is the indicator of export-import activities.

The RSCA index is a simple decreasing monotonic transformation of Revealed Comparative Advantage (RCA) or Balassa index. In practice, Balassa index is a commonly accepted method for analyzing trade data. This index tries to identify whether a country has a “revealed” comparative advantage rather than to determine the underlying sources of comparative advantage.

$$RCA = (X_{ij}/X_{it})/(X_{nj}/X_{nt}) = (X_{ij}/X_{nj})/(X_{it}/X_{nt}) \quad (1)$$

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.

RSCA index is formulated as follows:

$$RSCA = (RCA_{ij} - 1)/(RCA_{ij} + 1) \quad (2)$$

The values of  $RSCA_{ij}$  index can vary from minus one to one.  $RSCA_{ij}$  greater than zero implies that country  $i$  has comparative advantage in group of products  $j$ . In contrast,  $RSCA_{ij}$  less than zero implies that country  $i$  has comparative disadvantage in group of products  $j$ . (Dalum et al., 1998)

Trade Balance Index (TBI) is employed to analyze whether a country has specialization in export (as net-exporter) or in import (as net-importer) for a specific group of products. TBI is simply formulated as follows:

$$TBI_{ij} = (x_{ij} - m_{ij})/(x_{ij} + m_{ij}) \quad (3)$$

where  $TBI_{ij}$  denotes trade balance index of country  $i$  for product  $j$ ;  $x_{ij}$  and  $m_{ij}$  represent exports and imports of group of products  $j$  by country  $i$ , respectively. (Lafay, 1992)

Values of the index range from -1 to +1. Extremely, the TBI equals -1 if a country only imports, in contrast, the TBI equals +1 if a country only exports. Indeed, the index is not defined when a country neither exports nor imports. A country is referred to as “net-importer” in a specific group of product if the value of TBI is negative, and as “net-exporter” if the value of TBI is positive. (Widodo, 2009)

## Results and discussion

### Products mapping of the Russian agricultural exports

The analysis of the comparative advantage and specialization of Russian foreign trade in agricultural products and foodstuffs is

conducted by the distribution of the whole range of the exported and imported commodities in accordance with the methodology described before.

From the domestic point of view, leading exported products are supposed to be the products that can give bigger amount of foreign exchange for domestic economy. It means that the higher the share of a specific product in the total domestic exports, the more significant the contribution of the exported product to the domestic economy becomes. Such product can be considered as foreign exchange creator for domestic economy. (Widodo, 2009)

From international competition point of view, a specific exported product becomes leading exports if its share in the total world export is dominant.

This way we distinguish from the total export flows a group that creates the foundation of the country's exports, the group that contains the best products in term of their comparative advantage and trade balance. We also separate a group that has no revealed comparative advantage and keep negative trade balance as opposed to the first group. (Widodo, 2009)

