Effects of Export Control Policy on Food Security: The Case of the Grain Market in Russia

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Abstract—A discussion is provided of the issues arising from a grain export control policy aimed at stabilizing domestic prices and strengthening food security. It is shown that in recent years, the gross grain harvest in Russia has exceeded the total volume of domestic consumption and exports. Russia has repeatedly introduced measures to restrict grain exports in connection with the rise in prices in the domestic market, but these measures have only exacerbated the tensions. It is concluded that export restrictions have little potential to curb food inflation, and they adversely affect the development of the grain sector. It is proposed to focus on alternative methods of stabilizing the situation in the food market. These methods should set the following priorities: ensuring a stable growth and increased efficiency of the grain sector based on its technological modernization, improving the institutional structure, and increasing the efficiency of government policy. Transitional measures could include quotas for domestic supply and targeted food assistance programs for low-income population groups.

Keywords: export regulation, export restrictions, food security, grain market, food inflation

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In 2020, disruptions in agrifood chains and other setbacks in agricultural production, amid the spread of the COVID-19 pandemic, created risks of reduced food security in many countries [1]. In order to protect their interests, 33 countries introduced restrictive food policy measures [2, 3].

In recent years, Russia has been implementing a quite successful program in the agrifood complex (AFC) to reduce imports and increase domestic production. When the borders were closed due to the pandemic, people were fully provided with food products thanks to these measures [4]. At present, Russia is able to fully provide itself with grain crops, sugar, meat, vegetable oil, and some vegetables (potatoes and tomatoes) even in the event of a crop failure [5].

Given that the country achieved a high level of food self-sufficiency and increased its exports of some agrifood products, the annual food inflation reached in 2020 its maximum (6.7%) since 2016, including due to the growth in prices for chicken eggs (+13.2%), sunflower oil (+25.9%), and sugar (+64.5%).\textsuperscript{1} In 2021, the growth in food prices continued, and at the end of February, the growth rate of food prices reached 7.7%, outstripping the growth rate of prices for nonfood products (5.7%).\textsuperscript{2}

\textsuperscript{1} https://www.cbr.ru/Collection/Collection/File/31914/CPD_2020-12.pdf.
\textsuperscript{2} http://www.cbr.ru/collection/collection/file/32084/cpd_2021-02.pdf.

In order to stabilize domestic prices and ensure food security, the Russian government has taken measures, including setting price caps for sugar and sunflower oil and imposing restrictions on grain exports.

Grain export restrictions affect all the participants in the grain chain; these measures can have an impact on food security and the development prospects of food industry, as well as social consequences. Thus, the rationale for introducing this kind of measures deserves a detailed study.

Importance of exports for food chain participants. In 2020, agrifood exports increased by 20% and reached a record value of $25.8 billion, exceeding their maximum of 2018. More than a third of these exports is grain crop exports, which increased in 2020 compared to 2019 by 25% in physical terms, having reached 48.7 million tons.\textsuperscript{3} Since the 2000s (except for 2003 and 2010), Russia’s gross grain harvests exceeded domestic consumption, and in 2013–2020, they did so by a factor of 1.43–1.74.\textsuperscript{4}

The consumption of grain crops in the domestic market consists of personal consumption for nutri-

\textsuperscript{3} https://rosstat.gov.ru/folder/10705.
\textsuperscript{4} The calculations in this study are based on Rosstat data, according to which the main grain crops cultivated in Russia are as follows: wheat (around 65% of the 2020 gross grain harvest), barley (15.7%), and corn (for seeds) (10.4%); the total share of all other grain crops (rye, oats, millet and sorghum, buckwheat, rice, legumes) is 9.3%. 
tion, industrial consumption for seeds and livestock/poultry fodder, and grain processing to produce flour and for other purposes:

\[ C^F_k = PrC + P + PsC , \]

where \( C^F_k \) is the total domestic consumption of a given type of agricultural products; \( PrC \) is the total industrial consumption; \( P \) is the total amount of processing of agricultural products; and \( PsC \) is the total personal consumption.

