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Macroeconomic Impact of the War in Ukraine and of High Commodity Prices Across Countries

Markus Haacker

Abstract

The war in Ukraine was associated with large changes in the prices of key food and fuel commodities (wheat, maize, coal, gas, and oil) in 2022 which produced macroeconomic gains for exporters and losses as import costs increased. Across 49 countries benefitting, these gains averaged about 8 percent of GDP and reach up to 36 percent of GDP. In contrast, 125 countries suffered direct losses between 0 percent of GDP and 5 percent of GDP, and 10 countries losses between 5 percent of GDP and 10 percent of GDP.

Economic performance was significantly worse among countries experiencing losses from the commodity price shock. An increase in the costs of imports of 1 percent of GDP was associated with lower GDP growth (minus 0.1 percent) and a weakening fiscal balance. Most significantly, GDP in countries experiencing losses in the form of higher import costs bought less when measured against the consumer price index (a loss of 0.75 percent for each percent of GDP in increased import costs). This price effect wiped out all gains from real GDP growth for high-income countries experiencing a negative commodity price shock and resulted in declining living standards for low-income countries relying on imports.

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Macroeconomic Impact of the War in Ukraine and of High Commodity Prices across Countries

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This paper builds on and expands from earlier work for the Global Fund to Fight HIV, TB, and Malaria addressing the fall-out from the war in Ukraine and high commodity prices across countries supported by the Global Fund.

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Online data annex is available at

https://www.cgdev.org/sites/default/files/ukr_comm_shock_data_annex.xlsx

Introduction

The war in Ukraine—directly and especially as a contributor to high prices for key food and fuel commodities—has disrupted the global economic recovery from Covid-19. The IMF (2023b) estimates that the global economy has grown by 3.5 percent in 2022, and projects economic growth at 3.0 percent in 2023. These numbers are about one percentage point lower than the estimates and projections published by the IMF in January 2022, just before the Russian invasion in Ukraine (IMF, 2022).

Identifying the impact specifically of the war in Ukraine and of the commodity price shock, however, is challenging, as many other factors played a role—including the ongoing recovery from the economic fall-out of Covid-19, tightening monetary policy, and a slowdown in growth in China (IMF, 2022). The magnitude to countries of the commodity price shock, however, can be quantified, e.g., in terms of increased costs of imports or higher revenues. These estimates, in turn, provide a platform for interpreting and estimating the macroeconomic costs of the commodity price shock in terms of headline economic indicators.

Specifically, we look at three aspects of commodity price shocks:

- Commodity price shocks yield gainers (here: exporters of commodities the prices of which increase) and losers (here: importers of these commodities). We estimate the magnitude of these gains and losses in terms of increased export revenues or import costs.
- GDP growth—measured in *constant* prices—is not designed to and does poorly capture the macroeconomic implications of a commodity price shock. Instead, we look at what money buys. E.g., if the consumer price index increases faster than GDP (a key aspect of the "cost-of-living" crisis), living standards decline even if real GDP increases.
- The variation in the impacts of the commodity price shock across countries also provides a handle for better understanding the consequences for headline macroeconomic variables like real GDP growth or the fiscal balance.

Data

We obtain estimates of the magnitude of imports and exports for 2021 from the BACI database maintained by the Centre d'Études Prospectives et d'Informations Internationales (CEPII, 2023). The BACI database builds on the United Nations ComTrade database, but fills gaps for non-reporting countries from partner country data (one country's imports are another one's exports, and vice versa), and is estimated consistently excluding freight costs. Specifically, we pull data for HS ("Harmonized System") commodity categories 1001 (wheat), 1005 (maize), 2701 (coal), 2709 (crude oil), 2710 (refined oil), and 2711 (gas). The method for filling gaps from partner country data, however, does not capture trade between non-reporters, e.g., re-exports to neighboring non-reporters. This source

of error apparently results in implausibly high estimates of fuel imports in five countries, which we exclude from the analysis.[i]

At the time of writing, updated trade data were available from the UN ComTrade database directly (United Nations Statistics Division, 2023), but for 2022 these included data from only 88 reporting countries (mostly more developed economies). This means that the shortcomings in the data from trade between non-reporters are even more pervasive than for the BACI database. We therefore decided to stick with the more complete and consistent 2021 data from the BACI database to gauge the magnitude of imports and exports across countries.

