Competitiveness of agri-food products of Russia in current conditions

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Abstract. Import substitution has become an important element of economic policies in the Russian Federation. Agriculture is one of the main sectors of the Russian economy, demonstrating significant results of import substitution. Therefore, it seems appropriate to analyze what growth rates of agricultural products have been achieved in terms of import substitution, whether manufactured products are competitive, what is the potential for further import substitution, due to which it is possible to ensure sustainable development of the industry in the long term. As a result of the research, it was established that despite the negative macroeconomic conditions formed after 2014, import substitution made it possible to achieve positive results in the development of the agro-industrial complex. The duration of the import substitution process is different for individual types of agricultural products and depends on a number of factors, both economic and technological. Competitiveness of domestic products in 2013-2016 increased significantly. The main factors for improving competitiveness were the favorable market conditions and the depreciation of the national currency. As the share of domestic products in the general market resources increases and/or the Russian ruble strengthens, growth opportunities in the agricultural sector of the economy will weaken due to import substitution, which requires searching for new development factors.

1. Introduction

The present stage in the development of the agro-industrial complex is characterized by an active policy of import substitution. In world practice, in order to replace imported products with national goods, various mechanisms are used: customs-tariff and non-tariff regulation, production subsidies within the country, etc. Import substitution is not a new topic for the Russian agrarian sector; however, until recently it has not been proclaimed a strategic goal in the development for neither the country nor the industry. In August 2014, a new impulse to the development of import substitution in the agro-industrial complex was given by the imposed embargo on the import of a number of agricultural products and foodstuffs [1]. A ban on the importation of a number of products by the government of the Russian Federation was introduced in response to Western sanctions, reducing the access of Russian leading banks and financial companies to foreign credit resources, which had a significant negative impact on domestic financial markets.

The need to solve the problem of import substitution was caused by a deep recession in agro-industrial production that emerged in the late 1990s, which led to a gradual increase in imports of food products. Over the ten years from 2005 to 2014, food imports increased 2.3 times (from 17.4 to 39.9
billion dollars). In 2014, their share reached one third of the country’s total food resources. The most serious situation is in providing the population with domestic vegetables and fruits, animal products. Therefore, these types of products needed additional support and embargoes were extended to them.

According to the Decree of the Government of the Russian Federation of July 4, 2017 No 790, the ban on the import of products from a number of Western countries was extended until December 31, 2018. Thus, for more than four years, the Russian agro-industrial complex has been operating in relatively favorable market conditions, a significant proportion of the country’s agri-food market has become free from foreign competitors, and a course has been taken to accelerate import substitution and strengthen the country’s food security. In the agro-industrial complex, earlier than in other sectors of the economy, a special plan was approved to promote import substitution. To this end, the State Program was adjusted for the period up to 2020. Additional funds were allocated from the federal budget for resource support of the state program. In order to stimulate the growth of agricultural production, to increase the rate of import substitution, new forms and mechanisms of budget support for the industry were introduced [2].

The policy of import substitution creates several “greenhouse” conditions for the functioning of domestic producers; therefore, it is extremely important in the process of import substitution not to lose the competitiveness of products. In this regard, an empirical analysis is necessary with a focus on the process of import substitution, the growth of agricultural production, its competitiveness before imposing the food embargo and after.

The complex nature of the study required the development of an original methodology for assessing the competitiveness of agricultural products, taking into account the main factors affecting its dynamics, availability and comparability of information.

2. Theoretical Aspects

Competitiveness is one of the most important integral characteristics used to assess economic efficiency. It is a complex concept that includes a large number of objects significantly different from each other. In this regard, in the economic literature there is no generally accepted definition of this category, which would include all its aspects [3].

Methodical approaches to the assessment of competitiveness largely depend on the levels (micro, meso, macro) on which the research is conducted. These levels include the study of the competitiveness of a country, economy, industry, company and product. For example, in the domestic market, imported and domestic products can compete with each other; individual enterprises, regions; in the foreign market - the state, their blocks, large companies.

Accordingly, a set of tools that will allow a quantitative assessment of competitiveness depends on the object of study. Taking into account the fact that the task of the study is to examine the competitiveness of agri-food products, we will consider in more detail the approaches to assessing the competitiveness of goods.

