Czech University of Life Sciences Prague

Faculty of Economics and Management

PROCEEDINGS - of the 29th International Scientific Conference Agrarian Perspectives XXIX. Trends and Challenges of Agrarian Sector

Publication is not a subject of language check.

Papers in individual sections are sorted by authors' names in alphabetical order.

Czech University of Life Sciences Prague, Faculty of Economics and Management

Agrarian perspectives XXIX. Trends and Challenges of Agrarian Sector

Publisher
Czech University of Life Sciences Prague
Kamýcká 129, Prague 6, Czech Republic

Papers in individual sections are sorted by authors' names in alphabetical order.
Publication is not a subject of language check.
All papers passed a double-blind review process.

ISBN 978-80-213-3041-2; ISSN 2464-4781 (Online); ISSN 1213-7960 (Print); ISSN 1213-7979 (CD-ROM)

ETHICS GUIDELINES

The conference AGRARIAN PERSPECTIVES is committed to the highest ethics standards.

All authors, reviewers, and editors are required to follow the following ethical principles. In case of any doubts do not hesitate to contact the editors of the conference AGRARIAN PERSPECTIVES.

The editors (co-editors) have the following responsibilities:

- The editor(s) clearly identify contributions that are fully with the scope and aim of the conference AGRARIAN PERSPECTIVES. The editor(s) should treat all contributions fairly without any favour of prejudice. The editor(s) only authorise for review and publication content of the highest quality.
- The editor(s) should recuse himself or herself from processing any contribution if the editor(s) have any conflict of interest with any of the authors or institutions related to the manuscripts.
- The editor(s) should provide advice to the author(s) during the submission process whennecessary.
- The editor(s) should be transparent with regards to the review and publication process withan appropriate care that individuals will not be identified when it is inappropriate to so do.
- The editor(s) should not use any parts or data of the submitted contribution for his or her ownfuture research as the submitted contribution is not published yet.
- The editor(s) should respond immediately and take reasonable action when ethical problemsoccur concerning a submitted or a published contribution. The editor(s) should immediatelycontact and consult these issues with the author(s).

The author(s) have the following responsibilities:

The author(s) ensure that submitted contribution is original, prepared to a high scholarly standard and fully referenced using the prescribed referencing convention. Therefore, the author(s) should carefully read the instructions for authors published on the website of the conference AGRARIAN PERSPECTIVES.

- The author(s) should not submit similar contributions (or contributions essentially describingthe same subject matter) to multiple conferences or journals. Furthermore, the author(s) should not submit any contribution previously published anywhere to the conferences orjournals for consideration.
- The author(s) are represented accurately and other appropriate acknowledgements are clearlystated including sources of funding if any.
- The author(s) state the source of all data used in the submitted contribution and how the datawas acquired. Moreover, the author(s) should clarify that all the data has been acquiredfollowing ethical research standards.

- The author(s) recognise that the editors of the conference AGRARIAN PERSPECTIVES. have the final decision to publish the submitted, reviewed and accepted contribution.
- The author(s) should immediately inform the editor(s) of any obvious error(s) in his or heraccepted contribution. The author(s) should cooperate with the editor(s) in retraction orcorrection of the contribution.

The reviewers have the following responsibilities:

- The reviewer(s) who feel unqualified to review the assigned contribution or if the reviewer(s) feel that cannot meet the deadline for completion of the review should immediately notify theeditor(s).
- The reviewer(s) should inform the editor(s) if there is any possible conflict of interest relatedto the assigned contribution. Specifically, the reviewer(s) should avoid reviewing anycontribution authored or co-authored by a person with whom the reviewer(s) has an obviouspersonal or academic relationship.
- The reviewer(s) should treat the contribution in a confidential manner. Read the contributionwith appropriate care and attention and use his or her best efforts to be constructively critical.The contribution should not be discussed with others except those authorized by the editor(s).
- The reviewer(s) should agree to review a reasonable number of contributions.
- The reviewer(s) should not use any parts or data of the reviewed contribution for his or herown future research as the reviewing contribution is not published yet.
- The reviewer(s) should immediately notify the editor(s) of any similarities between thereviewing contribution and another manuscript either published or under consideration byanother conference or journal.

