Special Feature: Commodity Market Developments and Forecasts

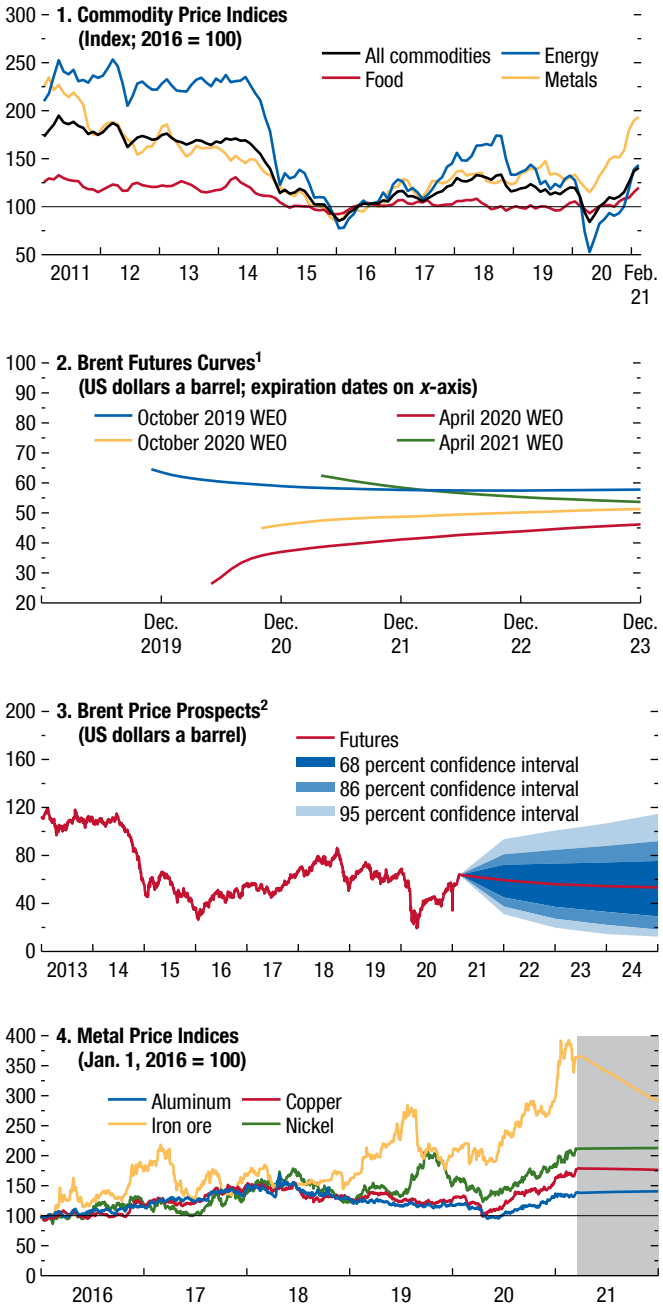
The IMF's primary commodity price index increased by 29 percent between August 2020 and February 2021, the reference period for the current World Economic Outlook *(WEO) (Figure 1.SF.1, panel 1). The broad-based increase, led by energy commodities, followed announcement of effective COVID-19 vaccines last November and continued until January despite renewed lockdowns that weakened the demand outlook, especially for petroleum products. This special feature also includes an in-depth analysis of food security.*

The Oil Market Rebalance Continues, while Natural Gas Prices Showed Seasonal Volatility

Oil prices increased by 39 percent between August 2020 and February 2021 on positive vaccine news and the rapid economic recovery in Asia. A resurgence of COVID-19 cases and difficulties in vaccine rollout at the beginning of the year weakened the oil demand outlook and led the OPEC+ (Organization of the Petroleum Exporting Countries, including Russia and other non-OPEC oil exporters) coalition to review more prudently the relaxation of the 7 million barrels a day production curbs announced in April 2020 (see the October 2020 WEO).