The actual consumption of some groups of food products in Russia differs significantly from the rational norms recommended by the Russian Ministry of Health.5 Thus, we conducted calculations for 2020, based on Rosstat data, to find out that Russians tend to consume more than recommended by these norms—they eat 63% more of sugar, 21% more of bread and bread products, and 10% more of eggs. Meanwhile, the consumption of dairy products, vegetables, and fruits by Russians, albeit having increased relative to the early 2000s, remains low—at 72, 77, and 62% of the norms, respectively.6

The fact that Russian people consume food products above (bread products and pasta) or below the rational norms (fruits and vegetables) is due not only to their dietary habits and physical availability of certain foods but also to their purchasing power, which has diminished in recent years.

We corrected the calculated results for domestic consumption, taking into account the attainment of the rational norms of food consumption.

The degree of attainment of the rational norms is calculated as the ratio of food consumption per capita (kg/year) to the rational food consumption norm recommended by the Russian Ministry of Health (kg/year):

\[ k_N = \frac{Cp}{N} , \]

where \( Cp \) is the per capita food consumption by main groups of food products (kg/year) and \( N \) is the rational norm of consumption of food products.

When food is consumed according to the rational norms, the total consumption of agrifood products is

\[ C^N_k = PrC + \frac{(P + PsC)}{K_N} , \]

where \( C^N_k \) is the total domestic consumption of a given type of agricultural products in the case of rational consumption; \( PrC \) is the total industrial consumption; \( P \) is the total amount of processing of agricultural products; and \( K_N \) is the degree of attainment of the rational norms.

Calculations show that in 2020, the gross grain harvest exceeded the grain consumption in the domestic and foreign (export) markets in terms of consumption calculated on the basis of the rational norms (Fig. 1).

Over the past five years, the consumption of grain crops in the domestic market has shown an annual growth of 1—2%, mainly due to the development of animal husbandry, given a decrease in the consumption of grain and processed grain products by the population.

The population’s demand for grains and processed grain products is completely inelastic at medium time intervals (two to three years); other things being equal, it does not change with a decrease or increase in prices [6]. The volume of personal consumption of bread and pasta (in flour equivalent), flour, cereals, and legumes was, at different prices, at the following levels: 119 kg in 2011–2012, 118 kg in 2013–2015, 117 kg in 2016–2017, and 116 kg in 2018–2020 (Fig. 2). In Fig. 2, each dot symbol shows the volume of consumption of bread products by the population at the prevailing price level in a certain period (year).

Amid the weak growth in domestic consumption, Russian grain exports increased from 2000 to 2020 by a factor of more than 48. The export growth rate in 2010–2020 was 16%. The excess of the export growth rate over those of domestic consumption suggests that grain exports indeed act as a catalyst for the grain production industry. The contribution of grain exports to the overall growth of the gross output of the industry in 2000–2018 was 79.4% [7].

The export growth allows producers to expand their production, increase revenues, and modernize grain farming. As to foreign trade intermediaries and exporters, the export growth allows them to increase sales and export incomes. The development of the industry due to the inflow of financial resources contributes to the development of related industries and Russia’s economy as a whole. In this sense, the export growth has a positive effect on economic security in general and food security in particular.

**Export control measures.** Export restrictions can be introduced for various purposes, e.g., to increase producers’ incomes; to improve the terms of trade; to provide cost advantages over foreign competitors to domestic processing companies that use exported goods as raw materials [8]; to increase national food security by increasing the amount of food products available for consumption in the domestic market and reducing their prices [9].

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5 https://minzdrav.gov.ru/opendata/7707778246-normpotreb-product/visual.
6 http://www.gks.ru/.
7 This technique assumes that the fodder consumption is at its actual level.
However, some studies show that export restrictions may not always achieve the goals they proclaim, and in many cases, they exacerbate the jump in food prices [10]. Thus, most economists (see, e.g., [11]) consider these restrictions as a costly and dangerous tool that jeopardizes food security in the long-term because it undermines the incentives to develop and improve production efficiency and raise competitiveness, as these incentives are created by foreign competition.