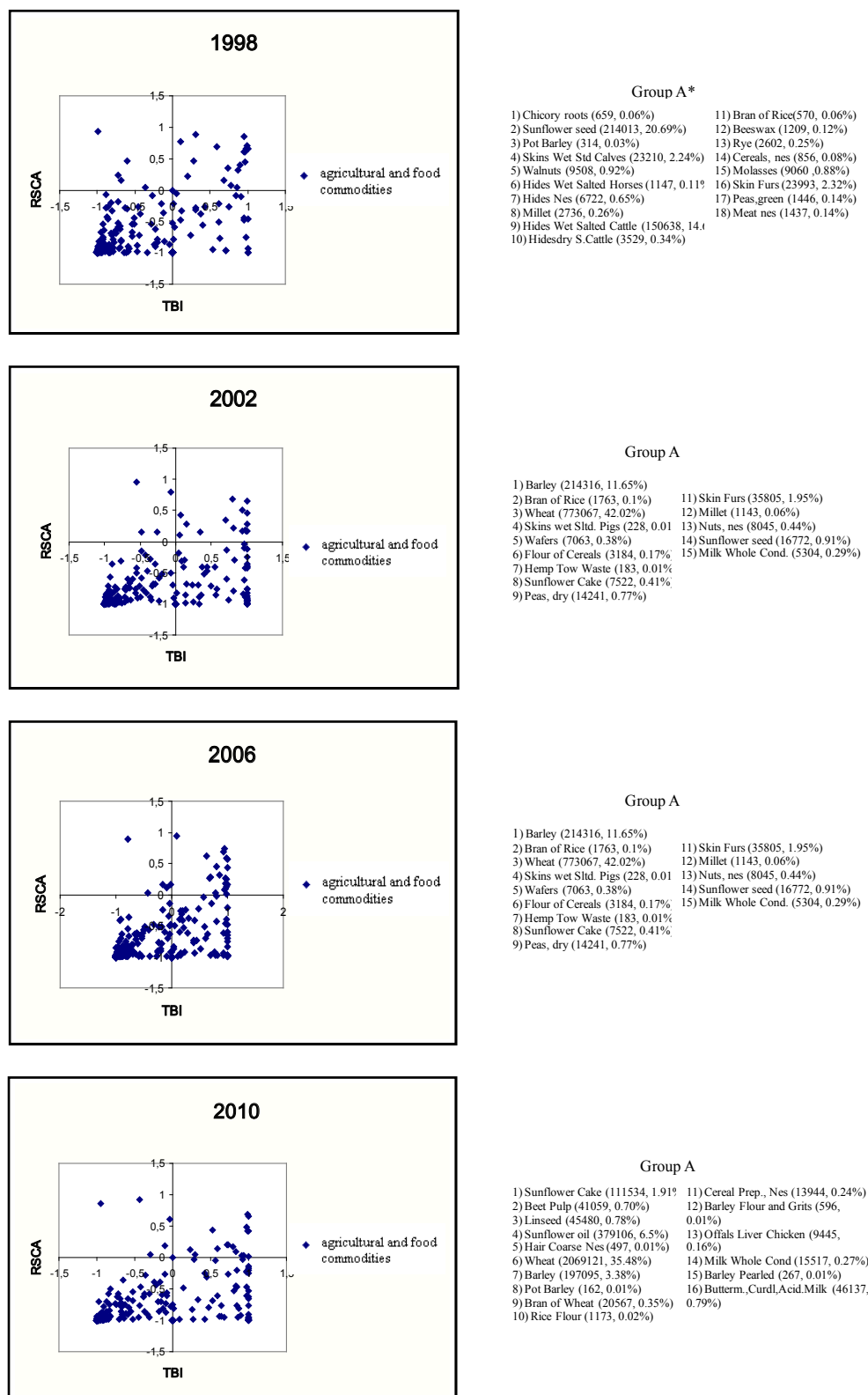
The remaining two groups can be considered as a transient from group D to group A, or vice versa.

Figure 2 presents the products mapping for 1998-2010. As we can see, the lower left area of the chart is the most filled with dots representing exported products. This is a group D that has no comparative advantage and keeps negative trade balance. The upper left area of the chart is the emptiest one. This is a group B. Items in this group have comparative advantage but negative trade balance. On the right of the chart there is a list of commodities included in the group A. These products are considered as the best products in term of their comparative advantage and trade balance. They are in the position of having comparative advantage in the international trade and the country has positive trade balance in this products.

Next, consider these groups in more detail (Table 1).

From 1998 to 2010, the number of products in each group did not change significantly.

The most of the products is part of the group D. They have no revealed comparative advantage and keep negative trade balance. However, this is a normal phenomenon for any country, where different branches of agriculture have different efficiency, due to economic, historical, natural or geographical



\* note: The right part of the fig. 2 represents products in Group A, in decreasing order of the index RSCA. In brackets next to the name of the product its value is specified (in thousands of U.S. dollars), as well as its share in total Russian export.

Source: FAO, author's calculation (2012)

Figure 2: Products mapping of Russian export (1998-2010).



|         | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Group A | 5.8  | 4.7  | 4.7  | 4.3  | 4.8  | 4.4  | 4    | 5.3  | 5.8  | 5.9  | 5.6  | 5.3  | 5.3  |
| Group B | 1.5  | 1.2  | 0.9  | 1.6  | 1.3  | 1.9  | 2    | 1.4  | 1.4  | 1.1  | 0.8  | 1.1  | 1.1  |
| Group C | 8.6  | 8.7  | 12.5 | 13   | 17.5 | 13.8 | 12.4 | 14.6 | 15.5 | 15.8 | 14.3 | 18.2 | 15.8 |
| Group D | 84   | 85.4 | 81.9 | 81.1 | 76.4 | 79.9 | 81.6 | 78.7 | 77.3 | 77.1 | 79.2 | 75.4 | 77.8 |

\*the term "total number of agricultural products" here means the set of 683 commodities according to FAOSTAT Commodity List

Source: FAO, author's calculation (2012)