Any report of possible ethics conflicts is a major issue for the conference AGRARIAN PERSPECTIVES. All ethics conflicts reported by reviewer(s), editor(s), co-editor(s) or reader(s) will be immediatelyinvestigated by the editors of the conference.

If misconduct has been committed the published contribution will be withdrawn. In addition, the author(s) may be excluded from having any future contribution reviewed by the conference AGRARIAN PERSPECTIVES.

FOREWORD

Agriculture, one of the oldest undertakings in recorded human history, still remains a strategic and integral part of every economy on earth. The 21st century, which has been characterized by turbulent changes in in every aspect of life, has brought a number of new challenges to the agricultural sector. It is not only the world's rapidly rising population and increasing demand on food supplies, but the sustainability of agricultural production that is closely intertwined with environmental and social requirements. The answers to these complex challenges require new and unorthodox approaches. The implementation of the latest scientific research findings, as well as comprehensive problem-solving utilizing the knowledge of various disciplines will be necessary to address the issues that currently face the agrarian sector.

Scientific conferences and professional seminars are an ideal platform for sharing opinions, experiences and the latest information in response to current challenges. The international scientific conference "Agrarian Perspectives", organized by the Faculty of Economics and Management at the Czech University of Life Sciences Prague, has a long tradition in this regard that began in 1992. Since that time, the conference has become popular among scientists and experts from all around the world.

The 29th annual "Agrarian Perspectives" conference, held on the 16th and 17th of September 2020, will be focused on the topic of "Trends and Challenges in the Agrarian Sector". Although the conference will not be held in its traditional format due to the current pandemic, the interest of the participants clearly demonstrates the usefulness and significance of this scientific meeting.

We strongly feel that the 29th annual Agrarian Perspectives conference will create an inspirational framework for all of the participants and contribute to the further development and expansion of agricultural research.

Karel Tomšík
Vice-dean for International relations
Faculty of Economics and Management, CULS Prague

COMPARATIVE ADVANTAGES AND COMPLEMENTARITY OF AGRI-FOOD TRADE BETWEEN THE EU AND RUSSIA

Sergey Victorovich Kiselev[1], Roman Anatolievich Romashkin[2] and Anastasiya Pavlovna Soldatova[3]

[1, 3] Faculty of Economics, Lomonosov Moscow State Universit, Russia
[2] Eurasian Center for Food Security, Lomonosov Moscow State University, Russia

[1]servikis@yandex.ru, [2]romromash@gmail.com, [3]soldatova-n99@yandex.ru

Annotation: The European Union and Russia are traditional trading partners. They have intensive ties in agri-food sphere as well. Since Russian food embargo imposition, some changes in trade patterns have happened. The paper analyses major trends in comparative advantages for selected products and complementarity of agri-food trade between the EU and Russia taking into account possible influences of embargo. The analysis is based on data of International Trade Center, Russian statistics and USDA information as well. The paper describes the results of the calculations of major indices and indicators of comparative advantages and complementarity. At the same time, changes in total factor and labor productivity were analyzed as the most important determinants of competitiveness. In addition, the influence of exchange rate trends on Russian export and import of agri-food products has been estimated. The paper demonstrates that even under conditions of Russian food embargo and import substitution policy the European Union continues to maintain the high potential for agri-food export to Russia.

Key words: agri-food trade, comparative advantages, complementarity, competitiveness, embargo

JEL classification: Q17, Q18

1. Introduction

This paper aims to estimate the comparative advantages and complementarity of agri-food trade between the European Union and the Russian Federation, taking into account the competitiveness and the existence of Russian food embargo.