During the 2010s, despite the stable excess of gross grain harvests over their domestic consumption, Russia repeatedly introduced measures to restrict grain exports [7, 9, 12].

In order to stabilize domestic flour and bread prices amid the rise in grain prices, it was announced at the end of 2020 that Russia would introduce a grain export quota\(^8\) of 17.5 million tons, 70% of which were to be distributed among the ten leading exporters of the last season.\(^9\) Within that quota, the set of restrictive measures is supplemented with export duties: 25 euros per ton of wheat from February 1, 2021, and 50 euros from March 1; 25 euros per ton of corn and 10 euros per ton of barley from March 15. If the quota is exceeded, the export of grain is subject to a duty in the amount of 50% of the customs value but not less than 100 euros per ton. Since June 2, 2021, a grain damper tool was introduced in the grain market, which includes floating export duties, which are calculated on a weekly basis using price indicators, and grants compensations to farmers for those incomes that they will not receive due to the introduction of the duty.

**Impact of the export control policy on grain chain participants.** The domestic price of wheat in an open economy is directly related to the world market price [13]. Export restriction measures reduce supplies to the international market, and, if the country is a large exporter capable of influencing world prices, these measures create an increase in world prices [14]. For

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\(^8\) https://www.interfax.ru/business/750900.  
\(^9\) https://mcx.gov.ru/ministry/departments/departament-ekonomiki-investitsiy-i-regulirovaniya-rynkov/industry-information/info-tarifnaya-kvota-na-eksport-zernovoyh.
example, it was shown in [9] that a reduction in wheat exports by three large exporters—Russia, Kazakhstan, and Ukraine—can lead to a 23% increase in prices on the world market.

In the domestic market, export restrictions cause damage, first of all, to grain producers and the grain-growing industry as a whole. Given that the domestic grain market depends on the world market, the policy of export duties and bans cannot create any change in long-term price trends, but it puts the producers at a disadvantage as they pool from the traders the risks associated with export restrictions [7].

Thus, the purchase prices for wheat as of the end of 2020, amid the news about the introduction of the export duty, decreased by 1000–2000 RUB/ton in European Russia and by 700–900 RUB/ton in Siberia.10 Thus, the introduction of the export duty can be viewed as an additional tax on producers. In addition, against the backdrop of the rising world prices for wheat, manufacturers of fertilizers also increased their prices: by 46% for soluble nitrogen–phosphorus fertilizers and by 36% for nitrate fertilizers. Suppliers of fuels and lubricants raised their prices too, by 18%. Fertilizer prices continued to rise in 2021. According to the Ministry of Agriculture, the cost of combines and tractors increased by 13% compared to the previous year; of plant protection products, by 25%; of diesel fuel, by 6%.11 The profitability of plant crop production dropped tangibly due to the introduction of grain export duties, and the uncontrolled rise in the prices of producer goods will lead to a serious increase in production costs.

Currently, in order to curb the growth of fertilizer prices, Russia resorts to a policy of government control over the prices of mineral fertilizers. However, freezing the prices at their peak level of July 2021 does not seem to stabilize the situation.

According to N. Volchkova, the introduction (or planned introduction) of price control instruments at all the links of the value chain is an unprecedented measure that destroys the incentives for producers to expand their business. In the long term, this approach will cause a reduction in investment and a decrease in product competitiveness. The effectiveness of export restrictions to stabilize domestic prices for agricultural and food products is also questionable [15] since these measures do not address the issue of economic and physical availability of agricultural products to domestic consumers. This is especially true for wheat, which goes through a complex supply chain with multiple intermediaries until it becomes an end consumer product (baked goods and pasta). Thus, the decline in

