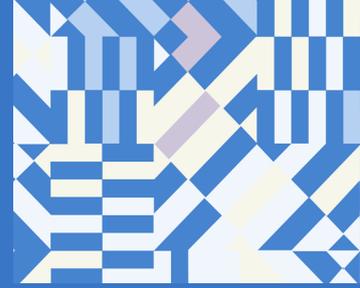




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Global Commodity Trade and Market Disruptions: Impact on Growth, Food Security and Poverty in Rwanda

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1. Introduction

With Russia and Ukraine being substantial players in the global commodities market, the intensification of the Russia war in Ukraine has caused significant disruptions to the world's agricultural and food markets with potential knock-on effects for global food prices. The wide-ranging disruptions caused by the war are a concern for African countries, which are highly dependent on exports and imports of agricultural commodities. With a focus on Rwanda, this brief assesses the Ukraine crisis's implications on the country's food and agriculture markets. It assesses their ramifications for the broader economy in terms of effects on growth, employment, income levels and distribution, income inequality and poverty. The analysis covers a period of three years, from 2022-2024.

THE UKRAINE CRISIS
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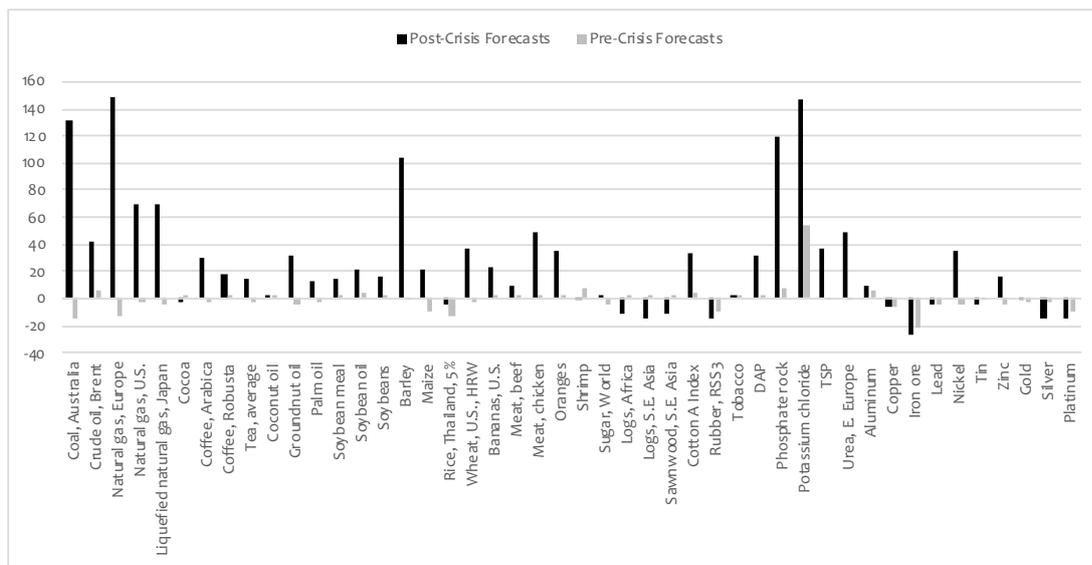
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2. Global Commodity Price Shocks Under Ukraine Crisis

The projections of the primary commodity prices for 2022 released by the World Bank in October 2021 (before the start of the war) and in October 2022 (after the start of the war) are compared to the estimates of the commodity prices for 2021.¹ The two sets of projections for 2022 and the estimated values for 2021 are used to calculate changes in global commodity prices between 2021 and 2022, depicted in Figure 1. A total of 46 globally traded commodities are covered, including, among others, energy, fertilizers, and food and agriculture products, for which substantial increases in prices are forecasted under the Ukraine crisis compared to the pre-crisis forecasts.

Figure 1: Projected Changes in Global Commodity Prices before and after the onset of the Ukraine Crisis (%)



Source: Compilations from the Commodity Market Outlook, World Bank (2021 and 2022)

Note: Pre-crisis and post-crisis forecasts are price projections released by the World Bank in October 2021 and October 2022, respectively