After the imposition of food embargo in 2014, Russia has strengthened import substitution processes. In general, the negative balance of Russian agri-food trade has been significantly improved. At the same time, food imports from the European Union declined. The reduction in imports from the EU was partially offset by other countries' exports that were not under to Russian sanctions. Besides, since 2018 the Russian government has aimed to increase the value of agri-food export in a short period (including high value added products), develop an export-oriented commodity distribution infrastructure, and facilitate access of agricultural goods to targeted markets. In this regard, it is of interest to study changes in basic factors in trade between such major partners as the EU and Russia in the context of the food embargo and the Russian policy of import substitution and export promotion. As a result, it will also allow us to assess what might happen in case the food embargo is lifted.

One of the influencing factors is level of trade complementarity between the two trading partners. Assessment of changes in complementarity allows to understand how the export profile of one country corresponds to the import profile of another. Such approach was used in relation to Chinese trade (Huo and Lu, 2014; Chunyan and Chunjie, 2015). Research on perspectives of the Russian agricultural exports in terms of comparative advantage with the use of Balassa, Lafay and some other indices was made by Benesova et al. (2017).

However, it should be emphasized that a sufficiently detailed analysis of the complementarity of trade between the EU and the Russian Federation has not been conducted yet.

In our opinion, it is worth to supplement such analyses with a study of competitiveness from the side of production factors. In particular, it is important to evaluate various indices in connections with trends in Total Factor Productivity (TFP), labor productivity, and the exchange rate of currencies. As for productivity as such, there are quite a lot of researches on this aspect. For example, Total Factor Productivity issues were studied by many American and other scientists (Rada et al., 2017).

2. Materials and Methods

Trade analysis is based on ITC Trade Map data, as well as Russian statistics. The analysis of the dynamics of Total Factor Productivity is based on data from the USDA and Eurostat.
One of the indices is Trade Complementarity Index (TCI). This is an indicator of how well the structure of one country imports matches to structure another country exports.

$$TCI = 100(1 - \sum(\frac{|m_{ik} - x_{ij}|}{2})), \quad (1)$$

where: x_{ij} is the share of good i in global exports of country j and m_{ik} is the share of good i in all imports of country k.

The index ranges from 0 (no goods are exported by one country or imported by the other) to 100 (export and import shares exactly match).

The analysis of comparative advantages in trade is based on the coefficient of the Revealed Comparative Advantage of B. Balassa (RCA) for goods from Russia and the EU (Balassa, 1977). The indicator represents the following ratio:

$$RCA = \frac{x_i/X}{x_{wi}/X_w}, \quad (2)$$

where: x_i – export of product i from a certain country, X – total export volume of the country taken, x_i – world export of product i, X – total world export volume.

RCA shows the ratio of the share of the product group (or certain product) in the country's export volumes to the share of the product group (or certain product) in world exports. This coefficient characterizes the country's competitiveness in world markets based on the value of exported products.

Given the fact that RCA has some limitations (does not account for the distortions in trade caused by subsidies, tariff and non-tariff barriers; does not take into account intra-industry import) analysis of competitiveness of Russian agricultural sector and EU is supplemented by the calculations of the Index of Lafay (Lafay, 1992), which is based on calculating comparative advantages based on net exports.

$$LFI = 100\left(\frac{x_{ij}-m_{ij}}{x_{ij}+m_{ij}} - \frac{\sum_{j=1}^{N}(x_{ij}-m_{ij})}{\sum_{j=1}^{N}(x_{ij}+m_{ij})}\right)\frac{x_{ij}+m_{ij}}{\sum_{j=1}^{N}(x_{ij}+m_{ij})}, \quad (3)$$

where: N – total number of traded goods; x_{ij}, m_{ij} – export and import of goods j by country i, respectively.