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10https://www.interfax.ru/business/742670.
11https://www.vedomosti.ru/business/articles/2021/07/18/878609-agrarri-predupredili.
12https://www.vedomosti.ru/business/articles/2021/07/18/878609-agrarri-predupredili.
13https://www.finanz.ru/novosti/aktii/rost-cen-na-nekotorye-mineralnye-udobreniya-y-v-1f-prevsyl-100percent-minsgembr-zh-stavropolos-1030535890.
14https://fpma.apps.fao.org/giews/food-prices/tool/public/#/dataset/domestic; https://fpma.apps.fao.org/giews/food-prices/tool/public/#/dataset/international.
the wholesale price from December 2020 to February 2021 by 9% occurred amid an increase in retail prices for flour and bread, which increased in US dollar equivalent by 9.6% and 8.6%, respectively.

For the wheat export restrictions to affect bread prices, wheat prices have to go down at all the stages of the wheat-to-bread value chain. Previous episodes of export restrictions in Russia created no significant effect of price damping for consumers [13].

Thus, since the grain chain includes a large number of intermediaries in addition to producers and consumers, the export control policy applied in the absence of price controls over the numerous resellers and over the domestic retail prices does not give the expected effect of lowering the consumer prices.

Artificial price containment is a means of withdrawing money from the producer, which benefits, however, not only low-income groups, as would be justified from a social point of view, but also higher-income consumers, who can afford to buy food at market prices. A more effective measure to stabilize domestic prices is to stimulate investment, expand domestic production, and enhance competition.15

For example, Canada exports most of its grown wheat to world markets, and, like in any major exporting country, the prices in its domestic market are directly related to the world prices [16]. The increase in the world prices for wheat in 2020 caused an increase in the domestic prices in Canada, just like in Russia, in the second half of 2020, but this increase did not exceed the price level of 2019. Thus, the average price for wheat (except for durum varieties) was 3.3% lower in October 2020 than in April 2019. When the wheat price growth rate is below inflation, wheat is produced at lower real prices because of a stable productivity growth in the grain sector from the use of new methods and machine technology.

Domestic prices largely depend on the behavior of intermediaries such as elevators and flour mills, which may be tempted to hold back grain and wait for even higher prices. In anticipation of a rise in prices, grain traders may prefer not to sell but to accumulate stocks [13]. This behavior of grain market participants weakens the impact of export restrictions on domestic prices and accelerates the growth in domestic prices in the short run [9].

Economically unjustified measures to restrict exports undermine Russia’s reputation as a reliable supplier, strike a blow to the competitiveness of Russian grain, reduce Russia’s presence in the world market, and impair investment opportunities in the grain sector [17, 18]. In addition, export restrictions impede the development of future markets with forward contracts since their fulfillment cannot be guaranteed, which also adversely affects investment opportunities in the industry (see, e.g., [19, 20]).

The rise in domestic retail prices for processed grain products such as bread, flour, or pasta reduces first of all the affordability of food for the poorest population groups, who are particularly sensitive to growing food prices. However, there are other measures to support low-income families and those with elderly or disabled members, for example, by special food assistance programs, which, unlike export restrictions, do not exert a stressful impact on the entire grain market. In the United States, for example, there are 15 food assistance programs. In the fiscal year 2019 (from October 1, 2018, to September 30, 2019), about one in four Americans participated in at least one of these programs.16 In the fiscal year 2020, government spending on the food and nutrition programs of the United States Department of Agriculture (USDA) amounted to $122.1 billion, up 30% from the previous year, driven by increased demand for food assistance during the COVID-19 pandemic. In March 2021, 42.3 million people participated in the Supplemental Nutrition Assistance Program (SNAP); 14.8 million people participated in the pandemic food assistance program (P-EBT); 6.3 million in the special supplementary nutrition program for women, infants, and children (WIC); 0.7 million in the Commodity Supplemental Food Program (CSFP); and 0.48 million in the Food Distribution Program on Indian Reservations (FDPIR).17 In addition, the USDA has developed a wide range of flexible baby food programs.18