3. Rwanda's Exposure to Global Commodity Trade and Market Disruptions Under Ukraine Crisis

The Ukraine crisis induced rising global prices spread over a wide range of commodity markets. The ultimate effects of the global commodity market disruptions across countries depend on the relative changes in the price of each of the 46 primary commodities (Figure 1) and their shares in a country's import and export baskets (Tables 1 and 2). Rwanda exports primarily mineral products, i.e., gold (69.5%) and tin ores (2.2%). The pre-crisis declining trends of gold and tin prices do not change significantly under the Ukraine crisis. Export prices of these minerals are projected to continue declining over 2023 and 2024 in general (Table 1). Coffee and tea are the main agricultural commodity exported by Rwanda, with a share of 7.4% and 6.1%, respectively (Table 1). A steeper price increase is projected in 2022 for coffee (30.8%) under the Ukraine crisis before declining slightly in 2023 and 2024 by 6.8% and 1.6%, respectively. An increase in the prices of tea (15.2%) is also observed before a decline (9.7%) in 2023 and a slight increase (0.7%) in 2024. International prices of key imported commodities are rising in 2022, fertilizer (76.9%), petroleum oil (42.0%), and wheat (36.5%); however, their shares in the import basket are relatively small, i.e. 0.6%, 1.1% and 1.2%, respectively. Rwanda's import basket is dominated by iron and steel products (9.0%) and fish products (3.9%), whose prices are declining in 2022. The international prices of key primary commodities imported by Rwanda are projected to decline in 2023 and 2024, except for fish products.

¹ The World Bank releases estimates of monthly (average) prices for 71 primary commodities, including energy, agricultural and food, fertilizers, and metal products. Twice a year, in April and October, it releases three to five years annual average price predictions for 46 primary commodities.

Table 1: Changes in International Prices of Rwanda's Top Export Commodities (%)

| Commodity | Share Exports | Pre-Crisis Forecasts | | | Post-Crisis Forecasts | | |
|-----------|---------------|----------------------|------|------|-----------------------|-------|------|
| | | 2022 | 2023 | 2024 | 2022 | 2023 | 2024 |
| Gold | 69.5 | -2.8 | -1.1 | -0.6 | -1.4 | -4.2 | -2.9 |
| Coffee | 7.4 | -6.9 | -1.2 | 1.6 | 30.8 | -6.8 | -1.6 |
| Tea | 6.1 | -3.3 | -1.9 | 1.4 | 15.2 | -9.7 | 0.7 |
| Tin ores | 2.2 | -4.3 | -4.8 | -5.1 | -4.3 | -29.0 | 1.2 |

Source: World Bank, commodity markets outlook (Retrieved April 2022); AKADEMIYA2063 and IFPRI, AATM Database (Retrieved April 2022)

Note: Pre-crisis and post-crisis forecasts are price projections released by the World Bank in October 2021 and October 2022, respectively

Table 2: Changes in International Prices of Rwanda's Top Import Commodities (%)

| Commodity | Share Imports | Forecasts Without Ukraine Crisis | | | Forecasts With Ukraine Crisis | | |
|------------------|---------------|----------------------------------|-------|-------|-------------------------------|-------|-------|
| | | 2022 | 2023 | 2024 | 2022 | 2023 | 2024 |
| Iron and steel | 9.0 | -19.6 | -7.7 | -16.7 | -25.8 | -16.7 | -2.0 |
| Fish products | 3.9 | 9.5 | -3.3 | 0.8 | -1.5 | 3.7 | 2.1 |
| Sugar products | 2.4 | -5.1 | 2.7 | 0.8 | 2.6 | -5.0 | 0.0 |
| Wheat and meslin | 1.2 | -20.6 | -2.0 | 0.8 | 36.5 | -4.7 | -1.2 |
| Petroleum oils | 1.1 | 5.1 | -12.2 | 0.6 | 42.0 | -8.0 | -13.0 |
| Fertilizer | 0.6 | 12.5 | -19.8 | -7.6 | 76.9 | -11.2 | -10.6 |

Source: World Bank, commodity markets outlook (Retrieved April 2022); AKADEMIYA2063 and IFPRI, AATM Database (Retrieved April 2022)

Note: Pre-crisis and post-crisis forecasts are price projections released by the World Bank in October 2021 and October 2022, respectively

4. Rwanda's Terms of Trade Shocks

A Country's Terms of Trade (ToT) is computed as the ratio of an index of the country's export prices to an index of its import prices. An increase in import prices relative to export prices indicates a deterioration of a country's ToT, i.e. the country's capacity to cover the cost of its imports through its export revenues has deteriorated. The opposite indicates an improvement in ToT. The more a country's export prices rise relative to its import prices, the more favorably its economy will be affected. Comparing the changes in international prices before and after the start of the Ukraine crisis in 2022, the increase in export price index (6.6 pp) is less than the increase in import price index (8.0 pp), suggesting a negative impact on the ToT (Table 3). The deterioration of Rwanda's ToT in 2022 is driven by price hikes of imported commodities such as wheat, petroleum oil, and fertilizer (Table 2). The ToT is projected to deteriorate further in 2023 as the prices of the country's main exported primary commodities are projected to decline more than the prices of its main imported primary commodities. Rwanda's ToT stabilizes in 2024.