For commodity prices, we use price indices for maize, wheat, coal, gas, and oil from the IMF's World Economic Outlook database (IMF, 2023).[ii] Macroeconomic data like economic growth, the fiscal balance, and consumer prices are from the IMF's World Economic Outlook database. We use country classifications by income from World Bank (2023).

Direct costs and gains from changes in prices of key food and fuel commodities

The war in Ukraine has had significant global implications through its impacts on the markets for key food and fuel commodities of which Ukraine and Russia are important exporters, notably wheat, maize, coal, oil, and gas (Table 1). The most obvious disruptions arise for wheat and maize where Ukraine accounted for 9 percent and 11 percent of global exports in 2021. Disruptions to production in and exports from Ukraine therefore have implications for global markets and food security. Moreover, Russia was a very significant exporter of wheat so total exports from countries involved in the conflict amount to nearly one-quarter of the global total.

While the share of wheat (0.3 percent) and maize (0.2 percent) in global trade is rather small from a macroeconomic perspective, these trade data do not fully capture the economic implications—production is more decentralized and often consumed domestically (so the global aggregate understates the weight for countries relying on imports), and it accounts for a larger share of consumption in poorer countries and households. These household-level and distributional effects, however, are out of scope for our study which focuses on macroeconomic aggregates.

Across fuel commodities, the picture is similar—Russia was a significant exporter, accounting for about one-tenth of global exports. From a macroeconomic perspective, disruptions on trade in fuel commodities are significant—these commodities account for 0.7 percent (coal), 8.3 percent (oil), and 2.1 percent (gas) of global trade, respectively.

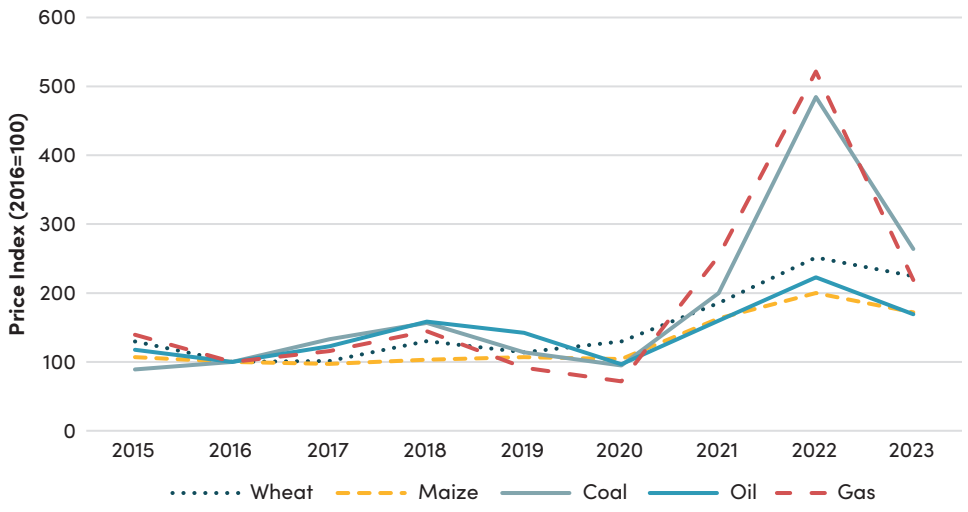
TABLE 1. Trade in key food and fuel commodities: role of Russia and Ukraine

Commodity	Share in Global Trade (Percent)	Russia (Share in Trade by Commodity, Percent)	Ukraine (Share in Trade by Commodity, Percent)
Wheat	0.3	13.1	9.2
Maize	0.2	1.3	11.1
Coal	0.7	12.9	0.1
Crude Oil	4.6	11.5	0
Refined Oil	3.6	11	0
Gas	2.1	8.8	0
Other	88.5	1.2	0.3
Total	100	2.3	0.3

Source: CEPII, 2023.