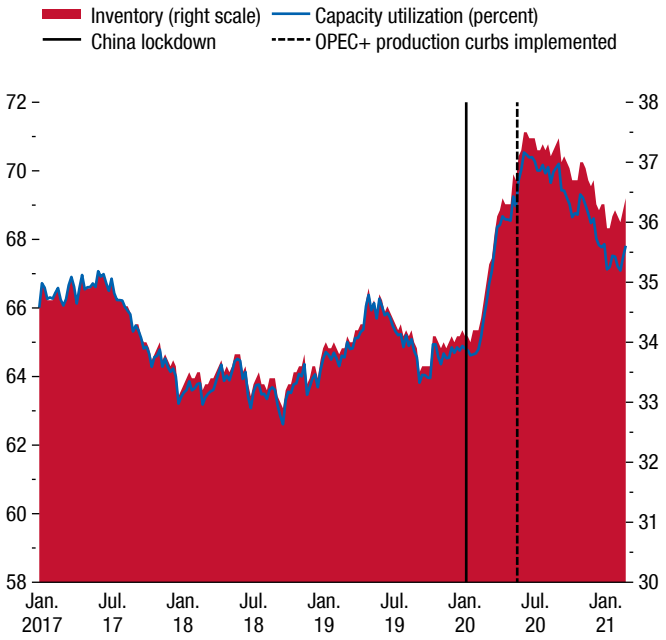
Futures markets point to *backwardation* (a downward sloping futures curve), with oil prices at $58.5 a barrel in 2021—42 percent higher than the 2020 average—falling to $50.7 in 2025. This is mostly because of a temporary tight demand-supply balance expected this year—in line with International Energy Agency projections of a steady decline in oil inventories, with oil demand (supply) projected at 96.4 million barrels a day (95.5 million barrels a day) in 2021. Although oil prices persistently above $60 a barrel may induce a substantial production recovery of higher-cost producers in non-OPEC+ countries, including of US shale oil, most of them seem focused on balance sheet repair. Risks to oil prices are slightly tilted to the upside as upside risks from large cuts in oil and gas upstream investments exceed downside risks from a setback in global oil demand recovery, still elevated inventories, and, in the medium term, a breakdown of the OPEC+ coalition (Figure 1.SF.1, panels 2 and 3, and Figure 1.SF.2).

Figure 1.SF.1. Commodity Market Developments



Sources: Bloomberg Finance L.P.; IMF, Primary Commodity Price System; Refinitiv Datastream; and IMF staff estimates.
Note: WEO = *World Economic Outlook*.
[1]WEO futures prices are baseline assumptions for each WEO and are derived from futures prices. April 2021 WEO prices are based on February 12, 2021, closing.
[2]Derived from prices of futures options on February 18, 2021.

Figure 1.SF.2. Global Oil Inventory



Sources: KPLER; and IMF staff calculations.
Note: Inventory is expressed in days of 2019 oil consumption. OPEC+ = Organization of the Petroleum Exporting Countries, including Russia and other non-OPEC oil exporters.

Natural gas prices showed strong weather-induced seasonal volatility. Asian liquefied natural gas prices spiked to almost $40 per million British thermal units (MMBTU) in January 2021, spilling over to European prices (for example, the Dutch Title Transfer Facility price rose to $7.3 per MMBTU), while US Henry Hub spot prices reached $17.5 per MMBTU as a cold snap crippled shale gas output in Texas amid strong electricity demand in mid-February. High natural gas price volatility sustained the power sector's demand for thermal coal. South African coal prices were also boosted by strong Indian steel and cement industry demand. Phaseout plans and rising emission costs continue to weigh on the demand outlook for coal over the medium term.

Base Metal Prices Rallied on a Stronger Recovery in Industrial Production

Base metal prices increased by 30 percent between August 2020 and February 2021. The resurgent industrial activity in China and other advanced economies, coupled with optimism about US fiscal stimulus, boosted sentiment toward metals. The prices of copper and iron ore, heavily used in the construction and manufacturing sectors, increased by 30 percent and 35 percent, respectively. The strong demand for electric vehicles also pushed up prices of metals, such as cobalt and nickel, that are used in their batteries. Precious metal prices decreased by 6 percent after reaching highs in August 2020 as demand for safe assets faded.

The IMF base metal price index is projected to increase by 32.1 percent in 2021 and decrease by 4.5 percent in 2022. Uncertainty over the speed of the global economic recovery and potential production and trade disruptions due to the pandemic are the main risks to the forecast (Figure 1.SF.1, panel 4). Precious metal prices are expected to increase by 6.0 percent in 2021 and by 0.4 percent in 2022 because monetary policies are expected to continue to be accommodative.