Table 3: Percentage Point Changes in Rwanda's Import and Export Price Indices, Pre-Crisis vs Post-Crisis Forecasts

| | 2022 | 2023 | 2024 |
|--------------------|------|------|------|
| Export Price Index | 6.6 | -2.8 | -0.5 |
| Import Price Index | 8.0 | -1.5 | -0.6 |

Source: World Bank, commodity markets outlook (Retrieved November 2022); AKADEMIYA2063 and IFPRI, AATM database (Retrieved April 2022)

Note: Pre-crisis and post-crisis forecasts are price projections released by the World Bank in October 2021 and October 2022, respectively

5. Simulation Scenarios and Results

Two sets of simulations are carried out: the Baseline scenario and the Ukraine scenario. The Baseline scenario assumes the absence of the war and the related growth, employment, food consumption, and poverty outcomes. The scenario is based on the projections for 2022-2024 of the commodity prices without the crisis by the World Bank and key economic variables by the International Monetary Funds (IMF), both released in October 2021. The Ukraine scenario captures the disruption of global commodity trade and markets and their effects on Rwanda's economy in the same areas of economic growth, employment, food consumption, and poverty. The scenario is based on the projections for 2022-2024 of the commodity prices with the crisis, released by the World Bank in October 2022. The presented findings discuss the projected socioeconomic outcomes over the next three years under the disruptions of global commodity markets compared to what they would have been in the absence of the war.

5.1 External Trade Effects

In 2022, Rwanda is projected to experience a sharp reduction in exports under the Ukraine scenario relative to the baseline scenario (Table 4). The decline in exports is driven by the negative price shock of the main primary commodities exported by the country, as well as the inflationary effects and the related negative supply shocks. The decrease in imports is much smaller, driven by high import prices and the contraction of the economy. Exports are projected to continue to decline in 2023 and 2024, driven by declining prices of the country's main export commodities. Imports are projected to start recovering in 2024.

Table 4: Percentage Point Changes in Rwanda Import and Export Volumes, Ukraine vs Baseline Scenarios

| | 2022 | 2023 | 2024 |
|---------|------|------|------|
| Exports | -4.6 | -6.6 | -2.5 |
| Imports | -0.7 | -6.8 | 1.4 |

Source: Simulation results (2022)

5.2. Economic Growth Effects

Rwanda's economy is projected to decelerate significantly in 2022. The fast GDP growth rate of 6.0% expected for the country before the Ukraine crisis is projected to be cut by half under the crisis (Table 5). The economy is projected to continue to grow at a slower pace in 2023 before it starts to recover in 2024. However, the sharp decline in 2022 and 2023 will put the GDP on a lower growth trajectory than in the absence of the global commodity trade and market disruptions caused by the war (Table 5). The GDP loss under the Ukraine scenario is projected to reach 3.1% of the GDP level in 2021 and will increase to 5.9% and 5.5% in 2023 and 2024. The resulting gap in growth between the baseline scenario and the Ukraine crisis scenario will take years of sustained growth to make up.

Table 5: Changes in Rwanda's GDP

| | 2022 | 2023 | 2024 |
|---|------|------|------|
| Annual GDP Growth, Percentage Point Change Between Ukraine and Baseline scenarios | -3.1 | -2.5 | 0.6 |
| GDP Loss Between Ukraine and Baseline Scenarios, in Percent of 2021 GDP Level | -3.1 | -5.9 | -5.5 |

Source: Simulation results (2022)

5.3 Employment Effects

The projected contraction in growth and economic activity in Rwanda is reflected in slower employment growth under the Ukraine crisis compared to the baseline scenario (Table 6). Annual employment growth in Rwanda is expected to decline by 2-3 percentage points relative to the baseline scenario over the period 2022-2023. The price shocks push the economy down

to a slower job creation trajectory than in the baseline, with a widening employment gap. In 2022, job creation in Rwanda is lower by 2.5% in terms of employment level in 2021. The country's job losses widen in 2023 and 2024 to reach 4.8% and 7.7% of the employment level in 2021, respectively.