For these commodities, prices increased steeply in 2022 from 2021 levels but even more so relative to the average for the pre-Covid years 2015–2019 (Figure 1). Prices of coal and gas more than doubled between 2021 and 2022 and increased more than fourfold compared to 2015–2019. The oil price increased by 39 percent (from 2021) and 74 percent (from 2015–2019). Prices of wheat and maize in 2022 increased by 24 percent and 36 percent from 2021, and roughly doubled from the 2015–2019 average.

FIGURE 1. Global market prices of key fuel and food commodities, 2015–2023



The economic gains or costs to a country—in terms of higher export revenues or increased imports costs—from a change in commodity prices depend on three factors: (1) The magnitude of imports or exports of the respective commodity, (2) the magnitude of the change in prices, (3) and the price elasticity of the demand for the respective commodity—how much does demand respond to an increase in prices?

As described above, we use data on the magnitude of imports and exports from the BACI database (CEPII, 2023) and data on commodity prices from the IMF's World Economic Outlook database (IMF, 2023). Meta-analyses across empirical studies suggests a short-run elasticities of minus 0.2 for energy (Labandeira, Labeaga, and López-Otero, 2017) and between minus 0.13 and minus 0.33 for fuel (Dahl, 2012). On food prices, the meta-analysis by Cornelsen and others (2015) returns a price elasticity of about minus 0.5 for cereals, ranging from minus 0.6 for low-income countries to minus 0.4 for high-income countries.

In contrast to these estimates, which would suggest a steep decline in consumption in 2022 in view of the price increases, the quantities of key fuel and food commodities consumed globally barely changed in 2022 (Table 2). There are several possible reasons for this. First, the large price increases were unanticipated so there was little time for fundamental adjustments to energy consumption (which require investments). And while the price shock—according to price projections—was expected to persist (see projections in April 2022 and October 2022 editions of the IMF World Economic Outlook database), fuel prices have dropped steeply from their peak in 2022, limiting incentives for further adjustments. Second, price increases in related commodities may have blunted the own-price effect on quantities consumed. Third, global prices are a poor indicator of domestic prices. If the domestic government intervenes to mitigate the impact of a price shock, then domestic prices increase less than the global price, blunting the potential impact of the change in (world) market prices on domestic consumption. For food, the observation of broadly constant quantities in 2022 is surprising in light of the conflict in Ukraine. In this regard, FAO (2023) points to a relatively good harvest in 2022, and stores may have been depleted, both factors do not provide an effective buffer against the fall-out from the war in Ukraine in 2023 and beyond.

TABLE 2. Quantities of key food and fuel commodities consumed globally, 2020–2022

