



Wheat Trade Flows and Logistical Competition from the United States and Black Sea Origins to Targeted International Markets (Summary)

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WHAT IS THE ISSUE?

Russia's 2022 invasion of Ukraine drastically impacted the domestic grain markets of both Russia and Ukraine, as well as international grain markets. Notably, the war disrupted transport and logistics, as shipments through traditional Black Sea routes now face severe port-capacity constraints. Additionally, vessels in the area risk attacks, raising ocean shipping costs. Consequently, these risks and increased costs have spurred new port development and the establishment of shipping routes through the Baltic Sea.

The Russian marketing system and export flows have transitioned from being spatially dispersed and competitive to falling increasingly under centralized government control. Russian export policies include the use of export quotas, minimum export prices, and restrictions on trade that target "unfriendly" countries.¹

Given the current conditions and uncertainty of the war, this study developed a model to evaluate the potential trade flow impacts among major wheat exporting competitors (Russia, Ukraine, the United States, the European Union, Argentina, and Australia) resulting from changes to wheat exports from the Black Sea region. In addition, the model optimizes export logistics, risks, and trade flows that minimize shipping costs for wheat exports from these major wheat competitors.

¹ The Russian government has maintained a long-term policy of export quotas and minimum export prices, while recently announcing the designation of friendly countries, which are targeted for more favorable trade terms. In contrast, other countries are labeled as "unfriendly" and face trade restrictions.

HOW WAS THE STUDY CONDUCTED?

The researchers developed a spatial logistics model to identify efficient trade flows and routes for shipping grain from export ports to ten major import destinations. The empirical model utilizes an Optimized Monte Carlo Simulation (OMCS) to determine the optimal trade flows among predefined origins and destinations.

The model aims to minimize export shipping costs, with restrictions on import demand, export supplies, and handling capacity. Additional constraints reflect varying marketing and trade policies, friendly countries, an export quota, expanded Russian ports, and a potential 50-percent increase in Russian exports by 2030. Sensitivity analyses were conducted to assess the impacts of these trade restrictions.

Wheat classes include U.S. Hard Red Winter (HRW) and Soft Red Winter (SRW), competing with wheat from Russia, Ukraine, the European Union (EU), Australia, and Argentina. U.S. exporting ports are in the Pacific Northwest and the U.S. Gulf. Ports for Ukrainian grain are Odesa, and Constanta in Romania, while Russian ports include Novorossiysk, the Azov and Caspian routes, and the Baltic ports. The ten import destinations encompass North Africa, Sub-Saharan Africa, the Middle East, Asia, Southeast Asia, the European Union, the U.S. East Coast, Mexico, South America, and Turkey.

WHAT DID THE STUDY FIND?

Three observations about the baseline scenario—which reflects actual shipments in recent years—have implications for logistical competition:

- Most ports have adequate capacity globally. However, Russian and Ukrainian ports have limited capacity during certain times of the year.
- Russia has a dominant logistical cost advantage when exporting to the Middle East.
- As a supplier of winter wheat exports, the United States fulfills a residual role in most markets.

Most of the model's variables—such as import demand, export supply, basis, and ocean rates—are seasonal. That seasonality is an essential feature of the model and its results. In the baseline scenario, the researchers found the peak for wheat exports from the United States is from April to September; from Australia, January to June; from Argentina, December to March; from the EU, March to April and, again, from August to September; from Ukraine, from August to November; and from Russia, August to December.

Analysis of several alternative scenarios suggests the following:

- Expanding Russian port infrastructure in the Baltic and Caspian Sea regions results in a reduction of U.S. exports of between 550,000 to 875,000 metric tons per year, depending on the degree of expansion. (In such cases, would-be U.S. exports are indirectly displaced to Russian businesses, as Russian exports directly displace EU and Australian exports – resulting in more direct competition in the Asia and SE Asia regions.)
- Removing China's phytosanitary restrictions on imports of Argentine and Ukrainian winter wheat has minimal impacts on trade flows, because both countries are logistically uncompetitive into China.
- Relaxing Russian export quotas alters the timing of wheat shipments: during the second half of the year, Russian exports increase 2.4 million metric tons to the targeted regions. This increase comes at the expense of exports from countries in the "overflow" category (such as Kazakhstan and Turkey), followed by the United States and Argentina. Under this scenario, all these countries see their exports to the 10 modeled import regions reduced, requiring them to find new markets for their exports.
- Removing the Russian "unfriendly country" designation results in minimal changes in trade flows, as Russia is logistically uncompetitive in most countries on its "unfriendly" list.

- Strictly enforcing Russia’s minimum price strategy results in fewer exports from Russia. The United States and Argentina are the primary beneficiaries of strict enforcement.
- Expanding wheat exports from Russia by 20 percent over 2 years (rather than by 50 percent in 5 years, as Russia has planned) would require that Russia find significant new markets outside of the 10 modeled regions, because the forecasted import growth in these regions is around 1.2 percent per year. Therefore, such an expansion is highly infeasible. If it did occur, Russian competition would capture significant export volumes to the modeled regions—at the expense of the United States, Argentina, and Australia.

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