Besides, we use the Export Competitiveness Index (XCI):

$$XCI = \frac{x_{it}/X_{it}}{m_{kj}/M_{kt}}, \quad (4)$$

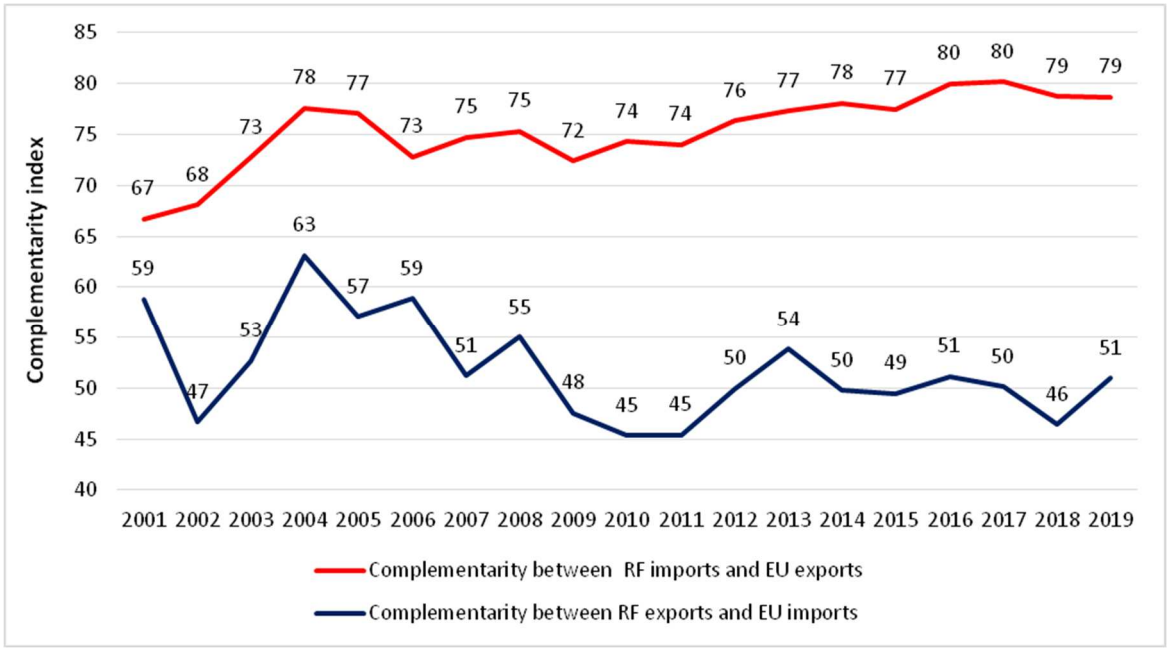
where: x_{ij} – export of product j of country i; X_{it} — total export of country i; m_{kj} — import of product j in market k; M_{kt} — total import in market k.

3. Results and Discussion

Russia and the EU have close trade ties. This refers to many products, including agri-food. Generally, export from Russia is rather small. In 2013 it is accounted for only 0.4% of total European agri-food imports, increasing to 0.45% in 2018. As for the Russian Federation, export-import relations with the EU are still of great importance. Thus, in 2013 and 2018 the shares of export to the EU in all export of Russian agri-food products were 14.4 and 11.2%, respectively. In Russian agri-food import, European goods accounted for 35.2 and 24.6% in 2013 and 2018. As a result of the food embargo, the value of mutual export and import decreased for Russia, but remained quite significant. Regarding particular goods, it should be emphasized that supply of many import products has ceased (cheese, meat, dairy products, fruit, etc.). At the same time import of some products (chocolate, wine, food preparations, preparations for animal feeding, etc.) have retained and even increased.

In terms of complementarity, TCI remains high for the EU (Figure 1). As a result of the Russian food embargo, it fell slightly in 2015, but then increased and afterwards remained at a high level. This indicator, therefore, demonstrates high potential of export of agri-food products from the EU to Russia. The embargo had only a minor impact on the index at the beginning. As for the Russian Federation, the complementarity index is lower than that of the EU, ranging from 46 to 51%. In this regard, we can conclude that Russia does not have great prospects for increasing its exports to the European Union from this point of view. Conversely, with the lifting of sanctions by Russia, the potential for increasing European exports is high.