Table 1: The share of individual groups in total number of agricultural products\* exported by Russian Federation (%).

|         | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Group A | 43.8 | 35.3 | 32.9 | 30.8 | 59.3 | 56.9 | 40.8 | 53.1 | 51.0 | 65.7 | 59.1 | 59.4 | 50.6 |
| Group B | 1.3  | 0.8  | 6.9  | 5.0  | 4.5  | 5.3  | 8.3  | 3.6  | 4.1  | 0.4  | 0.5  | 0.4  | 2.2  |
| Group C | 20.4 | 6.4  | 15.4 | 18.7 | 11.7 | 7.2  | 11.3 | 13.0 | 12.2 | 9.5  | 9.9  | 15.0 | 15.7 |
| Group D | 34.5 | 57.5 | 44.8 | 45.6 | 24.4 | 30.6 | 39.6 | 30.3 | 32.7 | 24.3 | 30.5 | 25.2 | 31.5 |
| Total   | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  |

Source: FAO, author's calculation (2012)

Table 2: The share of individual groups in the total value of Russian agricultural export (%).

factors. Such products are for example tropical fruits (bananas, apricots, coconut, etc.), meat, and most of the meat products, tea, coffee etc.

During the analyzed period, there was a decrease of number of products in group D, and the increase in the group C.

Group C contains the part of the products, not having comparative advantage according to the RCSA index, but having a positive trade balance. The comparative disadvantage in this case, may occur in relation to the whole world, while in bilateral trade with individual regions or countries comparative advantages quite possibly exist.

Group B consists of products, which have comparative advantage but the country is a net-importer of these products. For example, in 2010 this group included Flour of Sorghum, Tomatojuice Concentrated, Flour of Mixed Grain, Fat Preparations Nes., and Cheese Processed.

The existence of this group can be explained as follows. The total volume of global trade in these commodities is rather insignificant. Meanwhile, in this small-scale market Russia plays a significant role both as the exporter and the importer. This determines the comparative advantages of the country in these items. However, imports of these products exceed exports. There are very few such small-scale markets. These cases can be considered as specific, unusual for the system as a whole. Otherwise, this group is a transitional group for goods which is obtaining or losing their

comparative advantages over time.

Generally, the higher the comparative advantage of a specific product, the higher the possibility of a country to be a net-exporter.

### The export value of each group

To rationally judge about any changes in the structure of Russian exports, in the context of this grouping, we must investigate not only the number of products included in each group, but primarily their values and their share in the total value of foreign trade in agricultural products.

Table 2 shows the share of each group in the total agri-food export value of the Russian Federation.

Considering the value of products in each group instead of the number of products, we have got completely different results. According to the results of calculations, much of the export value is concentrated in Group A.

In 1998, the Group A comprised 43.8% of the total value of agricultural exports, in 2002-2003 increased to almost 60%, in 2007 reached its maximum of 65.7% and in 2010 it was 50.6%.

As we can see in the figure 2, since 2002, wheat has the greatest weight in the group A and amounted to 42.02% of total exports in 2002, 31.3% in 2006 and 35.5% in 2010, while the whole group A represented 59.3%, 51% and 50.6% of total exports respectively. Russia exports large volumes of wheat due to the following reasons. After the collapse

of the Soviet Union, during the transition from planned to market economy, livestock sectors contracted, thereby freeing up feed grain area to produce for export. In addition Russian wheat production rose because of an increase in yield, especially in 2007-2009. (Liefert, 2012)

At the beginning of the period, in 1998, wheat had no comparative advantage and Sunflower seed (20.7% of the total export) and Hides Wet Salted Cattle (14.6%) constituted the basis of group A. Later they have lost their relevance. In the case of sunflower seed it was likely caused by increase in production capacity for oilseed processing and by increase of the export of vegetable oils instead of raw materials (sunflower seeds), as it was in the 90's. In relation to Hides Wet Salted Cattle, the reduction of export performance was caused by the continued decline in the livestock sector.

Moreover, in October 1998, Russian Government established a licensing for export of hides and skins of cattle, sheep and other animals (The Decree of the government of the Russian Federation „On establishment of licensing export of cattle, sheep and other raw hides from Russian Federation“ October 31, 1998 № 1267). These export restrictions were aimed at protecting domestic leather industry.

At the same time, there is a reduction in the value

of groups D and C. These trends can be considered as a strengthening of the comparative advantages of the total Russian exports.

To avoid fluctuations in the time series we calculate a fixed-base index and a chain base index for the series of the values of exports and imports.

