Food Security: the impact of export restrictions

James Fell and Andrew Duver

The Russian invasion of Ukraine, poor growing conditions in major exporter countries, and the impacts of the COVID-19 pandemic have contributed to high global food grain prices. This has raised food security challenges globally, with real food prices increasing 65% in the last two years and reaching the highest level since October 2012 (World Bank 2022a). The FAO estimated that around 720 to 811 million people faced hunger in 2020 (FAO et al. 2021) and high food prices will make conditions especially challenging for these people.

In response to high food grain prices, some governments have introduced export restrictions in an attempt to moderate domestic prices. The experience of the 2007–08 global food crisis demonstrates that export restrictions are detrimental to global food security, while providing questionable benefits to domestic food price stability. While governments are unable to influence global growing conditions, governments can take steps to improve global food security by proactively eliminating export restrictions and other distortions to global markets.
High grain prices and export restrictions creating food security crisis

Russia’s invasion of Ukraine has contributed to a surge in world grain prices, particularly for wheat, barley and corn. World supply of wheat had already fallen due to dry weather in the northern hemisphere. ABARES forecasts that prices are likely to remain high during the remainder of the 2021–22 financial year, easing slightly when the northern hemisphere wheat harvest commences in June (ABARES 2022).

Ukraine is a major exporter of wheat, barley and corn (Figure 2). The inability of grain-laden vessels to embark from Ukraine’s Black Sea ports has cut the supply of grain on world markets. At the same time, there is uncertainty around exports of wheat and barley from Russia, as a result of its invasion of Ukraine. This has contributed to a reduced supply of wheat, barley and corn on world markets, and added to the rise in prices. After initially spiking following the invasion, prices have fallen back slightly, but remain elevated. Wheat prices rose further when India announced wheat export restrictions in mid-May. This scenario is made worse by poor production prospects in some growing regions and high input prices.

**FIGURE 2** Top five wheat exporters, world, 2010–11 to 2021–22f

Source: ABARES; International Grains Council; USDA

**FIGURE 1** War in Ukraine exacerbated grain price rises

Source: International Grains Council
Unlike 2007–08, rice markets have been largely unaffected. The global benchmark rice price is now 15% lower than when the war began. This reflects a different supply and demand situation to wheat, barley and corn, with a combined favourable production and stocks outlook for rice in the key exporters.

Further to these supply and export issues, fertiliser prices have increased significantly since early 2021, driven by rising energy costs. For example, since April 2021 diammonium phosphate (DAP) prices have increased almost 80% while urea prices have increased more than 180%, surpassing the 2008 peak (World Bank 2022b). As a major input to food production, rising fertiliser costs are likely to be at least partially passed through to consumers in the form of higher food prices.

From this definition, four main dimensions of food security can be identified: 1. availability, 2. access, 3. utilisation (nutrition) and 4. stability (FAO 2006).

- Russia’s invasion of Ukraine hinders availability by reducing Ukraine’s ability to supply grain.
- Access entails physical and economic access to food. The war raises the price of food grains, hindering access.
- Export restrictions since the beginning of the war hinder the stability of global food grain markets, by cutting the size of the global food supply market and driving up prices.

**FIGURE 3 The key elements of food security**

Source: Adapted from FAO (2006)
Global grain prices spiked in 2007–08, the last global food crisis. Headey & Fan (2010) from the International Food Policy Research Institute outlined what caused the crisis, which "seriously threatened the world’s poor, who struggle to buy food even under normal circumstances, and led to protests and riots in the developing world." They attributed the food price rises to increasing energy prices, growing demand for biofuels, unfavourable weather, panic purchases and macroeconomic factors such as the US dollar depreciation and low interest rates. Droughts in Ukraine and Australia were also significant contributors.

Analysis across various bodies of research has demonstrated that changes in policy measures exacerbated world price increases in the 2007–08 food crisis. While estimates of the magnitude of influence differ, the policy implications are clear: export restrictions contributed to the 2007–08 food crisis. Table 2 documents three studies that examined the contribution of policy, which accounted for 34–52% of the price rise for rice, 5–30% for wheat and 9–18% for corn. Table 3 shows selected export measures put in place during 2007–08 (Bouët & Laborde 2010).