In the economic literature there are various methods for assessing the competitiveness of goods [4]:

- methodology for assessing competitiveness on the basis of product sales;
- methodology based on the evaluation of goods from the point of view of their conformity to meet consumer qualities (Rosenberg model);
- method of comparison with the ideal value characterizing the property of the goods (model with an ideal point);
- assessment of the competitiveness of the product based on the calculation of the integral index.

This method of calculation includes several stages. At the first stage, the baseline indicators are compared with the benchmark for a particular type of product, at the second stage, taking into account the number of estimated parameters, the integral indicator of competitiveness is calculated.
These techniques can be used to some extent to assess the competitiveness of agri-food products. However, in our opinion, when analyzing the competitiveness of products at the macro level, it is most appropriate to use the method of calculating the integral indicator. On the basis of this methodological approach, we will construct a model for calculating the integral coefficient of competitiveness of agri-food products.

The main factors affecting the competitiveness of agri-food products can be divided into two groups: the first group is pricing factors, the second is production and export volumes [5]. In the first case, different levels of pricing are analyzed (cost, producer prices, export prices), and this approach also makes extensive use of the competitiveness ratio, which is the ratio of producer prices to import prices for a specific type of product. In the second, the competitiveness of products is determined on the basis of an analysis of production volumes and the share of exports of agri-food products (in this case, the coefficient of the revealed comparative competitive advantage of B. Balassa and its various modifications are used).

Using one of the above approaches does not give complete reliability. Exploring only the price factor, the problem of export volumes that may be minimal with a competitive price that does not increase the integral indicator of product competitiveness goes to the background. On the other hand, when estimating only the volumes of exports of agri-food products, a distorted picture can also be formed, since according to B. Balassa's formula, the ratio of exports of a specific type of product to the total export of a country is used in calculations, the volumes of which can be both large and small.

Existing differences of opinion on certain aspects of this economic category require its additional study in theoretical and methodological terms. In our opinion, the methodology for determining the competitiveness of goods should be based on an integrated and systematic approach. An integrated approach implies a comprehensive analysis based on both the price factor and the production and export volumes. Also, the assessment of competitiveness should be conducted at various levels: from the level of production and sales of products in organizations to the level of mutual and foreign trade.

Based on the proposed approach, the following formula is proposed for calculating the aggregate coefficient of competitiveness ($\Lambda_{ij}$) (1).

$$
\Lambda_{ij}= \left\{1 - \left( \frac{P_i + P_{ij} \cdot (1-V_{ij}) \cdot (1-D_{ij}) + K_{ij}}{5} \right) \right\}
$$

where:

$\Lambda_{ij}$ – a comprehensive index of competitiveness (unrated) for the i-th product in the j-th period;

$P_i$ – an average producer price;

$P_{ij}$ – an average export price;

$V_{ij}$ – a volume of production;

$D_{ij}$ – an export share in production;

$K_{ij}$ – a competitiveness ratio, calculated as the ratio of average producer prices of domestic agri-food products to average import prices (on CIF terms of delivery), taking into account customs duties and fees.

At the same time, each individual indicator under study must be normalized by dividing by the largest value that has developed over the period under consideration (2013-2016). Also, for the comparability of estimates of competitiveness in different periods of time, the calculated complex indicators of competitiveness are calculated as a percentage using formula 2. The higher the integral index of competitiveness, the products are considered more competitive.

$$
\lambda_{ij}= \frac{\Lambda_{ij}}{\max \{\Lambda_{ij}\}} \times 100
$$

where:
\[ \lambda_{ij} \] – an integral index of competitiveness for the \( i \)-th product in the \( j \)-th period.

Thus, the proposed method will allow to reveal the state of competitiveness of agri-food products, taking into account the main factors affecting its dynamics.

3. Data and Methods
The analysis in this study used the official data from the Federal State Statistics Service, the United Nations International Trade Database (UN Comtrade), information from the Ministry of Agriculture of the Russian Federation, other official sources. Taking into account the objectives of the study, the following methods were used: statistical groupings, a comparative analysis, a method of expert assessments, and a calculation-constructive method.

4. Research Results
Considering the results of the import substitution policies pursued since 2014, it can be noted that certain successes have been made.