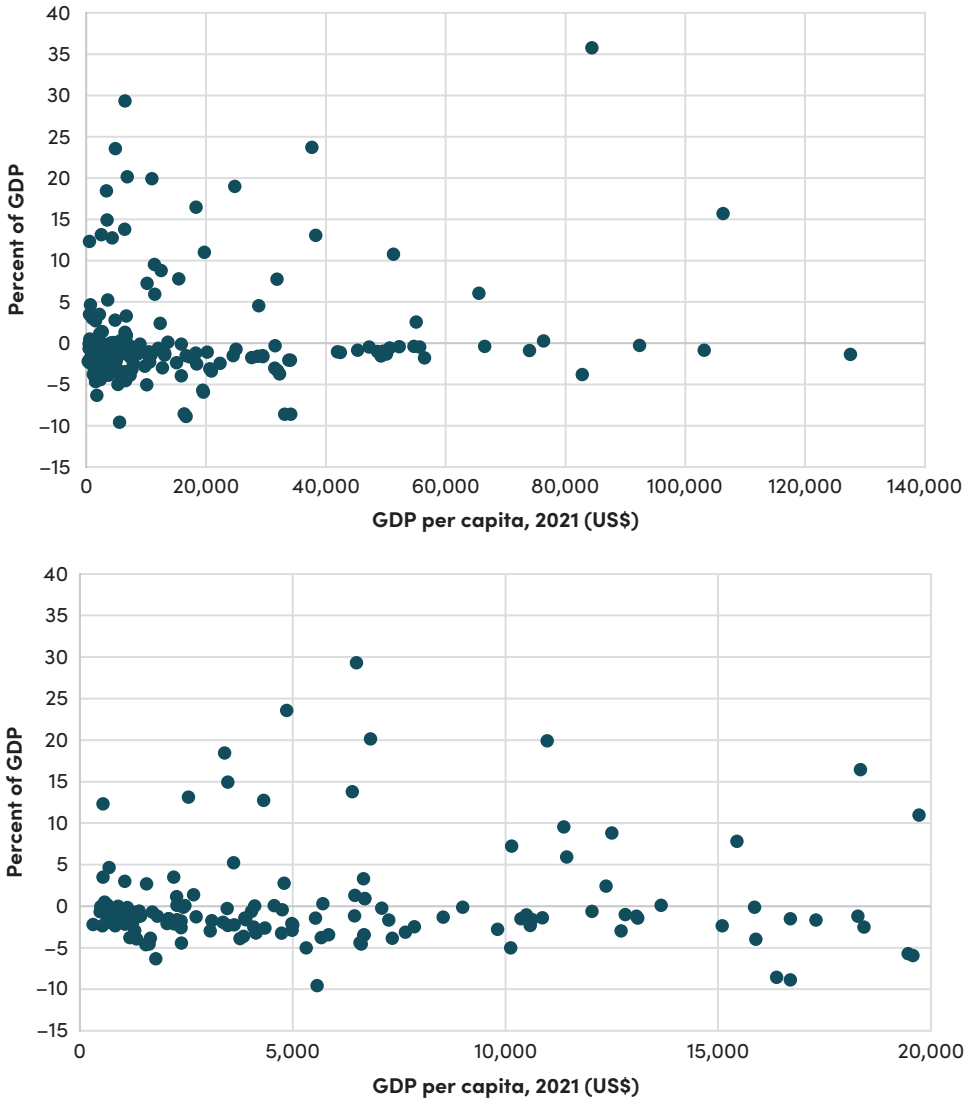
	2020	2021	2022
Wheat (millions of tons) 1/	762.1	773.8	781.5
Coarse Grain incl. Maize (millions of tons) 1/	1,488.6	1,504.5	1,478.0
Coal (millions of tons)	7,477	7,929	8,025
Gas (billions of cubic meters)	3,924	4,109	4,046
Oil (millions of barrels per day)	92	97	99

Sources: FAO (2023), IEA (2023, 2022), and U.S. Energy Information Association (2023)
1/Data for crop year starting in year indicated.

For these reasons, we use quantities unchanged from trade flows in 2021 as a benchmark for the calculations of the costs and gains from changes in key commodity prices, effectively imposing a short-run price elasticity of zero. This ensures that our country-level estimates are consistent with (broadly unchanged) global consumption of these key commodities. For each of the commodities, the costs or gains from the commodity price shocks are thus calculated by multiplying net exports in

2021 with the change in global prices for that commodity between 2021 and 2022. [The calculations, by country and commodity group, are documented in the online data annex.]

FIGURE 2. Estimated changes in import costs and export revenues from increased prices of key food and fuel commodities in 2022



Source: Author's calculations. Positive values mean that a country experiences a net gain in export revenues; with negative values, the increase in import costs dominates.

Note: Top figure shows data for all countries, bottom figure shows countries with GDP per capita up to US$ 20,000 in 2021.