**TABLE 1** The last major food crisis occurred in 2007–08

<table>
<thead>
<tr>
<th>2007–08 Food Crisis</th>
</tr>
</thead>
<tbody>
<tr>
<td>33 countries introduced export restrictions</td>
</tr>
<tr>
<td>19% share of world market of calories affected by export bans/taxes/licensing</td>
</tr>
<tr>
<td>59% Rise in FAO Food Price Index Jul 06 to Jun 08</td>
</tr>
<tr>
<td>12% share of world market of calories restricted by actual export bans</td>
</tr>
</tbody>
</table>

Source: Laborde & Mamun (2022)

**TABLE 2** Analysis shows the increase in world prices attributed to policy measures in the 2007–08 food crisis

<table>
<thead>
<tr>
<th>Study</th>
<th>Wheat</th>
<th>Rice</th>
<th>Corn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Martin &amp; Anderson (2012)</td>
<td>30%</td>
<td>45%</td>
<td>n/a</td>
</tr>
<tr>
<td>Anderson et al. (2013)</td>
<td>16–18%</td>
<td>51–52%</td>
<td>17–18%</td>
</tr>
<tr>
<td>Jensen &amp; Anderson (2017)</td>
<td>5%</td>
<td>34%</td>
<td>9%*</td>
</tr>
</tbody>
</table>

Note: *coarse grains
Export restrictions include two categories: quantitative restrictions and taxes. Export taxes require an exporter to pay a tax to the government in order to export, which reduces the profit from exporting and reduces the incentive to export, in favour of supplying the domestic market. Quantitative restrictions include export bans and quotas. These are the most pernicious variety of restriction, as they can cut off supplies to the world market entirely. Export licensing is also a quantitative restriction when a government requires a licence for exporting and then restricts the allocation of licences.

Attribution of commodity price speculation as a cause of the crisis has been attempted (see, for example, Robles et al. (2009)), but is controversial. The counterpoint is that speculation merely speeds up the functioning of markets, providing a stabilising effect (see, for example, Bohl & Stephan (2013) and Bohl et al. (2019)). Headey & Fan (2010) refute underlying statistical methods that suggest speculators played a role, and further found “it unlikely that they [speculators] were a driving force, if only because we have substantial confidence in several of the more tangible explanations of the crisis.”

Why are export restrictions bad for global food security?

Export restrictions reduce the supply of food available on world markets. As a result, food availability for importers is lower. Furthermore, lower supply means that importers must pay higher prices to access supplies. Export restrictions also prevent producers in that country from benefiting from higher global prices, which removes their incentive to increase production through additional planting or productivity-boosting investment. Export restrictions also reduce exporters’ ability to benefit from high export prices to offset higher costs for imported inputs (such as fuel and fertiliser) and so can actually make domestic production less commercially viable.

Export restrictions raise volatility on world markets. Fewer purchasing options are available to buyers meaning buyers are inclined to snap up what supplies they can get—buyers are less responsive to price changes and are likely to pay higher prices. Export restrictions can reduce confidence in international markets as a source of supply, increasing perceptions about risk, or the fear of missing out, further fuelling price rises.