Figure 1. Agri-food trade complementarity indices between the EU and the RF, 2001-2019, %



Source: Calculations on the base of ITC Trade Map, 2020

The analysis of complementarity of trade should be supplemented with a study of the comparative advantages and competitiveness of Russian and European products. Thus, it is of interest to make an assessment basing on Export Competitiveness Index (XCI), Revealed Comparative Advantage Index (RCA), and the Lafay comparative advantage index (LFI). In terms of comparative advantage, it is well known that the most competitive are Russian grains and oilseeds, vegetable oil (Ishchukova and Smutka, 2013; Benesova et al., 2017). However, it is essential to know how these comparative advantages change over time. In particular, whether the embargo and import substitution policies have affected Russia's agri-food products in terms of their comparative advantage and competitiveness. For this purpose, we analyzed products that once had a comparative advantage over others, products for which import substitution was significant (poultry meat and meat of swine), as well as products that are not competitive (bovine meat) (Table 1).

Table 1. Trends of comparative advantages and competitiveness of selected products in Russia

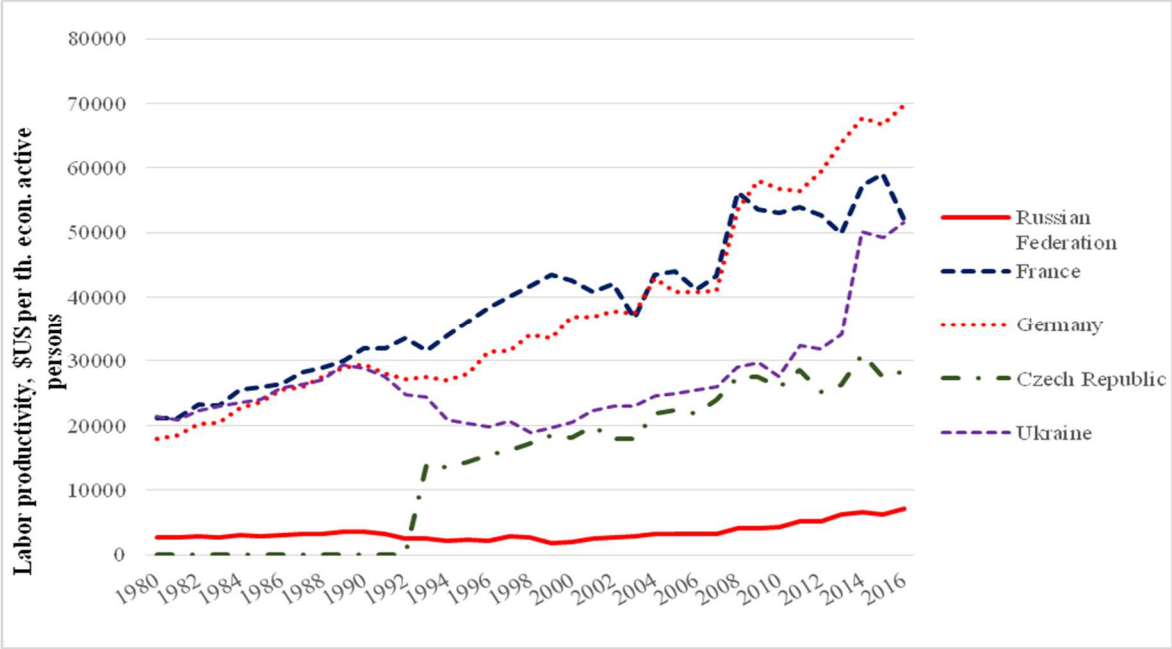
HS Product code	Products	XCI		RCA		LFI	
		2013	**2018**	**2013**	**2018**	**2013**	**2018**
1001	Wheat	296.9	760.3	3.314	9.189	0.0238	0.0945
1206	Sunflower seeds	0.206	0.040	1.019	0.464	-0.0029	-0.0093
1512	Sunflower Oil	9.243	1.175	5.844	5.909	0.0465	0.0003
0203	Meat of swine	close to 0	close to 0	close to 0	0.086	-0.0227	close to 0
0207	Poultry meat	close to 0	close to 0	0.037	0.296	-0.0313	close to 0
0202	Bovine meat	close to 0	close to 0	close to 0	0.025	-0.0213	close to 0