In 2016, for most types of agricultural products and foodstuffs (except for dairy products), the threshold values of the Food Security Doctrine were reached. The share of imported food products in the commodity resources of the food retail trade in 2017 was 21%, decreasing compared to the 2013 level by 15 percentage points (Figure 1).

![Dynamics of the share of imported goods in retail resources in the Russian Federation in 2005-2017 (II quarter).](source)

**Source:** Federal State Statistics Service [6]

**Figure.** 1. Dynamics of the share of imported goods in retail resources in the Russian Federation in 2005-2017 (II quarter).

For 2014-2016, agricultural production index increased by 11.3%. The share of agriculture, hunting and forestry in gross value added increased from 3.9% (2014) to 4.6% (2016). Assessing the sufficiency of such growth rates, one should take into account that one of the goals of Russia’s economic policy is to be among the leading countries in terms of gross domestic product, which requires an increase in the country’s economic role in the world community (Decree of the President of the Russian Federation of December 31, 2015 No. 683 “About the National Security Strategy of the...
Russian Federation”). In relation to the agrarian sector of the economy, this means that the growth rate in the industry should not be lower than the world average.

Currently this condition is almost fulfilled. The average annual growth rate of gross value added in agriculture in 2012-2016 in Russia amounted to 102.3%, and it was 102.4% in the world (Figure 2).

![Figure 2](image-url)

Source: Federal State Statistics Service, World Bank [6, 7].

**Figure. 2.** The growth of gross value added in agriculture in Russia and in the world, in % of the previous year.

At the same time, the prospects for increasing or at least maintaining the growth rates in domestic agriculture are not so clear and will be limited by a number of factors.

The share of expenditures on the industry in the consolidated budget of the country in recent years remains virtually unchanged and is only about 0.4%. In fact, the transferred funds of the federal budget aimed at the implementation of the State Program for the Development of Agriculture and Regulation of Agricultural Products, Raw Materials, and Food for 2013–2020 (hereinafter referred to as the State Program) in 2014 amounted to 186.6 billion rubles, and it was 234 billion rubles in 2017. [8]. Since the beginning of policies, the import substitution has increased by 25%, while the inflation in Russian has increased in the period 2014-2017 and reached 38%. Thus, in 2017, financing of the State Program at the expense of the federal budget in comparable prices decreased by 13%.

Despite some positive dynamics of import substitution, its share in commodity resources for such items as, for example, beef in 2017 was about 45%, butter and cheese – 28%, milk powder and cream – 55% [9]. It is planned that by 2020, the share of domestic meat and meat products in the total resources of these food products will reach 90.2%, potatoes – 97.6%, milk and dairy products – 80.6% [10].

The process of import substitution is only one of the stages in the development of the agro-industrial complex, its duration is different for individual types of agricultural products and depends on a number of factors, both economic and technological [11]. If for such types of products as meat of pigs and poultry the task of import substitution is practically solved, then for others – vegetables, fruits, cattle meat, dairy products – it will take a long time.

At the same time, one should not focus on the complete replacement of imported products with domestic products due to the fact that the development of world economic relations objectively implies an increase in the scale of mutual trade in goods, services and technologies, including in the sphere of agro-industrial production. At the same time, the parameters of ensuring the country’s food security should be considered the “border line” for imports.

As import substitution develops, conditions will be created for the possibility of increasing exports of agricultural products and foodstuffs, the transition from import dependence to an export-oriented development model. These processes should also contribute to improving the competitiveness of
products, which largely depends not only on the conditions created for the development of the industry within the country, but also requires maintaining steady demand in the global market.

To this end, it is advisable to analyze how the level of competitiveness of domestic agri-food products has changed in recent years. The study was conducted on the main types of agricultural and food products: wheat, barley, sunflower seeds, potatoes, tomatoes, cucumbers, cabbage, onions, carrots, flour, pasta, and sunflower oil. The year of 2013 will be used as a base period for analysis: it is a period characterizing the state of product competitiveness before imposing the product embargo and developing import substitution policies in the country.

One of the fundamental factors determining the competitiveness of products is the level of cost of production [12]. In the Russian Federation, there has been a steady upward trend in the cost of production. This trend is mainly due to the decline in the national currency exchange rate and, accordingly, the increased cost of production due to high import dependence on the supply of seeds, breeding and genetic material, premixes, vaccines, chemical plant protection products, etc. On the other hand, the depreciation of the national currency led to cheaper domestic products in terms of foreign currency. And the paradoxical picture turned out: the cost of agricultural products in the national currency grew, and in US dollars fell [13, 14].