### Table 3: Selected export measures documented by Bouët & Laborde (2010)

<table>
<thead>
<tr>
<th>Date introduced</th>
<th>Country</th>
<th>Commodity</th>
<th>Restriction</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>India</td>
<td>Rice</td>
<td>Export price floor</td>
</tr>
<tr>
<td>Oct</td>
<td>India</td>
<td>Rice</td>
<td>Export price floor</td>
</tr>
<tr>
<td>Dec</td>
<td>India</td>
<td>Rice (non-basmati)</td>
<td>Export ban</td>
</tr>
<tr>
<td>2008</td>
<td>Kazakhstan</td>
<td>Grains</td>
<td>Export tax</td>
</tr>
<tr>
<td>Feb</td>
<td>Russia</td>
<td>Wheat</td>
<td>Export tax rise</td>
</tr>
<tr>
<td>Mar</td>
<td>India</td>
<td>Rice (non-basmati)</td>
<td>Export ban</td>
</tr>
<tr>
<td>Mar</td>
<td>India</td>
<td>Rice (basmati)</td>
<td>Export price floor</td>
</tr>
<tr>
<td>Mar</td>
<td>Vietnam</td>
<td>Rice</td>
<td>Export ban</td>
</tr>
<tr>
<td>Apr</td>
<td>Argentina</td>
<td>Grains</td>
<td>Export tax</td>
</tr>
<tr>
<td>Apr</td>
<td>Argentina</td>
<td>Grains</td>
<td>Export licensing (extended)</td>
</tr>
<tr>
<td>Apr</td>
<td>Brazil</td>
<td>Rice</td>
<td>Export ban</td>
</tr>
<tr>
<td>Apr</td>
<td>Kazakhstan</td>
<td>Wheat</td>
<td>Export ban</td>
</tr>
<tr>
<td>May</td>
<td>Thailand</td>
<td>Rice</td>
<td>Export ban</td>
</tr>
</tbody>
</table>

Economic modelling demonstrates that export restrictions are bad for food security. On a global level, when multiple countries introduce trade-restricting measures (such as export restrictions) in attempts to reduce price volatility domestically, it leads to increased global price volatility (Martin & Glauber 2020; Giordani et al. 2016). Jensen & Anderson’s (2014) modelling demonstrated that policies, such as export taxes, that attempt to insulate a country from volatility on world markets “...are rather ineffective in achieving their stated aim of avoiding large domestic price rises when international food prices spike” if other countries implement similar policies. This highlights the importance of a coordinated and strong global trading system that works together to limit policy interventions on trade, thus preventing excessive price volatility and improving stability of food supply.

**Evidence shows that export restrictions do not achieve their goals**

Countries introduce export restrictions to reduce the impact of higher world prices on their domestic market. When world prices are high, food exporting countries can ‘import’ food price inflation. This is because domestic buyers must offer the same high prices to a seller, or the seller will only export. Introducing export restrictions alters the seller’s returns by reducing the profitability (or removing the option) of exporting. For an individual country, this encourages sellers to supply greater quantities to the domestic market, putting downward pressure on domestic prices.

However, if such restrictions are applied across multiple countries, accounting for a large share of the market, increases in world price can offset any benefits an individual country might enjoy from acting in isolation (Martin & Anderson 2012). This is supported by Yu et al. (2017) who found that the trade policy interventions introduced during the 2007–08 food crisis exacerbated increases in world prices. These policy interventions included a mixture of export taxes, bans and quotas, as well as import tariffs and quotas. In practice, the magnitudes and types of export restrictions imposed will have different effects. For example, compared to export taxes, export bans are more effective at insulating domestic markets from world prices but are more harmful to producers in those countries and have a greater impact on world supply.

Nevertheless, governments can still face domestic political pressure to take domestic policy actions against rising food prices. While there might be public demand to restrict exports, such reactions taken by numerous countries will ultimately exacerbate global food price increases, adversely affect producers that export, and have longer terms effects on the whole economy and development of an agricultural sector.

**Why are export restrictions ineffective domestically?**

In addition to the short run effects discussed above, export restrictions can fail in the long run for three reasons:

1) A vicious cycle takes hold where other countries introduce restrictions, spiralling world prices even higher (see below). Giordani et al. (2016) explore the motivations and behaviour behind this vicious cycle. These higher world prices can be transmitted to domestic prices in cases where trade is not banned, just taxed (in the case of export taxes).

2) Prices of inputs also rise. The high world prices may spur higher demand for inputs such as fertiliser, fuel and machinery. The rise in input prices flows through to higher production costs but with lower prices for producers.

3) Interfering with the incentives of buyers and sellers in the economy can distort economic activity away from what the country is comparatively best at. This cuts long run economic development and income growth. The lower returns to agricultural production lead to reduced investment in the agricultural sector. This in turn leads to lower long run agricultural production, entirely contrary to the policymaker’s original food security ambitions.

