

# Disruptions in exports of grains from Ukraine and Russia cost the world's economy more than \$1.6 billion: Study

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Russia's invasion of Ukraine has struck a major blow to global markets for vital commodities—particularly grains like wheat and maize.

Shortages and price increases are contributing to the food insecurity crisis in certain parts of the world, [according to the United Nations](#), and to more general economic uncertainty.

A new study led by Adam Rose, research professor at the USC Sol Price School of Public Policy and its Center for Risk and Economic Analysis of Threats and Emergencies (CREATE), estimates that disruption to exports of grain commodities during a projected one-year period of the war will result in a \$1.6 billion loss for the [global economy](#).

The study was recently published as a featured article in [Applied Economic Perspectives and Policy](#), the policy journal of American Agricultural and Applied Economics Association.

"Russia's unprovoked invasion of Ukraine has disrupted world commodity trading and has ramifications for many countries in terms of shortages and [price increases](#)," Rose said.

Significant findings include:

- Disruptions of Ukrainian exports will have the largest impact on its own economy, with a reduction in GDP of over \$858 million (a two-thirds of one percent decrease), in part because of its relatively large trade dependency.
- In contrast to Ukraine, the Russian economy will suffer a negative GDP impact of only \$3.8 million from disruptions of its own exports, primarily due to Russia's much lower disruption and trade dependency, as well as improvements in its terms of trade related to appreciation of the ruble.
- With grain [export](#) reductions from both Ukraine and Russia, the rest of Asia is projected to incur a \$573 million decrease in GDP, with the rest of Europe and the former Soviet Union, China, Africa and the Middle East also likely to incur GDP

losses.

- Other countries and regions, such as India, Canada and Latin America, are projected to grow in GDP as they fill some of the gap in grain exports from the war-torn countries.

The global negative impact on GDP would have been higher by another \$590 million during the first year of the war had the [Black Sea Grain Export deal](#) not allowed Ukraine to ship agricultural products through the Black Sea, said study co-author Dan Wei, research associate professor in the USC Price School and a CREATE Research Fellow.

Ukraine is the world's largest exporter of sunflower oil, fourth largest exporter of maize, and fifth largest exporter of wheat. The war prevented the harvest and/or transport to markets of 20-30% of Ukraine's winter crops from 2021, and farmers' capacity to plant crops for the spring and winter planting seasons in 2022 was seriously curtailed. It has been projected that the early grain harvest for 2023 in Ukraine could drop by 50 percent.

Russia is the world's number-one wheat exporter, according to the Observatory of Economic Complexity. However, its exports are only disrupted by 7.8%, in contrast to the more than 50% disruption to Ukraine wheat exports, the study authors said.

"We analyzed grains because of their humanitarian importance, but this is only the beginning of our research," said Rose. "The [economic impact](#) is going to be much greater when we take other commodities, like energy and metals, into account. Even then, the global impacts are not likely severe. They could become severe if the war lasts much more than a year, if supply-chain bottlenecks with metals continue to accelerate, and if energy commodity markets are further stunted and rattled."

Rose and his colleagues used a modeling approach that characterizes an

economy as a set of interrelated supply chains, where shortages or delays of a given good or service lead to ripple effects. For grains, these occur primarily "downstream," such as in food processing.

An additional co-author of the study is Dr. Zhenhua Chen, associate professor of city and regional planning, at The Ohio State University and a CREATE External Research Fellow. He also previously served as a CREATE post-doc at USC.

The study is part of the research project "Modeling the Economic Impact of Complex, Multi-Vector Disruptions to the Marine Transportation System and Supply Chains," funded by the DHS Center for Accelerating Operational Efficiency (CAOE) and performed in conjunction with researchers at another DHS research unit, The Command, Control and Interoperability Center for Advanced Data Analysis (CCICADA), headquartered at Rutgers University.

**More information:** Adam Rose et al, The economic impacts of Russia–Ukraine War export disruptions of grain commodities, *Applied Economic Perspectives and Policy* (2023). [DOI: 10.1002/aep.13351](https://doi.org/10.1002/aep.13351)

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