A fixed-base index is an index number for which the base period for the calculations is selected and remains unchanged during the lifetime of the index.

According to the results of calculation of the fixed-base index, we can see that the decline in international trade in Russia after the economic crisis of 1998 affected all product groups, but most of all - the group C.

Group A had been growing until 2008, when due to another economic crisis and the low yields of wheat, the value of its exports, and consequently, the cost of the whole group A decreased.

For clarity, we also calculate a chain-base index and a geometric mean of chain indices.

A chain base index is an index number in which the value at any given period is related to a base in the previous period. It measures changes in volume from period to period.

A geometric mean (GM) of chain indices is the average change in the value of export or import.

|         | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Group A | 100  | 48   | 78   | 76   | 241  | 294  | 198  | 404  | 492  | 1121 | 1030 | 986  | 651  |
| Group B | 100  | 36   | 561  | 421  | 628  | 929  | 1383 | 935  | 1367 | 247  | 302  | 227  | 974  |
| Group C | 100  | 18   | 78   | 99   | 102  | 79   | 117  | 213  | 251  | 348  | 371  | 536  | 432  |
| Group D | 100  | 99   | 135  | 143  | 126  | 201  | 244  | 294  | 400  | 528  | 675  | 533  | 516  |

Source: FAO, author's calculation (2012)

Table 3: Changes in export value of agricultural products in each group: the fixed-base index (at current prices, %).

|                                   | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | GM <sub>1</sub> | GM <sub>2</sub> |
|-----------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|-----------------|
| Group A                           | 48   | 164  | 97   | 317  | 122  | 67   | 204  | 122  | 228  | 92   | 96   | 66   | 117             | 127             |
| Group B                           | 36   | 1551 | 75   | 149  | 148  | 149  | 68   | 146  | 18   | 122  | 75   | 430  | 121             | 135             |
| Group C                           | 18   | 426  | 126  | 103  | 78   | 148  | 181  | 118  | 139  | 106  | 145  | 81   | 113             | 133             |
| Group D                           | 99   | 137  | 106  | 88   | 159  | 121  | 120  | 136  | 132  | 128  | 79   | 97   | 115             | 116             |
| Total Russian agricultural export | 59   | 176  | 104  | 165  | 127  | 94   | 157  | 127  | 177  | 102  | 95   | 77   | 116             | 123             |
| Total world agricultural export   | 95   | 99   | 101  | 107  | 119  | 116  | 108  | 110  | 121  | 122  | 89   | 113  | 108             | 109             |

Source: FAO, author's calculation (2012)

Table 4: Changes in export value of agricultural products in each group: the chain index (at current prices, %).

GM1 is a geometric mean of chain indices for the period from 1999 to 2010; GM2 is a geometric mean of chain indices for the period from 2000 to 2010. We calculated two geometric means for the following reason. In 1999, after the crisis, there was a strong decline in exports. It significantly affected the value of geometric mean. So the second geometric mean was calculated for the period 2000-2010, to avoid the impact of the crisis.

During the analyzed time period, the value of each group fluctuated considerably. The possible reasons for such oscillations are following. Firstly, the index is calculated at current prices. Prices for agricultural products were fluctuating and the chain index was changing respectively. In addition, contents of the groups had been changing over time, creating fluctuations in their value.

For example, in 2000-2004 sunflower oil belonged to group B. It created a large part of the value of the group. Then, in 2005, it moved to group A. The value of group A rose. The value of group B decreased.

In 2002-2006, tobacco products were in group B (before they were in the group D). Then, in 2007, tobacco products moved to group A causing a sharp decline in the value of group B.

The average annual increase in the value of group A is 17%, group B – 21%, group C – 13% and group D – 15%, that can be described as quite proportional growth along with the overall increase in exports. At the same time average growth of the world

agricultural export was only 8%. These figures are higher than the world growth of 8%.

In the post-crisis period, the growth of each group was even higher. The average annual increase in the value of group A was 27%, group B – 35%, group C – 33% and group D – 16%. Thus the growth of Russian agricultural export is much higher than the global rate of 9%.

### The import value of each group

Next, we consider the value of imports in the context provided by the methodology.

Here we can see that the first three groups of products for the entire investigated period have not exceeded the share of 3-4% of the total import (with the exception of 2003 and 2004 when the share of groups A, B and C for a total was 5-7%, which in fact is also not a big amount).

Group D accounts 95-99% of the total imports. Production of these commodities is ineffective for any reason within the Russian Federation, so country has to import them.