Our estimates are summarized in Figure 2, which plots the estimated loss or gain per country against the level of GDP per capita. The magnitude of the commodity price shock experienced in 2022 is very large, ranging from a loss in GDP of 10 percent (experienced by several small island economies) to a gain of 36 percent (enjoyed by Qatar, where net exports of gas accounted for 28 percent of GDP in 2021, the world market price of which more than doubled). Most countries (125 out of 184 shown in

Figure 2) experienced losses between 0 percent and 5 percent of GDP, and 10 countries a larger loss. Imports of refined oil were the most important contributor to increased import costs. Increased costs of importing wheat and maize played a relatively small role, but amount to several tenth of a percent of GDP in some less developed economies. 49 countries experienced gains, averaging about 8 percent of GDP. [Gains and losses, overall and by commodity category, are documented in the online data annex.]

Macroeconomic implications

The war in Ukraine affects the global economy in numerous ways. If investment and consumption decline because of a perception of increased uncertainty, this results in idle capacities and lower GDP growth. This is the aspect most difficult to quantify, as it similarly applies across countries, and as there are other significant developments (e.g., ongoing recovery from Covid-19, monetary tightening) going on at the same time.

The war and the sanctions it triggered also disrupt economic activity directly, most obviously for Russia (where GDP declined by 22.1 percent in 2022) and especially in Ukraine (where GDP contracted by nearly one-third). These countries, however, accounted for only 1.9 percent (Russia) and 0.2 percent (Ukraine) of global GDP and hence contributed little to the global slowdown in 2022.

A second channel through which the war affects the global economy is through disruptions in trade with countries involved in the conflict, owing to economic disruptions in these countries or sanctions. Russia and Ukraine however account for only a small proportion of global trade (2.6 percent of commodity exports, and 1.7 percent of commodity imports). This trade is heavily concentrated among former Soviet Republics—the top-10 trade partners of Russia and Ukraine are all former Soviet Republics,[iii] with trade (sum of exports and imports ranging from 12 percent of GDP (Georgia) to 62 percent of GDP (Belarus).[iv] For these countries, macroeconomic outcomes in 2022 were overall not notably different from elsewhere,[v] except for Belarus (where GDP declined by 7 percent) and Moldavia (minus 20 percent), countries at least indirectly involved in the conflict or immediately affected by it. Because of the small weight of these 10 countries in the global economy (1 percent), we do not develop this line of analysis further.

The increases in commodity prices triggered by the conflict, however, are ubiquitous, and affect countries in different ways—some countries gain from higher export revenues, others suffer a loss from increased costs of imports. Table 3 documents that the macroeconomic performances (economic growth, fiscal balance) of net gainers and losers from the commodity price shock in 2022 indeed have been different.[vi] [The macroeconomic data underlying Tables 3 and 4 are available in the online data annex.] Across income categories and overall, economic growth in countries which have suffered a loss from the commodity price shock has declined between 2021 and 2022, in absolute terms and even more relative to countries which gained. However, these differences in growth

trends may also reflect differences in the economic recovery from Covid-19. However, the change in growth estimated for 2022 (IMF, 2023) from the projections made by the IMF before the Russian invasion of Ukraine show a similar pattern (though the magnitude is about one-half of the change in growth from 2021), suggesting that much of the differences in growth are related to the commodity price shock.

TABLE 3. Change in the fiscal balance and in GDP growth between 2021 and 2022 across countries

		Real GDP Growth (Percent)			Fiscal Balance (Percent of GDP)		
	Loss or Gain	Value (2022)	Change from 2021	Change from Proj.	Value (2022)	Change from 2021	Change from Proj.
Low income	Loss	2.7	–1.5	–1.6	–0.6	–1.2	–1.9
	Gain	6.4	2.4	1.1	0.0	0.5	4.3
Lower middle income	Loss	5.5	0.0	0.2	0.3	0.9	5.5
	Gain	4.6	1.2	0.1	1.8	2.0	6.8
India	Loss	6.8	–2.2	–1.7	0.1	0.1	8.7
Upper middle income	Loss	3.0	–2.4	–0.2	0.1	0.8	1.9
	Gain	5.6	–0.1	1.0	2.0	1.7	10.2
China	Loss	3.0	–5.5	–2.6	–1.5	–0.7	4.5
High income	Loss	3.0	–2.2	–1.0	0.7	–0.7	0.1
	Gain	4.7	0.2	0.3	5.0	5.0	11.4
USA	Gain	2.1	–3.9	–3.1	6.1	1.4	1.1
Total	Loss	3.3	–3.1	–1.4	–0.1	–0.5	2.3
	Gain 1/	4.8	0.4	0.4	3.6	3.6	9.9