Disappointing Crops and Precautionary Stockpiling Sent Food Prices Higher

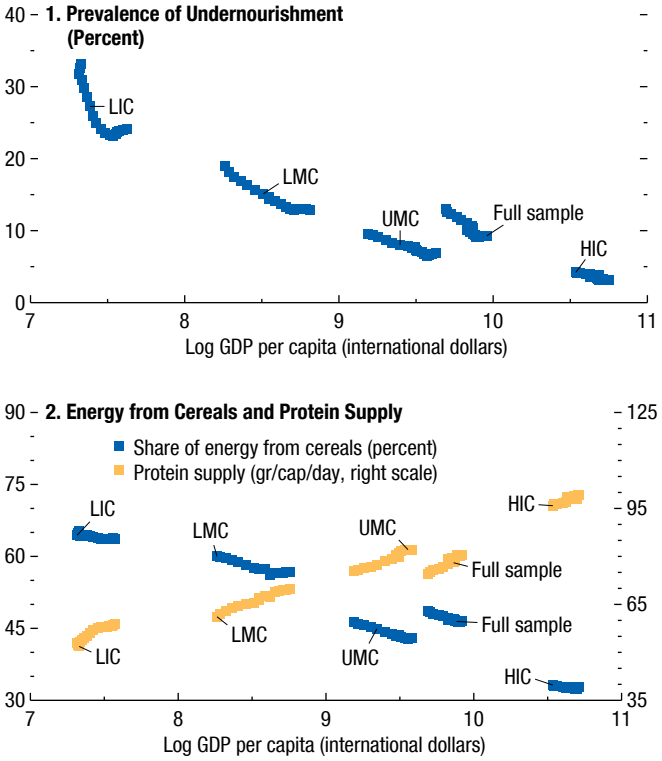
The IMF's food and beverage price index increased by 20 percent, led by vegetable oils and cereals, which rose by 45 percent and 41 percent, respectively. The second half of 2020 saw a surge in prices of many staple crops, including wheat, corn, soybeans, and palm oil, reversing an earlier trend of stable or declining prices over the first months of the pandemic when large global supplies and weaker demand weighed on prices.

Soybean and corn prices surged by more than 50 percent between August 2020 and February 2021. These prices were supported by weaker-than-expected harvests, first in the United States and more recently in South America, and strong demand from China, which is seeking to rebuild its hog population after an outbreak of African swine fever in 2019. Wheat increased by 38 percent, following dry winter wheat conditions across the US Great Plains, a small 2020 crop in the European Union, and strong stockpiling demand. Wheat prices received further support from a looming Russian export tax, scheduled between February 15 and June 30 this year, aimed at combating domestic food price inflation.

Food (In)security: Collateral Damage of the Pandemic?

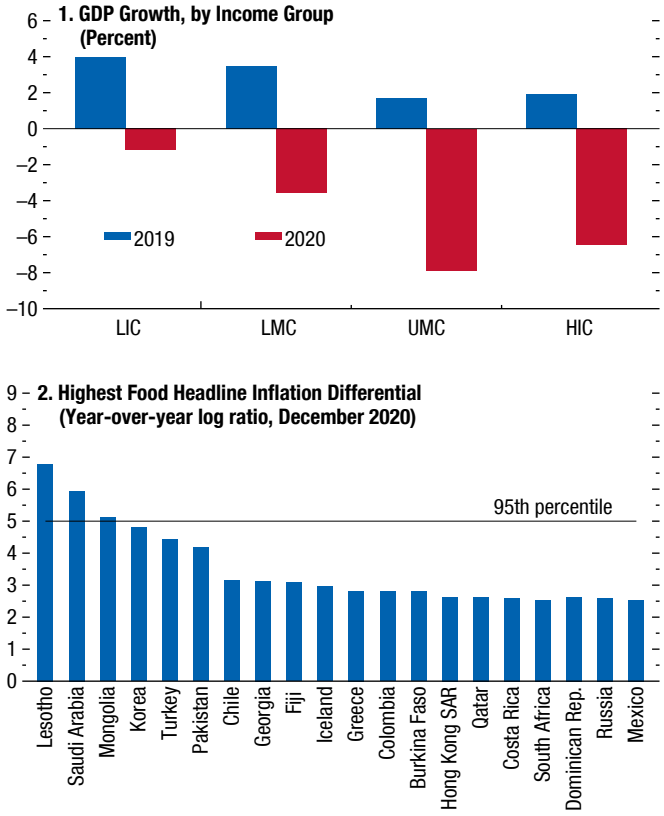
Changes in access to and availability of food (*food security*) have been important across human

Figure 1.SF.3. Undernourishment, Diet Composition, and Income



Sources: Food and Agriculture Organization; World Bank; and IMF staff calculations.
Note: The statistics refer to the estimation sample. Data labels use World Bank income group classification. Gr/cap/day = grams per capita a day; HIC = high income; LIC = low income; LMC = lower middle income; UMC = upper middle income.