In the case of imports, there are also visible negative effects of the crisis in 1998 in relation to the total foreign trade.

There is also a visible increase in the value of group A. The main reason is the growth in the import of wheat.

Since 2002, wheat has been in the group A. Despite the comparative advantage and significant share of wheat in the total value of Russian agricultural export, the country imports this product. Russia

|         | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Group A | 0.2  | 0.3  | 0.2  | 0.8  | 0.8  | 1.3  | 2.6  | 1.9  | 1.5  | 1.8  | 1.5  | 0.7  | 0.6  |
| Group B | 0.8  | 0.5  | 1.3  | 1.3  | 2.0  | 3.2  | 3.2  | 1.2  | 1.2  | 0.2  | 0.2  | 0.2  | 0.6  |
| Group C | 1.6  | 0.2  | 1.2  | 1.3  | 1.0  | 0.5  | 1.0  | 1.5  | 1.4  | 1.1  | 0.9  | 1.4  | 0.8  |
| Group D | 97.4 | 99.1 | 97.2 | 96.6 | 96.2 | 95.0 | 93.2 | 95.5 | 95.9 | 96.8 | 97.4 | 97.7 | 98.0 |
| Total   | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  |

Source: FAO, author's calculation (2012)

Table 5: The share of individual groups in the total value of Russian agricultural import, (%).

|         | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Group A | 100  | 82   | 68   | 272  | 302  | 587  | 1307 | 1159 | 1175 | 1790 | 1932 | 801  | 804  |
| Group B | 100  | 45   | 119  | 137  | 234  | 434  | 488  | 219  | 293  | 73   | 91   | 65   | 219  |
| Group C | 100  | 10   | 52   | 70   | 54   | 33   | 72   | 140  | 159  | 170  | 168  | 222  | 159  |
| Group D | 100  | 77   | 69   | 82   | 88   | 102  | 113  | 144  | 181  | 232  | 299  | 255  | 305  |

Source: FAO, author's calculation (2012)

Table 6: Changes in import value of agricultural products in each group: the fixed-base (at current prices, %).



imports mainly high quality wheat and seeds. For example, durum wheat does not yield in the climatic conditions of the most of Russia but it is the main raw material for the production of pasta. Therefore, country has to import it. (Gaidar, 2009)

Thus the value of group A grew and fell along with the value of wheat imports.

During the whole analyzed period, the average annual increase in the import value of group A is 19%, group B – 7%, group C – 4% and group D – 15%.

If we do not take into account the post-crisis year 1999, the average annual increase in the value of group A is 23%, group B – 15%, group C – 29% and group D – 13%. The growth of Russian agricultural import is also higher than the global rate of 9%.

However, during the period 2000-2010, the average export growth was higher than average import growth.

### The balance of trade in each group

Then we calculate the balance of trade of each group as the difference between exports and imports of agricultural products.

Considering the balance of trade in each group, it can be seen that in groups A and C these figures

constantly increased. The absolute changes in import values are higher in comparison with exports. In group D, on the contrary absolute changes in import values are lower in relation to absolute changes in exports value.

Considering the current picture as a whole, we can see that 5% of the exported goods, belonging to group A, account for about 50% total agricultural export value. In turn, the group D includes about 80% of items, but it accounts for only about 30% of total export value, but 95-99% of the total import value of agricultural products and foodstuffs.

On this basis, we can consider the contents of the group A as the foundation of the Russian agri-food export.

At the same time, Group C products are also important. They do not have comparative advantages, but have a positive trade balance. The comparative disadvantage in this case, may occur in relation to the whole world, while in bilateral trade with individual regions or countries comparative advantages quite possibly exist. We can assume that, for example in bilateral relations with the CIS countries many products belonging to the group C have comparative advantages. So the items included in the Group C require a separate assessment from the point of view of bilateral relations with specific countries and regions.

|                                   | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | GM <sub>1</sub> | GM <sub>2</sub> |
|-----------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|-----------------|
| Group A                           | 82   | 83   | 400  | 111  | 194  | 223  | 89   | 101  | 152  | 108  | 41   | 100  | 119             | 123             |
| Group B                           | 45   | 263  | 116  | 171  | 185  | 113  | 45   | 134  | 25   | 125  | 72   | 336  | 107             | 115             |
| Group C                           | 10   | 529  | 135  | 78   | 61   | 217  | 196  | 114  | 107  | 99   | 132  | 72   | 104             | 129             |
| Group D                           | 77   | 90   | 120  | 107  | 116  | 110  | 128  | 125  | 128  | 129  | 389  | 120  | 110             | 113             |
| Total Russian agricultural export | 75   | 91   | 120  | 107  | 117  | 112  | 125  | 125  | 127  | 128  | 85   | 119  | 110             | 113             |
| Total world agricultural export   | 97   | 98   | 102  | 105  | 119  | 116  | 106  | 111  | 121  | 122  | 88   | 112  | 108             | 109             |