Depending on the level of costs, a producer price is formed, which is the next important characteristic of the competitiveness of agri-food products [15]. In addition to cost, it includes profit, premiums, and discounts for the quality of products sold. In 2016, the average price level of producers of sunflower seeds and sunflower oil in national currency increased by 82% and 57% respectively, in comparison with 2013, cabbage – by 48%, wheat – by 32%, pasta – by 36% (Table 1). At the same time, when recalculated into US dollars, prices for each of the considered types of products decreased. The maximum decrease was noted for potatoes – by 41%, tomatoes and barley – by 34%, carrots – by 32%, wheat – by 29%. Also, a significant decrease in the cost level was noted for onions – by 28%, cabbage – by 20%, sunflower oil – by 15%.

Table 1. Dynamics of average producer prices of agri-food products in the Russian Federation in 2016 and 2013.

| Product name     | Average producer price, rub. per ton | Average producer price, USD per ton |
|------------------|-------------------------------------|-----------------------------------|
| Wheat            | 6715 8837                            | 2013 2016 2016 to 2013, %         |
| Barley           | 6376 7741                            | 2193 205 146 -29.0                |
| Pasta            | 21171 28748                          | 2013 2016 2016 to 2013, %         |
| Wheat flour      | 11705 15338                          | 2013 2016 2016 to 2013, %         |
| Sunflower seeds  | 12024 21886                          | 2013 2016 2016 to 2013, %         |
| Sunflower oil    | 32084 50463                          | 2013 2016 2016 to 2013, %         |
| Potatoes         | 9447 10248                           |                                  |
| Tomatoes         | 50594 62304                          | 2013 2016 2016 to 2013, %         |
| Cucumbers        | 56249 75293                          |                                  |
| Onion            | 7306 9706                            | 2013 2016 2016 to 2013, %         |
| Cabbage          | 8227 12217                           | 2013 2016 2016 to 2013, %         |
| Carrot           | 9812 12344                           |                                   |

Source: Federal State Statistics Service, authors’ calculations [6].

The next factor characterizing competitiveness is the volume of production and export of products [16]. Production volumes directly affect production costs, and, consequently, producer prices. At the same time, to determine the competitiveness of products, not only the volume of its production is important but also the share of products coming in for export. Consider these indicators in more detail.

In 2016, wheat production in the Russian Federation reached a record level of 73.3 million tons, which is 19% more than in 2015 and 41% more than the production in 2013. Also, a significant
increase in production was recorded for sunflower oil – up to 4.2 million tons (27% of the 2013 level), barley – up to 18.0 million tons (17.0%), sunflower seeds – up to 11.0 million tons (Table 2).

Along with the production in 2016, a significant increase in exports was noted. In 2013, the export of wheat amounted to 13.8 million tons, and it reached 25.3 million tons by 2016; the volume of exports of sunflower oil increased from 1.4 million tons in 2013 to 1.8 million tons in 2016. In 2013, exports of potatoes amounted to 40 thousand tons, and in 2016 it reached 221 thousand tons.

Significant growth in exports is also noted for all types of vegetables. As a result, in the period of 2013-2016, the maximum export volumes in 2016 were reached for wheat, sunflower seeds, sunflower oil, potatoes, cucumbers, onions, cabbage and carrots. In barley and wheat flour, the largest volume was exported in 2015 (in 2016 there was a decrease by 46% and 10% respectively).

Table 2. Production and export of agri-food products in the Russian Federation in 2013 and 2016.