Figure 1.SF.4. The Impact of the Pandemic



Source: IMF staff calculations.
Note: In panel 1, data labels use World Bank income group classification. Data are simple averages of each group. In panel 2, the horizontal line is the 95th percentile for the food headline inflation differential since January 2015, which is 5 percent. HIC = high income; LIC = low income; LMC = lower middle income; UMC = upper middle income.

history, not only for their impact on people's health and their ability to thrive, but also by catalyzing political change and triggering conflict. The first world food crisis of modern times, between 1972 and 1975, led to 2 million hunger-related deaths and the violent toppling of incumbent governments. The increase in global food prices in the late 2000s ignited a series of anti-government protests that spread across the Middle East and North Africa.

Food (in)security also has significant repercussions on economic development. Undernourishment, especially in childhood, can have negative effects on physical and cognitive development, limiting educational attainment and lifetime earning potential, possibly perpetuating inequality (Atinmo and others 2009). When the phenomenon is widespread across the population, it can reduce human capital accumulation and potential growth (Fogel 2004).

Despite the progress of the past two decades, undernourishment is still elevated in many countries (Figure 1.SF.3). The quality of institutions and income per capita are major long-term determinants (Timmer 2000); however, economic cycles, such as downturns, tend to exacerbate food security problems, halting progress and even reversing past gains. The ongoing global health crisis, by leading to a dramatic fall in incomes (Figure 1.SF.4), has thus raised serious concerns about access to food in some regions and for some segments of the population. In some cases, disruptions in food supply chains have exacerbated the problem, reducing the availability of food and raising domestic food prices (Figure 1.SF.4). The COVID-19 pandemic thus risks erasing decades of progress in reducing undernourishment globally, which jeopardizes United Nations Sustainable Development Goal No. 2 (bringing the number of undernourished people to zero by 2030).

This Special Feature tries to answer the following questions: How is food insecurity affected by fluctuations in GDP and food prices? How effective are social transfers in containing increases in undernourishment in the short term? What drives domestic food price inflation?

What Is Food (In)security?

According to the United Nations, there is food and nutrition security if all people at all times have "physical, social and economic access to sufficient, safe and nutritious food that meets their preferences and dietary needs for an active and healthy life" (CSF 2012). Absent these conditions, food insecurity arises.

This Special Feature focuses on the two dimensions of food security that are measurable and economically relevant: (1) caloric intake, proxied by "prevalence of undernourishment," which is the share of households with a caloric intake below a given threshold; and (2) diet composition (proxied by the cereal contribution to the overall caloric intake and protein supply).[1]

The next section studies how undernourishment and diet vary with fluctuations in economic activity and food prices and whether they react to countercyclical stabilizers, such as spending on social transfers.

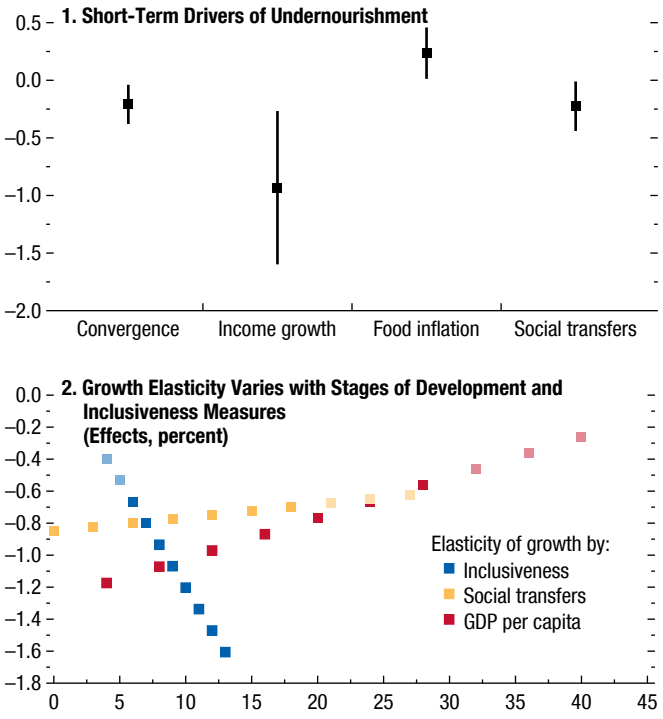
The Business Cycle Determinants of Food (In)security