The OECD (2020) found that greater reliance on local production in an economy led to greater vulnerability to shocks. Cao et al. (2021) found that protecting the domestic economy from global shocks (as opposed to trade-openness) was expensive—it lowered aggregate incomes—and did not significantly reduce volatility. This demonstrates that export restrictions do not support domestic food security, given the implications for access (via incomes) and stability. Having free and open trade through multiple trading relationships gives producers options to overcome shocks.
Cutting export restrictions improves global food security

Export restrictions do not support domestic food security, as explained above. Removing export restrictions increases the availability of food to the world and increases the stability of food supplies.

Given the surplus of food at a global level, agricultural trade provides a more stable supply than dependence on local production: crop failure in one area need not lead to famine, or even to reduced food consumption. At a national level, for example, Burgess & Donaldson (2010) found that increased trade between regions in India reduced the incidence of famines. Similarly, at the regional level, analysis undertaken by the OECD (2017) found that integration of ASEAN rice markets could reduce the undernourished population of modelled countries by 5%. As put by Martin & Glauber (2020), “world output is much less volatile than output in individual countries”.

Recently some countries introduced export restrictions

Around 24 countries have introduced export restrictions (including export bans and export licensing) during the Ukraine-Russia crisis, affecting roughly 16% of global calorie markets (Laborde & Mamun 2022). Export restrictions now affecting a similar share of global calories traded as in the 2008 food crisis. Active export bans are in place on wheat from India, Kazakhstan and Russia. Notably, India will make special dispensation for wheat exports that fulfil importers’ food security needs.

A detailed listing of export restrictions is available on the Food & Fertilizer Export Restrictions Tracker at https://public.tableau.com/shared/CJYC998JN.

**FIGURE 4** Export restrictions are increasing

![Graph showing the increase in export restrictions over time](image)

Source: Laborde & Mamun (2022)
Alternative options

Supporting food security means enhancing all four elements of availability, access, utilisation and stability. The 2007–08 food crisis demonstrated an important role for governments in relation to these four elements. This was in the areas of short-term humanitarian aid (enhances availability and access), market transparency (enhances availability and access), development assistance (access) and cutting trade barriers (utilisation/nutrition and access).

Provision of humanitarian aid in the short term

In addition to the high prices and poor availability, macroeconomic factors (e.g. energy prices, COVID-19) have hampered economic growth, and thereby incomes, hindering access to food. Furthermore, a trait of food grain markets is the significant lag between the initial production decision (planting) and completion of production (harvest), taking around 150 days for wheat. The provision of targeted support to vulnerable households, through cash transfers and food assistance, can strengthen interim access to food until markets can respond to price signals and export restrictions are removed. In the case of international food aid, consideration must be given to the potential to displace commercial trade and production, as per the tenth WTO Ministerial Conference in Nairobi (WTO 2015) and in the interests of improving food security.

Supporting market transparency

A key role played by governments and international organisations like the International Grains Council, the G20’s Agricultural Market Information System (AMIS) initiative, and the UN Food and Agriculture Organization, is to provide information on where supplies exist (and where supplies have been restricted), and where demand is. The 2007–08 crisis demonstrated the need for market transparency, giving rise to AMIS. Supporting market transparency helps markets price in all information and uncertainty more efficiently—when a price spike occurs (e.g. caused by war or export restrictions), transparency supports prices to adequately reflect global supply and demand.

Supporting development

Development assistance, such as infrastructure investment, in developing countries can cut the cost of accessing food. Examples of such assistance are funding improved transport infrastructure to enable farmers and market actors to reduce the cost of transport associated with food transportation, increase the quality of food arriving to markets (due to reduced transport times), allowing consumers to receive better quality food more cheaply and enhance the resilience of food supply chains. Supporting the availability and access to quality planting material inputs (e.g. seeds and seedlings) domestically can also assist with increasing farmer resilience and ability to diversify production in response to market signals, or quickly replant after harvests are damaged or destroyed (e.g. after natural disasters).
Cutting trade barriers

Advocating for the removal of export restrictions will help support food security. Under Article 11 of the General Agreement on Tariffs and Trade, countries may temporarily apply export restrictions to relieve food shortages. Capturing the benefits from open trade will require continued investment in refining these rules through the World Trade Organisation and continued cooperation through other international organisations.