| Product name       | 2013       |          |          | 2016       |          |
|--------------------|------------|----------|----------|------------|----------|
|                    | Production | Export    | Export    | Production | Export    |
|                    | volume,    | volume,   | in       | volume,    | volume,   |
|                    | thousand   | thousand  | production| thousand   | thousand  |
|                    | tons       | tons      | volumes,% | tons       | tons      |
| Wheat              | 52091      | 13796    | 26.5     | 73295      | 25327    | 34.6     |
| Barley             | 15389      | 2325     | 15.1     | 17993      | 2863     | 15.9     |
| Pasta              | 915        | 78       | 8.5      | 1012       | 103      | 10.2     |
| Wheat flour        | 9048       | 116      | 1.3      | 9124       | 237      | 2.6      |
| Sunflower seeds    | 9842       | 80       | 0.8      | 11010      | 187      | 1.7      |
| Sunflower oil      | 3328       | 1358     | 40.8     | 4217       | 1790     | 42.5     |
| Potatoes           | 30199      | 40       | 0.1      | 31108      | 221      | 0.7      |
| Tomatoes           | 2162       | 0.3      | 0.0      | 2366       | 9        | 0.4      |
| Cucumbers          | 1068       | 0.1      | 0.0      | 1143       | 8        | 0.7      |
| Onion              | 1985       | 1.0      | 0.0      | 2023       | 62       | 3.1      |
| Cabbage            | 3335       | 0.3      | 0.0      | 3626       | 17       | 0.5      |
| Carrot             | 1605       | 0.1      | 0.0      | 1847       | 17       | 0.9      |

Source: Federal State Statistics Service, authors’ calculations [6].

Among the products under consideration, the maximum share of exports in the volume of production in 2016 was noted for sunflower oil – 42.5%, wheat – 34.6%, barley – 15.9%, and pasta – 10.2%. For comparison, it was 40.8% in 2013 for sunflower oil, 26.5% for wheat, 15.1% for barley, and 8.5% for pasta. Thus, this indicator also shows a positive trend.

In characterizing the competitiveness of products, its most important aspect is the study of average export prices. In the period from 2013 to 2016, a decrease was observed in almost all types of products. The most significant decrease in export prices was recorded for vegetables: carrots (from $ 822 per ton in 2013 to $ 125 per ton in 2016) and tomatoes (from $ 1,464 per ton to $ 257 for tons), cabbage (from $ 490 per ton up to $ 129 per ton). The only product for which price growth was observed in the period from 2013-2015 was sunflower seeds (from $ 426 per ton in 2013 to $ 544 per ton in 2015). However, in 2016, a decrease was also observed – to $ 443 per ton.

The next indicator that is appropriate to use in the analysis of competitiveness is the ratio of prices of producers of agri-food products and the prices of imported products (coefficient of competitiveness) (Table 3). When calculating the coefficient, the import price increases by the amount of customs duties and taxes, VAT and excise taxes (the products we analyze do not apply to excisable goods). This indicator allows one to compare the efficiency of purchasing products from a domestic manufacturer or purchasing it by import. Accordingly, the smaller its value, the more competitive domestic products.
Table 3. The coefficient of competitiveness of agri-food products in the Russian Federation in 2013 and 2016.

| Product name | 2013       | 2016       |
|--------------|------------|------------|
|              | Producer average price | Average import price | Cc | Producer average price | Average import price | Cc |
| Wheat        | 205.2      | 256.8      | 0.7 | 145.7                  | 153.5                  | 0.8 |
| Barley       | 194.8      | 322.8      | 0.5 | 127.6                  | 128.4                  | 0.9 |
| Pasta        | 6468       | 1427.7     | 0.4 | 473.9                  | 1105.5                 | 0.3 |
| Wheat flour  | 357.6      | 396.3      | 0.7 | 252.9                  | 238.8                  | 0.9 |
| Sunflower seeds | 367.4     | 7732.2     | 0.0 | 360.8                  | 2138.5                 | 0.1 |
| Sunflower oil | 980.3      | 1304.0     | 0.6 | 831.9                  | 853.1                  | 0.8 |
| Potatoes     | 288.6      | 520.9      | 0.5 | 168.9                  | 377.0                  | 0.4 |
| Tomatoes     | 1545.8     | 1290.3     | 1.0 | 1027.1                 | 1063.0                 | 0.8 |
| Cucumbers    | 1718.6     | 1357.5     | 1.0 | 1241.2                 | 1083.5                 | 0.9 |
| Onion        | 223.2      | 511.7      | 0.4 | 160.0                  | 407.5                  | 0.3 |
| Cabbage      | 251.4      | 600.1      | 0.3 | 201.4                  | 447.4                  | 0.4 |

Source: Federal State Statistics Service, Comtrade [6, 17]

In 2016, if compared to 2013, a decrease in the coefficients of competitiveness was noted: wheat – from 0.7 to 0.8; barley – from 0.5 to 0.9; sunflower oil v from 0.6 to 0.8, wheat flour – from 0.7 to 0.9. However, it is worth noting that in the period 2014-2015, the improvement in the competitiveness ratio was observed. Thus, in 2015-2016, the production of these types of products has become less competitive than in 2014. Based on the analysis, we calculated the integral coefficient of competitiveness ($\Lambda_{ij}$), according to the formulas 1 and 2, given above.