Source: Calculations on the base of ITC Trade Map, 2020

Trends in the indicators show that there have been no significant changes in the comparative advantage and competitiveness of major Russian agricultural products. Traditional agri-food products of Russian agriculture – wheat, sunflower seeds, sunflower oil – remain competitive. However, while there have been visible improvements in competitiveness of wheat production, export opportunities of sunflower seeds and oil have declined. This requires additional analysis, although it is possible to assume increased competition from other countries, particularly Ukraine.

The performance in the production of poultry meat, meat of swine and bovine meat has improved somewhat. This indicated certain success of import substitution policy and implementation of state-supported investment programs in these industries. However, there is no turning point yet, and we cannot expect a significant increase in these exports in the near future. This is also consistent with the comparative analysis of changes in labor productivity in the Russian Federation and the European Union (Figure 2).

Figure 2. Trends of agricultural labor productivity in the RF and some countries of the EU, 2005-2016 ($US per th. econ. active persons)

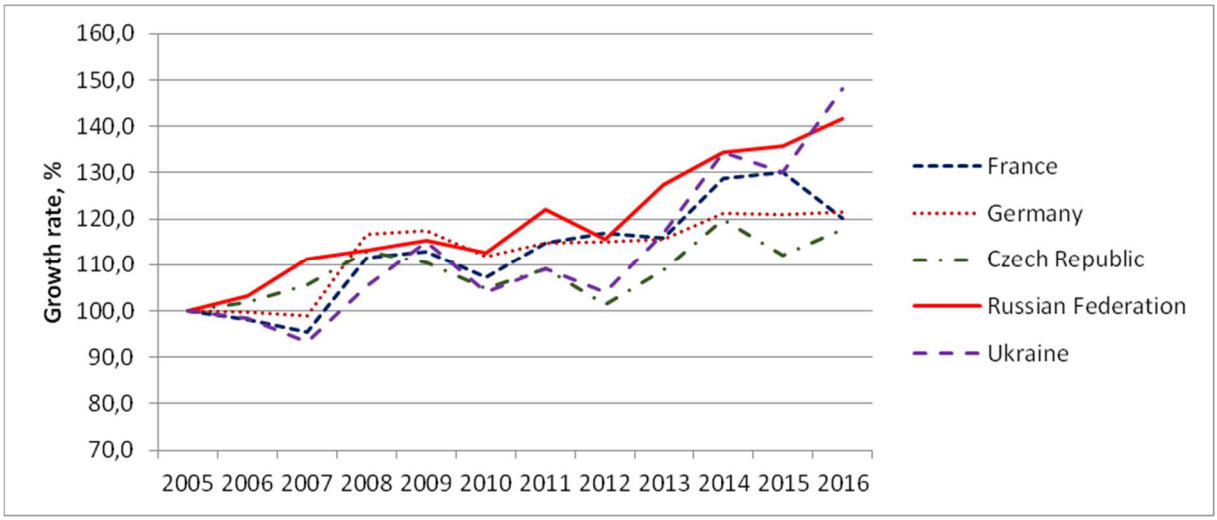


Source: Calculations on the base of USDA data

As can be seen from figure 2, the growth of agricultural labor productivity and its overall level is significantly higher in European countries. This is a fundamental factor that determines the competitiveness of EU agri-food products. It should be stated that the dynamics and level of labor productivity in the Russian Federation is far behind the leading European countries and Ukraine as well.

However, growth of agricultural Total Factor Productivity in the Russian Federation is more dynamic in comparison to European countries, slightly lagging behind Ukraine (Figure 3). However, this indicator does not reveal real level of competitiveness, showing only relative changes. As shown, Russia's TFP increases faster in comparison to the leading European countries. However, this growth still does not compensate for the lag in the level of labor productivity.