In importing countries, trade barriers raise the price of food for consumers. While global average tariffs in agriculture have fallen (Fell 2022), the number of non-tariff policy measures have risen (Figure 6). These non-tariff measures can reduce utilisation by restricting access to a variety of different food required for a balanced diet.

References

ABARES 2022, Agricultural Commodities: March quarter 2022, Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra.


Cao, L, Fell, J, Eather, J & Greenville, J 2021, Understanding effects of supply disruptions on globally and locally focused economies, ABARES research report 21.03, Australian Bureau of Agricultural and Resource Economics, Canberra.


World Bank 2022a, Commodity Markets, Monthly Prices, Washington DC

World Bank 2022b, Fertilizer prices expected to remain higher for longer, World Bank Blogs, Washington DC

WTO 2015, Tenth WTO Ministerial Conference, Export Competition, Nairobi


Fell, J, 2022, Australia’s future agricultural trade advantage, ABARES Insights 22.2, Australian Bureau of Agricultural and Resources Economics and Sciences, Canberra.


Food security: the impact of export restrictions

ABARES Insights

The Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) is the research arm of the Australian Government Department of Agriculture, Water and the Environment. Our mission is to provide professionally independent data, research, analysis and advice that informs public and private decisions affecting Australian agriculture, fisheries and forestry.

ABARES performs applied economic and scientific research, through developing innovative modelling techniques, undertaking comprehensive surveys and developing internationally recognised data management processes.

Ownership of intellectual property rights

Unless otherwise noted, copyright (and any other intellectual property rights, if any) in this publication is owned by the Commonwealth of Australia (referred to as the Commonwealth).

Creative Commons licence

All material in this publication is licensed under a Creative Commons Attribution 4.0 International Licence except content supplied by third parties, logos and the Commonwealth Coat of Arms.

Inquiries about the licence and any use of this document should be emailed to copyright@awe.gov.au.

Citation and cataloguing data

This publication (and any material sourced from it) should be attributed as: Fell, J, Duver, A, Food Security: the impact of export restrictions, ABARES Insights, Canberra. DOI: https://doi.org/10.25814/ngtv-n935, CC BY 4.0.

ISSN: 2209–9123

Internet

Food security: the impact of export restrictions is available at awe.gov.au/abares.

Contact

Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES)

Postal address: GPO Box 858 Canberra ACT 2601
Switchboard: 1800 900 090
Email: info.abares@awe.gov.au
Web: awe.gov.au/abares

Inquiries about the licence and any use of this document should be sent to copyright@agriculture.gov.au.

Disclaimer

The Australian Government acting through the Department of Agriculture, Water and the Environment, represented by the Australian Bureau of Agricultural and Resource Economics and Sciences, has exercised due care and skill in preparing and compiling the information and data in this publication. Notwithstanding, the Department of Agriculture, Water and the Environment, ABARES, its employees and advisers disclaim all liability, including liability for negligence, for any loss, damage, injury, expense or cost incurred by any person as a result of accessing, using or relying on any of the information or data in this publication to the maximum extent permitted by law.

Professional independence

The views and analysis presented in ABARES publications, including this one, reflect ABARES professionally independent findings, based on scientific and economic concepts, principles, information and data. These views, analysis and findings may not reflect or be consistent with the views or positions of the Australian Government, or of organisations or groups who have commissioned ABARES reports or analysis. More information on professional independence is provided on the ABARES website at awe.gov.au/abares/about/research-and-analysis#professional-independence.

About the author

James Fell

James Fell is an economist at ABARES who specialises in agricultural trade research, with a focus on non-tariff measures, China and data analysis. Prior to ABARES, James worked as an economist at the International Grains Council producing analysis and forecasts for global grains markets, specialising in rice and barley. James was previously ABARES’ wheat analyst.

Academic research published by James focusses on the welfare effects of agricultural trade liberalisation and on the quantification of non-tariff measures.

Andrew Duver

Andrew joined ABARES in 2019 and works as a research economist in the Agricultural Forecasting and Trade Branch. His work has covered commodity market analysis and global market competitiveness.

Prior to joining ABARES, Andrew had a career in the private sector investment industry as an asset manager. He has an honours degree in economics and econometrics from Monash University.