Table 6: Changes in Rwanda's Employment

| | 2022 | 2023 | 2024 |
|---|------|------|------|
| Annual Employment Growth, Percentage Point Change Between Ukraine and Baseline scenarios | -2.5 | -2.2 | -2.8 |
| Employment Loss Between Ukraine and Baseline Scenarios, in Percent of 2021 Employment Level | -2.5 | -4.8 | -7.7 |

Source: Simulation results (2022)

The growth and employment effects resulting from the disruption of global commodity trade and markets give rise to changes in income levels and distribution and the general cost of living. These changes, in turn, drive household consumption and poverty outcomes. Changes in income and adjustments to the local prices of food and nonfood items determine food affordability and, ultimately, household demand and consumption. This determines the impact of the crisis on food security outcomes.

5.4 Household Income Growth Effects

The bulk of ToT losses for Rwanda accrues to the mineral sector, which also dominates the country's export basket. However, prices for exported agricultural commodities, i.e. coffee and tea, are projected to increase, resulting in positive income changes (3.1%) for rural households in 2022. Rural household incomes continue to grow (0.7%) in 2023 because of the delayed growth effects resulting from the positive shock in the agricultural sector. However, incomes will slow down in 2024 (-2.3%), driven by the contraction of economic activities in Rwanda. On the other hand, urban incomes decline over the entire period of 2022-2024, driven by slower economic activity.

Table 7: Percentage Changes in Rwanda's Household Gross Revenue, Ukraine vs Baseline Scenarios

| | 2022 | 2023 | 2024 |
|-------|------|------|------|
| All | 0.7 | -1.9 | -2.4 |
| Rural | 3.1 | 0.7 | -2.3 |
| Urban | -1.8 | -4.5 | -2.5 |

Source: Simulation results (2022)

5.5 Household Consumption Price Effects

Rising global commodity prices expose countries to general inflationary pressures and the rising cost of food. How strongly a country is affected depends on the structure of global price changes and the commodity composition of its external trade. Rwanda experiences a relatively high level of induced inflation, both in general and in the food sector. The rise in global prices of imported products induced by the Ukraine crisis is projected to primarily drive the increase in the consumer price index in Rwanda (Table 8). In addition, the increase in fertilizer and other agricultural inputs prices affects the supply of agricultural and food products and contributes to further increase the cost of food. Thus, the Ukraine crisis is projected to increase the food consumer price index much higher than the general consumer price index (Table 8). General and food price increases are projected over 2022-2024.

Table 8: Percentage Changes in Rwanda's Consumer Price Index, Ukraine vs Baseline Scenarios

| | All Product | | | Food Product | | |
|-------|-------------|------|------|--------------|------|------|
| | 2022 | 2023 | 2024 | 2022 | 2023 | 2024 |
| All | 4.0 | 3.2 | 2.4 | 8.1 | 5.6 | 5.1 |
| Rural | 4.7 | 3.6 | 2.8 | 7.5 | 5.2 | 4.8 |
| Urban | 3.2 | 2.6 | 2.0 | 9.1 | 6.2 | 5.6 |

Source: Simulation results (2022)

5.6 Food Security, Income Inequality and Poverty Effects

Changes in household incomes (Table 7) and food and nonfood prices (Table 8) affect household consumption levels (Table 9). Although income is projected to increase, its effect is dominated by the inflationary effect resulting in a decline in household consumption levels. The adverse consumption effect is more pronounced for urban households compared to rural households as they experience different income effects (Table 7).

Table 9: Percentage Changes in Rwanda's Household Consumption, Ukraine vs Baseline Scenarios

| | All Product | | | Food Product | | |
|-------|-------------|------|------|--------------|------|------|
| | 2022 | 2023 | 2024 | 2022 | 2023 | 2024 |
| All | -2.5 | -4.4 | -4.6 | -3.8 | -4.2 | -4.6 |
| Rural | -0.8 | -2.5 | -4.8 | -3.0 | -3.3 | -5.1 |
| Urban | -4.3 | -6.6 | -4.4 | -5.2 | -5.7 | -3.9 |

Source: Simulation results (2022)

Income inequality for Rwanda, measured by the Gini index, is projected to decline over 2022-2023 (Table 10). The decline in inequality is a result of the increase in real income of rural households relative to urban households.