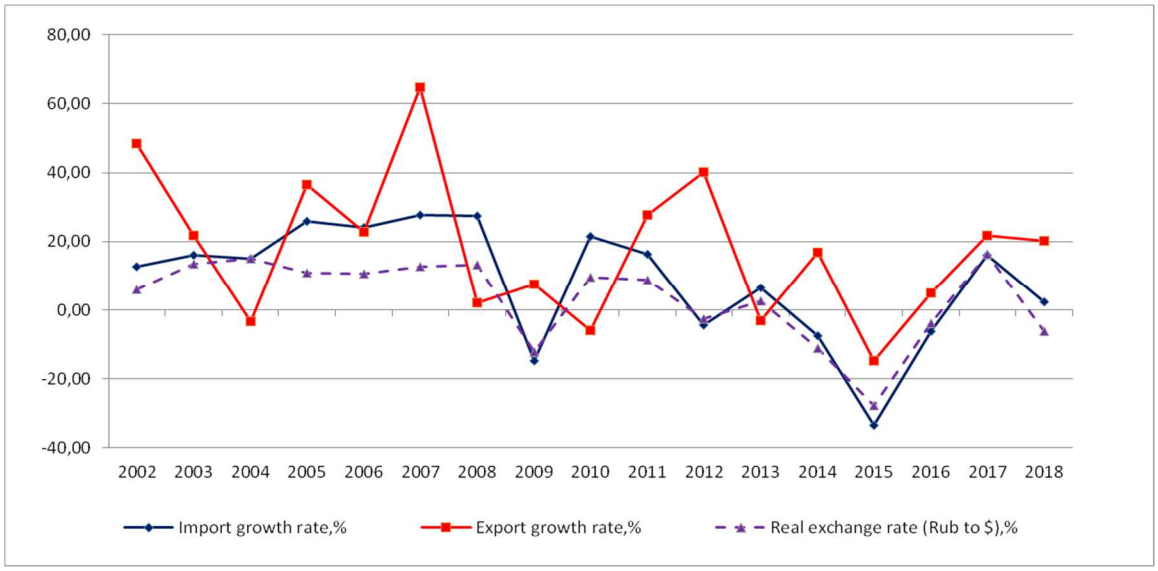
Figure 3. Trends of Agricultural Total Factor Productivity in the RF and some countries of the EU, 2005-2016, %



Source: Calculations on the base of USDA data

Another factor that affects competitiveness of Russian agri-food trade is the exchange rate (Figure 4).

Figure 4. Trends of exchange rate (Rub.to $), agri-food export and import, 2004-2018



Source: Calculations on the base of statistics of Federal State Statistic Service of Russia and CBR

The influence of exchange rate on Russian import was highlighted by Kiselev et al. (2016). The dynamics of the exchange rate, export and import of agri-food products demonstrate their close relationships. Regression analysis shows that changes in exchange rate determine agri-food import dynamics by 89%. Thus, food embargo influenced on the decrease of agri-food import was rather modest. And changes in imports and exchange rates are co-directional. Import of agri-food products is so sensitive that their changes almost always exceed the changes in exchange rates. Export is significantly less dependent on the exchange rate. Its impact determines only 12% changes in export. Although in the period from 2014 to 2018, this influence increases to 61%. Generally, we can conclude that in case of ruble devaluation,

there most probably will be no significant growth in exports, including export to the European Union.

4. Conclusion

In spite of food embargo, compliance of EU export profile to Russia's agri-food import structure continues to grow. Actually, no influence on agri-food trade complementarity from the Russian food embargo. It is supported by comparative advantages of the EU in agri-food trade with the Russian Federation. The fundamental factor of such situation is high level of labor productivity in the EU. For example, in Russia labor productivity 5 times less than in Germany. In current conditions the elimination of embargo will restore the volumes of main exported European products in Russian market. However, TFP trends demonstrate the competitiveness in Russia is growing faster than in selected European countries.