Four main candidate factors have been selected to explain *changes* in the prevalence of undernourishment (Timmer 2000): (1) GDP per capita growth (to capture household income), (2) food price inflation (to capture food supply and external factors), (3) initial conditions, and (4) social transfers (government policies aimed at protecting the vulnerable segments of the population).

Results indicate that GDP growth is the most important driver of fluctuations in undernourishment (Figure 1.SF.5). A 1 percentage point increase in GDP growth drives down undernourishment by 0.95 percent. The elasticity of undernourishment to GDP growth becomes more sizable for poorer countries but vanishes for high-income countries. This happens because a bigger share of the population is closer to undernourishment in middle- and low-income countries. Higher inequality reduces the elasticity of undernourishment to GDP growth, suggesting that the same process that during good times makes growth more inclusive reverts when growth declines or the economy contracts.

Food price inflation is also relevant: a typical 2 percentage point increase in food price inflation tends to increase undernourishment by 0.24 percent.[2] Food inflation remains especially relevant for countries with per capita income between $10,000 and $20,000 (2017 purchasing-power-parity dollars) as these countries usually have a high weight of food in the consumer price index (see Online Annex 1.1, available at www.imf.org/en/Publications/WEO). Social protection is a valuable shield against income and food price shocks as it mitigates their effects for a given level of

Figure 1.SF.5. Food Insecurity and the Business Cycle



Sources: Food and Agriculture Organization; and IMF staff calculations.
Note: In panel 1, the vertical lines show the 95 percent confidence intervals. Coefficients have been adjusted for the different variability of each regressor. In panel 2, the *x*-axis includes social transfers (as percent of GDP), inclusiveness (income share to the bottom 20 percent), and GDP per capita (thousands of international dollars). Statistically significant effects are shown by darker squares.

[1]Prevalence of undernourishment is measured by the Food and Agriculture Organization and is defined as the share of the population whose habitual food consumption is insufficient to provide adequate energy levels.

[2]Food inflation and changes in social transfer are two and eight times more volatile, respectively, than GDP growth in the econometric sample.

economic development. Moreover, social transfers have a direct positive effect in reducing undernourishment (Figure 1.SF.5).[3]

Finally, diet composition matters. Before descending into undernourishment when incomes decline, households change their diet by moving to cheaper staple foods. This margin of adjustment is quantitatively relevant in the econometric results (see Online Annex 1.1). Negative GDP shocks tend to increase cereal consumption and decrease protein consumption as cereals are cheaper than animal protein. Changes in diet habits, however, are often perceived by lower-middle-income people as a descent into poverty—a major factor in raising social tension.

Determinants of Food Inflation

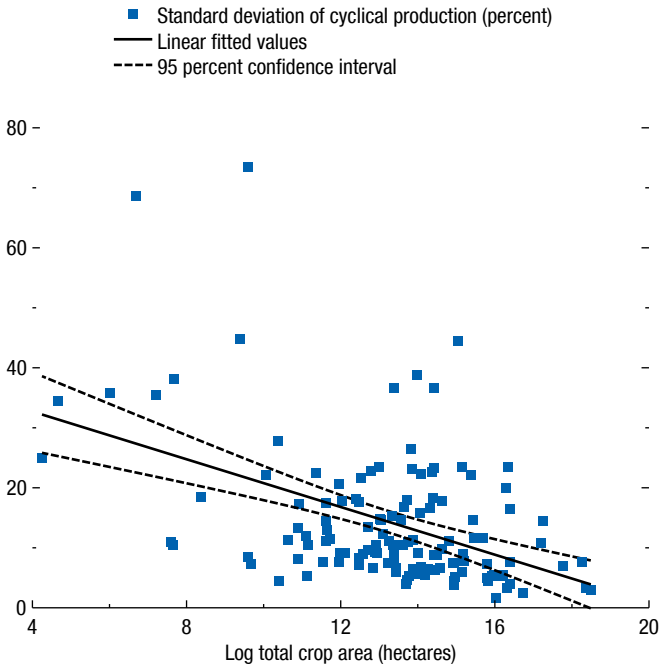
To analyze major determinants of domestic food inflation, this section uses a sample of 121 countries between 2001 and 2018, where annual food consumer price index inflation is regressed on world food price inflation, exchange rate appreciation against the US dollar, trend headline inflation (to control for monetary factors), and food supply shocks.