Table 10: Changes in Rwanda's Income inequality, Ukraine vs Baseline Scenarios

| | 2022 | 2023 | 2024 |
|------------|------|------|------|
| Gini Index | -1.7 | -2.9 | -2.7 |

Source: Simulation results (2022)

The commodity price shocks have put Rwanda's GDP and employment levels on a lower growth trajectory compared to the baseline scenario. Thus, poverty reduction in Rwanda will slow down, and this negative impact will accelerate into 2024 (Table 11). Close to 353,000 individuals will remain below the national poverty line over the period of 2022-2024 when they were expected to be lifted out of poverty under the baseline scenario, i.e., the state of the economy without the global commodity market disruption caused by the war. Considering the international poverty and food poverty lines, this number reaches 373,00 and 214,000 individuals, respectively.

Table 11: Rwanda Headcount Poverty Indices, Changes between Ukraine and Baseline Scenarios

| Poverty Line | 2022 | 2023 | 2024 |
|---------------|------|------|------|
| National | 0.8 | 2.0 | 3.1 |
| Food | 1.0 | 2.5 | 4.1 |
| International | 0.8 | 1.8 | 2.7 |

Source: Simulation results (2022)

Note: International poverty line is set at \$1.90 a day (2021 PPP)

Table 12: Rwanda Number of Poor, Changes between Ukraine and Baseline Scenarios

| Poverty Line | 2022 | 2023 | 2024 | Total 2022-2024 |
|---------------|--------|---------|---------|--------------------|
| National | 49,057 | 118,601 | 184,910 | 352,568 |
| Food | 28,378 | 70,782 | 114,463 | 213,623 |
| International | 53,050 | 126,368 | 193,487 | 372,905 |

Source: Simulation results (2022)

Note: International poverty line is set at \$1.90 at 2021 PPP

6. Conclusion

The Russia-Ukraine war is projected to negatively impact, in the short run, the economy and people's livelihood in Rwanda. The crisis is expected to deteriorate the country's terms of trade, driven by the price hikes of its imported primary commodities such as wheat, petroleum oil, and fertilizer. Consequently, Rwanda's exports are projected to decline because of the negative supply shocks induced by high input costs, exacerbated by the declining prices of its main exported primary commodities, i.e., gold and tin ores. Rwanda's pre-crisis GDP growth prospect of 6 percent is projected to be cut by half in 2022 because of the global primary commodity trade and market disruptions induced by the Russia-Ukraine crisis.

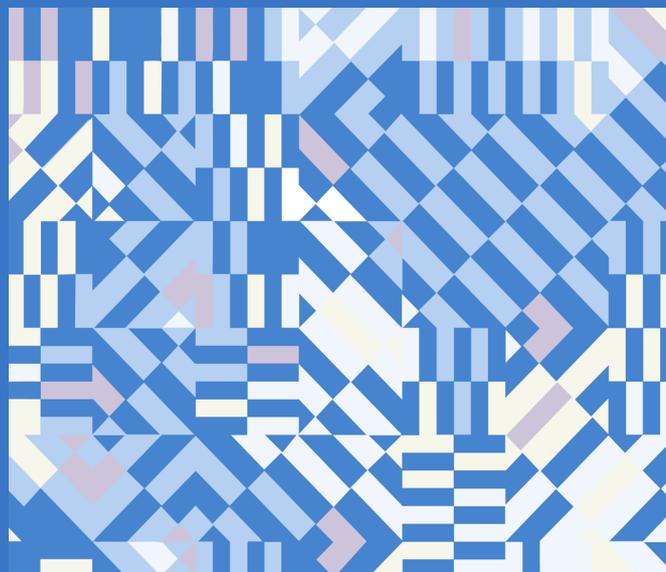
The negative growth projected in 2022 will be prolonged in 2023 before the country recovers in 2024. However, the economic slowdown in 2022 and 2023 is expected to put the country in a lower GDP and employment growth trajectory compared to the baseline, which will take years to make up. Income growth is projected to slow down in urban areas due to GDP and employment declines. On the contrary, incomes in rural areas are projected to increase in 2022 because of higher export prices of the main exported agricultural commodities, i.e., coffee and tea. Rural income growth is expected to erode in 2023 and 2024, with the decline in agricultural productivity driven primarily by higher fertilizer prices. The global commodity trade and market disruptions are projected to raise Rwanda's household consumption price index. The food price index increases more than the nonfood price index because of the negative supply shock induced by higher fertilizer prices.

Food insecurity, as measured by the availability and accessibility domains through household food consumption, increases among both urban and rural households. However, urban households are more adversely hit compared to rural households, as the latter experience a positive income prospect under the crisis driven by the increase in the prices of coffee and tea. Generally, depending on the type of poverty line used, 214-373 thousand people remain in poverty due to the Russia-Ukraine crisis over the period 2022-2024, while they were lifted out of poverty under the scenario without the crisis.

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