The import substitution and export promotion policy in Russia has not changed a lot the competitiveness of major exported agri-food products. Product spectrum of Russian export goods should be the same. The performance in the production of poultry meat, meat of swine and bovine meat has improved to some extent. This indicated certain success of import substitution policy and implementation of state-supported investment programs in these industries.

One of the most important factor for Russian agri-food import is exchange rate. Import is so sensitive that its percentage changes almost always exceed the changes in exchange rates. There is no significant influence of percentage changes in exchanges rates on Russian agri-food export.

Acknowledgements

This research was conducted at Lomonosov Moscow State University and financially supported by the Russian Foundation for Basic Research (Grant No 20-010-00639 A).

References

Balassa, B. (1977), "Revealed Comparative Advantage Revisited: An Analysis of Relative Export Shares of the Industrial Countries, 1953-1971", *Manchester School of Economic and Social Studies*, 1977, Vol. 45(4), pp. 327-344, ISSN 1465-9957, DOI 10.1111/j.1467-9957.1977.tb00701.x

Benesova, I., Maitah, M., Smutka, L., Tomsik, K. and Ishchukova, N. (2017), "Perspectives of the Russian agricultural exports in terms of comparative advantage", *Agricultural Economics – Czech,* vol. 63, no. 7, pp. 318-330, DOI 10.17221/344/2015-AGRICECON

CBR, Central Bank of Russia, The main derivatives of the dynamics of the ruble exchange rate, [Online], Available: http://www.cbr.ru, [Accessed: 15 Apr. 2020]

Chunyan, Y. and Chunjie, Q. (2015), "Research on the Complementarity and Comparative Advantages of Agricultural Product Trade between China and CEE Countries", *Journal of Service Science and Management*, 8, pp. 201-208, DOI 10.4236/jssm.2015.82022

Federal State Statistic Service of Russia, Foreign Trade, [Online], Available: https://www.gks.ru/folder/11193, [Accessed: 21 Apr. 2020]

Huo, W. and Lu, X. (2014), "Research on the Competitiveness and Complementarity between China and Members of the Shanghai Cooperation Organization: An Empirical Study Based

on RCA, GL, ES and TI Indexes", *Journal of Southwest University for Nationalities (Humanities and Social Sciences)*, vol. 3, pp. 110-115

Ishchukova, N. and Smutka, L. (2013), "Revealed comparative advantage of Russian agricultural exports", *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*", vol. 61, no. 4, pp. 941-952, DOI 10.11118/actaun201361040941

ITC Trade Map, International Trade Center, Trade statistics for international business development, [Online], Available: http://www.trademap.org, [Accessed: 15 Apr. 2020]

Kiselev, S., Strokov, A., Zhorova, M. and Belugin, A. (2016), "The Impact of Food Trade Restrictions on the Russian Agriculture" *Proceedings of the Agrarian Perspectives XXV*, Prague, pp. 147-154, ISBN 978-80-213-2655-2

Lafay, G. (1992), "The Measurement of Revealed Comparative Advantages" in Dagenais, M. and Muet, P. (eds.), *International Trade Modeling*, Chapman and Hill, London, 1992, pp.209-234, ISBN 10: 0412450003 / 0-412-45000-3, DOI:10.1007/978-1-4757-2150-8_10

Rada, N., Liefert, W. and Liefert, O. (2017), "Productivity Growth and the Revival of Russian Agriculture", ERR-228, U.S. Department of Agriculture, Economic Research Service, 2017 [Online], Available: https://www.ers.usda.gov/webdocs/publications/83285/err-228.pdf?v=0, [Accessed: 22 Apr. 2020]

USDA, United States Department of Agriculture, International Agricultural Productivity, [Online], Available: https://www.ers.usda.gov/data-products/international-agricultural-productivity/, [Accessed: 21 Apr. 2020]