Econometric results show that the annual pass-through from international food prices to the domestic food consumer price index is about 0.26 for middle- and low- income countries and 0.14 for high-income countries. Not surprisingly, the pass-through is far below 1.0, given that the transmission of international price variations across borders is often limited by taxes, subsidies, price controls, weak market integration, and local distribution costs. Similarly, the exchange rate pass-through is larger for middle- and low-income countries (0.23) than for high-income countries (0.08).

Even though external factors are relevant, food production is mostly consumed domestically. In fact, domestic food price shocks are an important driver of food price inflation. Moreover, countries with a small arable area tend to experience relatively larger shocks (Figure 1.SF.6). A typical domestic food production shock increases food inflation by about 0.3 percentage point, and the same shock on a regional scale increases food inflation by 0.7 percentage point (Table 1.SF.1).

[3]In terms of how countries move together, convergence from high initial shares of undernourished is slow in absence of other improvements, about 0.4 percentage point year for a typical low-income country that starts with a 20 percent share of population undernourished.

Figure 1.SF.6. Small Crop-Area Countries Experience Larger Production Shocks



Sources: Food and Agriculture Organization; World Bank; and IMF staff calculations.

Even though heavy reliance on food imports can leave a country more affected by external factors, the increase in the pass-through is rather small and not significant in the econometric analysis. However, high dependence on food imports tends to mitigate the impact of domestic food production shocks on food prices (see Online Annex 1.1).

Additional evidence that food trade can improve welfare comes from a simple observation: domestic food production shocks have a low correlation with those in other countries and especially with global food production shocks (Table 1.SF.2). Given that a regional

Table 1.SF.1. Food Supply Shocks' Impact on Food Inflation

	Domestic	Regional	World
Food Inflation Elasticity	–0.02	–0.13	–0.15
Supply Shock	–16.34	–5.84	–2.06
Impact on Food Inflation	0.28	0.73	0.31

Sources: International Energy Agency; and IMF staff calculations.
Note: The table shows the food inflation effects of negative food supply shocks at different aggregation levels (domestic, regional, and rest of the world). The "impact" is the product of the food inflation elasticity and the supply shock.

Table 1.SF.2. Food Supply Shocks Correlations

	Domestic	Rest of the Region
Domestic	1.00	
Rest of the Region	0.20	1.00
Rest of the World	0.00	0.02

Sources: Food and Agriculture Organization; US Department of Agriculture; and IMF staff calculations.
Note: Food production is the sum of production of maize, rice, soybeans, and wheat (in calorie terms). For each country domestic shocks are calculated as deviations from its Hodrick-Prescott production trend for 1990–2018. Rest-of-the-region shocks represent the population-weighted average of the shocks of other countries in the region. Rest-of-the-world shocks are constructed analogously. Standard World Bank classification is used for the regions.

food supply shock has a larger impact than a domestic one, food trade integration should extend beyond the region.

Conclusions

Income is the most important driver of food (in)security in low-income countries and some emerging markets. The COVID-19 pandemic, therefore, risks delaying the process of bringing the number of undernourished people to zero by 2030. Absent policy interventions, the 2020 decline in income and increase in food prices would lead, respectively, to a 62 million and 4 million increase in the number of hungry people. Governments should thus strengthen safety nets for the most vulnerable and mitigate the risk of food price spikes by guaranteeing the smooth functioning of food supply chains. Smaller food producers should exploit international food markets to smooth the impact of domestic production shocks on local food prices. This is particularly relevant as climate change is increasing the volatility of those shocks. International food markets should be kept open and food exporters should avoid export restrictions that exacerbate the global price impact of food production shocks and undermine confidence in international food markets. Finally, given that trade is not a hedge against *global* food supply shocks, governments must take alternative measures that stimulate sufficient strategic food reserves at the regional level and encourage the development and adoption of more climate-resilient crops and production methods.