The rise in prices for livestock products due to the rise in fodder prices, which followed the rise in grain prices in the domestic market, could be a strong argument in favor of export control. However, the share of grain expenses in the retail price of poultry and pork meat is 25–35% or less, and an increase in domestic prices for grain, e.g., by 20%, may cause an increase in prices for meat products within 5–7% [12]. The rise in prices for meat products in the beginning of 2021 was due not only to an increase in the cost of combination fodders but also to several other factors, which had had, on the whole, a greater impact on the growth of the production costs. Since 2020, there was an increase in logistics costs. Food transportation costs increased by 10–15% on domestic routes and from 24 to 160% on international routes.19 An important factor in the growth of production costs was the reduction in the livestock population of poultry and pigs.
October 2020, the poultry herd decreased by 26 million heads due to bird flu, and the spread of the disease in many countries simultaneously led to a shortage of hatching eggs. The pork market is in the same situation. Thus, the introduction of export duties on grain also seems to be ineffective in terms of containing prices and preventing an increase in animal husbandry costs.

An alternative to export restriction measures could be a consumer subsidy program that would increase the welfare of producers without affecting consumers in the sense that they do not benefit or lose from the program.

Another idea that deserves attention is to set up a grain exchange on the domestic market. In early August 2021, wheat auctions were launched in the testing mode on the National Commodity Exchange (a member of the Moscow Exchange), which were organized by the Russian public corporation United Grain Company (OZK). This is not yet a full-fledged grain exchange with a large number of buyers and sellers, but it will provide a market estimate for the value of Russian grains, which can be used as a price benchmark for domestic transactions and for floating export duties.

Also noteworthy is the idea that instead of export restrictions, one should set a quota on mandatory product deliveries to the domestic market at predetermined prices in the amount not lower than the self-sufficiency threshold. As to the rest of the products, the producer can sell them at the international market at world prices. The authors share the opinion that this measure will preserve the incentives to expand production and will help the industry remain attractive to investors.

Conclusions. Export control policy is currently viewed as a means to ensure food security by reducing the dependence of the domestic market on international trade. In addition, an increase in the supply of Russian grain in the domestic market should stimulate the development and enhance the competitiveness of animal husbandry in Russia.

The study showed that export restrictions on the grain market have too little potential to curb food inflation, adversely affect the development of the grain sector, and lead to an increase in the production costs of animal husbandry. This approach can only be used as a temporary measure not only for economic but also for socio-political reasons.

A long-term effect on prices in the food market can come from measures to stimulate the development of the agrifood sector. Thus, we believe that the government policy in the agrifood sector should focus on reducing the unit costs of agricultural production through technological and institutional modernization of the agro-industrial complex and through increased labor productivity in this sector of the economy and on improving the quality of life of the population.