In 2014, the maximum values were reached for three products – barley, sunflower seeds, and sunflower oil (table 4). In 2015, five products: wheat, pasta, wheat flour, tomatoes, and cucumbers. In 2016, we analyzed the total of four products: onions, cabbage, carrots, and potatoes.

Table 4. An integral indicator of the competitiveness of agri-food products of the Russian Federation in 2013-2016.

| Product name | 2013 | 2014 | 2015 | 2016 |
|--------------|------|------|------|------|
| Wheat        | 57   | 99   | 100  | 93   |
| Barley       | 57   | 100  | 96   | 73   |
| Pasta        | 60   | 90   | 100  | 92   |
| Wheat flour  | 52   | 78   | 100  | 85   |
| Sunflower seeds | 83   | 100  | 51   | 85   |
| Sunflower oil | 68   | 100  | 91   | 83   |
| Potatoes     | 35   | 57   | 94   | 100  |
| Tomatoes     | 37   | 45   | 100  | 89   |
| Cucumbers    | 40   | 46   | 100  | 90   |
| Onion        | 38   | 41   | 77   | 100  |
| Cabbage      | 36   | 55   | 92   | 100  |
| Carrot       | 26   | 47   | 87   | 100  |

Source: Authors’ calculations.

In order to assess the competitiveness of agricultural and food products produced in the Russian Federation on the world market, it is advisable to use other approaches. One of them is the definition of the Balassa’s coefficient. We present the results of its calculation for the Russian Federation in 2013 and 2016.
In 2013, the highest Balassa’s coefficient was recorded for sunflower oil (5.1), wheat (2.5), and barley (2.3). For other products, its value was in the range of 0.001-0.4 (Table 5). In 2016, for each of the products reviewed there was a significant increase. For instance, for sunflower oil, the coefficient value reached 13.3, for wheat – up to 6.2, barley – up to 3.8.

Table 5. Balassa’s coefficient for agri-food products produced in the Russian Federation in 2013 and 2016.

| Product name       | 2013 | 2016 |
|--------------------|------|------|
| Wheat              | 2.5  | 6.2  |
| Barley             | 2.3  | 3.8  |
| Pasta              | 0.4  | 0.6  |
| Wheat flour        | 0.4  | 0.8  |
| Sunflower seeds    | 0.3  | 1.3  |
| Sunflower oil      | 5.1  | 13.3 |
| Potatoes           | 0.08 | 0.37 |
| Tomatoes           | 0.002| 0.017|
| Cucumbers          | 0.001| 0.066|
| Onion              | 0.003| 0.156|
| Cabbage            | 0.002| 0.043|
| Carrot             | 0.002| 0.092|

Source: UNComtrade, authors’ calculations [17].

Thus, the analysis showed that in 2013-2016, the competitiveness of domestic products both domestically and globally increased significantly. The main factor in improving competitiveness was the depreciation of the national currency, which led to the cheapening of domestic products as compared with imported counterparts. The growth of competitiveness was also supported by relatively favorable market conditions and an increase in production and export volumes.

5. Conclusions
As the share of domestic products in the general market resources increases and / or the Russian ruble strengthens, growth opportunities in the agricultural sector of the economy will weaken due to import substitution, which requires searching for new growth factors. It is necessary (a) to ensure the macroeconomic conditions for the development of the agricultural sector, (b) to increase domestic demand by increasing incomes of the population, reducing their differentiation, as well as providing targeted food aid, and (c) to develop the advanced processing of agricultural raw. There will be more intensive development and diversification of exports of agricultural products, foodstuffs, and products of deep processing of agricultural raw materials, which would require a more comprehensive state policy in this area, including expanding the State Program of Agricultural Development with export infrastructure development projects. Maintaining the growth rate of agricultural production at a level not lower than the world average will require a significant increase in productivity and acceleration of technical and technological renewal of the industry.

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