Source: IMF, 2023 and 2021.

Notes: "Change from Proj." shows difference between estimates from IMF April 2023 World Economic Outlook and projections made in the October 2021 WEO. China, India, and USA separated out from respective income group because of their large economic weight in the respective group. Data by income category shown exclude these three countries.

1/ Excludes the United States, which account for 2/3 of GDP in this group but are untypical as they gain only marginally from the commodity price shock.

Trends in the fiscal balance also differed systematically between countries which gained and those which suffered losses from the commodity price shock. While showing a pattern similar to the one observed for real GDP growth, the large improvements in the fiscal balance in more advanced economies benefitting from the commodity price shock stand out. In these countries, the fiscal balance improved by more than 8 percent in upper-middle-income countries, and over 11 percent of GDP in high-income countries (excluding the United States), relative to countries which experienced losses.

Accepting that the commodity price shock played a large role in explaining differences in economic performance across countries, it is necessary to take into account that real GDP (which measures a country's output at *constant* prices) is a poor measure of the consequences of a price shock. If export revenues increase because of a commodity price shock, then a country's GDP, even if it

stays unchanged in real terms, buys more. If the costs of imports increase, living standards fall—as experienced by many countries experiencing a cost-of-living crisis in 2022—as the value of incomes (measured against steeply rising consumer prices) declined even though GDP in real terms was growing in most countries.

TABLE 4. Economic growth and what GDP buys

	Loss or Gain	Growth in GDP/CPI	Contribution from Prices	Real GDP Growth
Low income	Loss	–1.9	–4.6	2.7
	Gain	4.3	–2.1	6.4
Lower middle income	Loss	5.5	–0.1	5.5
	Gain	6.8	2.3	4.6
India	Loss	8.7	1.9	6.8
Upper middle income	Loss	1.9	–1.0	3.0
	Gain	10.2	4.5	5.6
China	Loss	4.5	1.5	3.0
High income	Loss	0.1	–3.0	3.0
	Gain	11.4	6.7	4.7
USA	Gain	1.1	–0.9	2.1
Total	Loss	2.3	–1.1	3.3
	Gain	9.9	5.0	4.8

Source: IMF, 2023 and 2021.

Notes: See notes on Table 3 on country composition. GDP/CPI measures how much GDP buys in terms of a typical consumption bundle, and is the sum of the contribution from prices and real GDP growth. The contribution from prices is the change in the GDP deflator relative to the CPI.

The relevance of this point is underscored in Table 4, which shows estimates of changes in "what incomes buy" (measured by GDP, deflated by the consumer price index), and decomposes them into real GDP growth and the contribution from prices (the GDP deflator divided by the consumer price index (CPI)). In this diction, an increase in the price of a country's exports increases the GDP deflator (but not necessarily real GDP growth) relative to the consumer price index, and nominal GDP then buys more in terms of the consumption bundle contained in the consumer price index.

Incorporating the price effects changes the picture on macroeconomic gains and losses very considerably (and, we argue for the reasons outlined above, provides a more accurate picture of the fall-out from the commodity price shock of 2022). Overall, the price effect doubled the increase in living standards among countries which gain (from an increase in real GDP of 4.8 percent to an increase in GDP, deflated by the CPI, of 9.9 percent) from the commodity price shock, whereas it offset one-third of the gain in output in real terms in countries which experienced a loss (from an increase in real GDP of 3.3 percent to an increase in GDP, deflated by the CPI, of 2.3 percent). Among countries experiencing a loss, the price effect was particularly acute in high-income countries, where all of the gains in terms of GDP growth were absorbed by the price effect. And the effect is even stronger

in low-income countries. While real GDP on average increased by 2.7 percent in these countries, the increased costs of consumption goods turned this gain into a loss of 1.9 percent of GDP.