REFERENCES
1. B. Kheifets and V. Chernova, “Impact of the COVID-19 pandemic on global food security,” O-vo Ekon., No. 7, 86–98 (2020).
2. P. Udmale, I. Pal, S. Szabo, M. Pramanik, and A. Large, “Global food security in the context of COVID-19: a scenario-based exploratory analysis,” Prog. Disaster Sci. 7, 100120 (2020). https://doi.org/10.1016/j.pdisas.2020.100120
3. T. Falkendal, C. Otto, J. Schewe, et al., “Grain export restrictions during COVID-19 risk food insecurity in many low- and middle-income countries,” Nat. Food 2, 11–14 (2021). https://doi.org/10.1038/s43016-020-00211-7
4. A. Gur’ev, Vedomosti, Apr. 6 (2021). https://www.vedomosti.ru/opinion/articles/2021/04/06/864868-rossiya-pomoch.
5. I. Dashkovskii, Agrotekhnika i Technologii, May 16 (2020). https://www.agroinvestor.ru/analytics/article/33713-produktovaya-strategiya-smozhet-li-importo-zameshenienie-spasti-ot-problem-v-mirovoy-torgov-le-vyzvanny/.
6. C. R. Makkonnell, S. L. Brue, and S. M. Flynn, Economics: Principles, Problems and Politics (McGraw-Hill, New York, 2009).
7. N. M. Svetlov, D. S. Ternovskii, V. Ya. Uzun, N. I. Shagaida, and E.A. Shishkina, Impact of Exports on Agricultural Producers and Consumers in Russia (Delo, Moscow, 2020) [in Russian].
8. W. M. Liefert and P. C. Westcott, Economic Research Service, June (2015). https://www.ers.usda.gov/publications/pub-details/?pubid=45374.
9. T. Fellmann, S. Helaione, and O. Nekbay, “Harvest failures, temporary export restrictions and global food security: the example of limited grain exports from Russia, Ukraine and Kazakhstan,” Food Security 6 (5), 727–742 (2014).
10. C. Estrades, M. Flores, and G. Lezama, The role of export restrictions in agricultural trade: Working paper 0417, Department of Economics (eCON), 2017. https://www.colibri.udelar.edu.uy/jspui/bitstream/20.500.12008/19975/1/DT%20E%202017-04.pdf.
11. B. Wright, “The economics of grain price volatility,” App. Econ. Perspect. Policy 33, 32–58 (2011). https://doi.org/10.1093/aepp/ppq033
12. M. Yu. Ksenofontov, D. A. Polzikov, and A. V. Urus, “A food security and grain market regulation in Russia,” Stud. Russ. Econ. Dev. 30, 606–613 (2019).
13. L. Götz, I. Djuric, and T. Glauben, “Wheat export restrictions in Kazakhstan, Russia, and Ukraine: Impact on prices along the wheat-to-bread supply chain” in The Emerging Role of KRU in Global Agricultural Markets: Promise and Concern. Ed. by A. Schmitz and W.H. Meyers (Commonwealth Agricultural Bureaux Inter-

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20https://www.agroinvestor.ru/analytics/news/35304-eksperty-v-rossii-vyrastut-tseny-na-yaytsa-i-kuritsa/.
14. A. Espitia, N. Rocha and M. Ruta, Covid-19 and food protectionism. The impact of the pandemic and export restrictions on World food markets, policy research, working paper 9253, 2020. https://ideas.repec.org/p/wbk/wbrwps/9253.html.

15. The Impacts of the El Niño and La Niña on Large Grain Producing Countries in ECA: Yield, Poverty and Policy Response (World Bank, Washington, DC, 2018). https://openknowledge.worldbank.org/handle/10986/30191.

16. F. G. Baquedano and W. M. Liefert, “Market integration and price transmission in consumer markets of developing countries,” Food Policy, 44, 103–114 (2014).

17. G. Welton, The impact of Russia’s 2010 grain export ban. Oxfam. Research Report, June 2011. https://www.researchgate.net/publication/266573930_The_Impact_of_Russia%27s_2010_Grain_Export_Ban.

18. V. Vorotnikov, Grain export restrictions taking toll, 2021. https://www.world-grain.com/articles/15108-grain-export-restrictions-taking-toll.

19. OECD-FAO Agricultural Outlook 2012–2021 (Organisation for Economic Cooperation and Development, Paris, and Food and Agricultural Organisation of the United Nations, Rome, 2012). https://www.fao.org/fileadmin/templates/est/COMM_MARKETS_MONITORING/Oilcrops/Documents/OECD_Reports/Ch5StatAnnex.pdf.

20. T. Glauben, M. Belyaeva, I. Bobojonov, I. Djuric, L. Götz, H. Hockmann, D. Muller, O. Perekhozhuk, M. Petrick, S. Prehn, A. Prishchepov, S. Renner, and F. Schierhorn, “Eastern breadbasket obstructs its market and growth opportunities,” IAMO Policy Brief, 16, 1–4 (2014).

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