Source: FAO, author's calculation (2012)

Table 7: Changes in import value of agricultural products in each group: the chain index (at current prices, %).

|         | 1998       | 1999       | 2000       | 2001        | 2002        | 2003        | 2004        | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---------|------------|------------|------------|-------------|-------------|-------------|-------------|------|------|------|------|------|------|
| Group A | 428 614    | 337 376    | 1 016 425  | 572 652     | 1938756     | 4 193 719   | 2 752 874   | 1159 | 1175 | 1790 | 1932 | 801  | 804  |
| Group B | -68 546    | -22 822    | -108 605   | -216 220    | -58857      | -34 715     | -50 347     | 219  | 293  | 73   | 91   | 65   | 219  |
| Group C | 45 968     | 80 297     | 125 966    | 129 515     | 267283      | 504 869     | 649 816     | 140  | 159  | 170  | 168  | 222  | 159  |
| Group D | -9 868 326 | -6 552 076 | -8 554 286 | -10 652 111 | -17 084 438 | -28 153 957 | -29 363 013 | 144  | 181  | 232  | 299  | 255  | 305  |

Source: FAO, author's calculation (2012)

Table 6: Changes in import value of agricultural products in each group: the fixed-base (at current prices, %).

## Conclusion

The analysis presented in this paper was conducted using the analytical tool, named “products mapping”, that enables to assess leading exported products from two different points of view, i.e. domestic trade-balance and international competitiveness.

During the analysis four specific groups of products were distinguished from the total agricultural export flows.

According to the results of “products mapping”, the largest number of the agricultural products exported by Russian Federation is part of the group D. They have no revealed comparative advantage and keep negative trade balance. Production of these commodities is ineffective due to economic, historical, natural or geographical factors within the Russian Federation, so country has to import them. Such goods are, for example, tropical fruits (bananas, apricots, coconut, etc.), meat, and most of the meat products, tea, coffee etc.

But considering the value of products in each group instead of the number of products, we got completely different results. According to the results of calculations, much of the export value is concentrated in Group A.

Wheat has the greatest weight in the group A and accounted 42.02% of total exports in 2002, 31.3% in 2006 and 35.5% in 2010, while the whole group A represented 59.3%, 51% and 50.6% of total exports respectively.

During the analyzed period there were significant changes in the volumes and structures of these groups.

In 1998, the Group A comprised 43.8% of the total value of agricultural exports, in 2002-2003 increased to almost 60% of the total value and in 2007 reached its maximum of 65.7% of the total value of Russian agricultural exports. In 2010,

its share was 50.6%. Despite some fluctuations, the overall trend can be assessed as a steady growth of the share of the group A in the total value of Russian agricultural exports.

At the same time, there is a reduction in the share of groups D and C in the total exports value.

These trends can be considered as a strengthening of the comparative advantages of Russian exports on the whole.

At the beginning of the period, in 1998, wheat had no comparative advantage and Sunflower seed (20.7% of the total export) and Hides Wet Salted Cattle (14.6%) constituted the basis of group A. Later they have lost their relevance. In the case of sunflower seed it was likely caused by increase in production capacity for oilseed processing and by the increase of the export of vegetable oils instead of raw materials (sunflower seeds), as it was in the 90's. In relation to Hides Wet Salted Cattle, the reduction of export performance was caused by the continued decline in the livestock sector and by the establishment of licensing for export of hides and skins of cattle, sheep and other animals.

Thus, there is a situation when 5% of the exported goods, belonging to group A, account for about 50% total agricultural exports. In turn, 80% of items included in the Group D, account for only about 30% of total exports, but 95-99% of the total imports. On this basis, we can consider the contents of the group A as the foundation of the Russian agri-food export.

It should be noticed that Group C products are also important. They do not have comparative advantages, but have a positive trade balance. The comparative disadvantage in this case, may occur in relation to the whole world, while in bilateral trade with individual regions or countries comparative advantages quite possibly exist.

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