Organizing countries in baskets by income group and depending on whether they gain in export revenues or experienced a loss in terms of import costs is an instructive but crude way of identifying the consequences of the commodity price shock. As an alternative, we exploit the correlation between variables of interest and the size of the commodity price shock (in terms of export gains or import costs) through univariate regressions. [Underlying data are available in the online data annex.] This approach yields improved estimates on how much a commodity price shock feeds through to key macroeconomic indicators.

TABLE 5. Macroeconomic effect of commodity price shock (change in net exports)

Dependent Variable	Coefficient	t-Ratio	P-Value	R-Square
GDP/CPI growth	0.75	3.78	0.00	0.28
Real GDP growth	0.10	0.76	0.45	0.01
GDP/CPI deflator change	0.65	5.01	0.00	0.45
Change in real GDP growth	0.26	2.48	0.01	0.08
Fiscal balance	0.33	4.50	0.00	0.15
Change in fiscal balance	0.16	2.78	0.01	0.07
No. of observations (all regressions)	173			
Heteroscedasticity-robust standard errors				

Notes: Results are for univariate regression of dependent variable on magnitude of change in net exports (in percent of GDP). Growth variables in percent, fiscal balance in percent of GDP.

The commodity price shock played a minor role in contributing to economic growth—a gain in the value of net exports of 1 percent of GDP was associated with a 0.1 percentage-point difference in real GDP growth. In part this small association could reflect that commodity exporters were on a lower growth trajectory than importers. This supposition is consistent with the higher estimate for the change in real GDP growth—a net export gain of 1 percent of GDP was associated with an acceleration of a quarter of a percentage point in GDP growth, which is also a more precise and statistically significant estimate.

The macroeconomic gains, however, are dominated (even more so than it appears in the grouping of countries in Table 4) by the change in the value of GDP, in terms of procuring goods and services, here proxied by GDP/CPI. A gain in net exports of one percent of GDP is associated with a gain in the value of GDP of nearly the same size (0.75 percent). By far the most important contribution (0.65 out of 0.75) came from the price effect, while GDP growth—as observed earlier—contributed little (0.10 out of 0.75).

The gains also show in the fiscal balance—a gain in net exports of one percent of GDP is associated with a higher fiscal balance (i.e., a smaller fiscal deficit) of 0.33 percent of GDP. This estimate may mirror the fiscal benefits from resource extraction in general; the impact in terms of the change in the fiscal balance—less vulnerable to this source of bias—still comes out at 0.16 percent of GDP.

If the sample is broken into net exporters and net importers, results come out similarly (or even stronger) for net exporters, but insignificant for net importers. This does not mean that the effect is unimportant for net importers, and indeed an exporter's gain (their GDP buys more, it becomes more valuable through higher export revenues) is an importer's loss (where GDP buys less, as the country has to pay more for its imports). The weaker evidence for importers could be a consequence of the statistical properties of the data.

The losses, however, are distributed more widely (there are 128 importers to 45 exporters in the sample used in the regression), so losses for a typical importer are smaller than the gains made by a typical exporter, and other factors such as the fall-out of exchange rate swings during and following the economic crisis triggered by Covid-19 are relatively more important. Second, the economic mechanisms are different. The gains in the value of exports are directly counted in national GDP figures. The increased costs of imports appear in our calculations primarily as they affect the CPI deflator, and there are other factors (government interventions, changing margins) which may slow down the effect on the CPI. Nevertheless, the economic loss is real and evident from the impact on the costs of imports, and it will become more obvious as more definite data on trade flows and the effects across the economy become available.

Summary

Returning to the three objectives outlined at the outset, we first find that the commodity price shock of 2022 triggered by the war in Ukraine resulted in very substantial gains to some countries, and significant costs to many others. In the 49 countries experiencing a gain, the increase in export revenues was substantial, averaging about 8 percent of GDP and reaching up to 36 percent of GDP (for Qatar). In contrast, 125 countries suffered direct losses between 0 percent of GDP and 5 percent of GDP, and 10 countries losses between 5 percent of GDP and 10 percent of GDP.

Second, on the macroeconomic consequences of the price shock, we find countries experiencing a gain have overall done better in terms of headline macroeconomic indicators like real GDP growth or the fiscal balance. The largest impacts, however, arise from changes in what GDP buys. For a country experiencing a gain in export revenues (even if real GDP is unchanged), the value of GDP in terms of procuring goods and services goes up, while countries experiencing higher import costs can afford less. For gainers from the commodity price shock, this price effect is valued at about 5 percent of GDP. Among countries suffering a loss, the negative price shock eliminates all of the gains from GDP

growth in high-income countries, and it exceeds GDP growth across low-income countries, resulting in declining living standards.

Third, these results are underscored by our regression-based analysis, which exploits the difference across countries more effectively. The commodity price shocks have a strong impact on the value of GDP (in terms of the ability to procure goods and services, measured by GDP/CPI). A one-percent net gain in export revenues was associated with an increase in GDP/CPI by 0.75 percent. Almost all of this gain came from the price effect (the GDP deflator—the price of GDP—increased faster than the CPI), which contributed 0.65 percentage points to this gain, while the contribution of real GDP growth was very small at 0.10 percentage points.

Endnotes

i The countries are Djibouti (oil imports at 60 percent of GDP), Dominica (oil imports at 40 percent of GDP, and gas at 30 percent of GDP), Liberia (oil imports at 75 percent of GDP), the Marshall Islands (oil imports over 600 percent of GDP), and Togo (oil imports at 64 percent of GDP).

ii The price indices used from IMF (2023) are PMAIZMT (Maize (corn), U.S. No.2 Yellow, FOB Gulf of Mexico, U.S. price, US$ per metric tonne), PWHEAMT (Wheat, No.1 Hard Red Winter, ordinary protein, FOB Gulf of Mexico, US$ per metric tonne), PCOALW (Commodity Coal Price Index includes Australian and South African Coal), PNGASW (Commodity Natural Gas Price Index includes European, Japanese, and American Natural Gas Price Indices), and POILAPSP (Crude Oil (petroleum), simple average of three spot prices; Dated Brent, West Texas Intermediate, and the Dubai Fateh, US$ per barrel).

iii We formed lists of 25 countries each (a) with the highest imports (in percent of recipient country's GDP) from Russia or Ukraine, and (b) the highest exports to Russia or Ukraine (in percent of sending country's GDP), and ordered countries by total trade with Russia or Ukraine (sum of imports and exports, in percent of GDP) in descending order. The top-10 are Belarus, Kyrgyzstan, Armenia, Moldavia, Estland, Latvia, Lithuania, Kazakhstan, Tajikistan, and Georgia.

iv We have considered including Belarus among the participants in the conflict, in light of its support during the Russian invasion. Because of the small economic weight of Belarus, especially with regard to the key food and fuel commodities we focus on, the results come out very similar if we follow that approach.

v The change in the fiscal balance was about the same as in other countries in 2022, while GDP growth changed by 0.4 percentage points less (each compared to 2021).

vi In our analysis, we exclude three groups of countries: (1) Russia and Ukraine, i.e., the countries directly involved in the war in Ukraine; (2) the five countries listed in endnote i where trade data were highly implausible, likely because of unrecorded trade; (3) several countries affected by severe macroeconomic disruptions resulting in very large changes in real GDP or prices (Libya, Macao, Turkey, South Sudan, Sudan, Zimbabwe).

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