

Impacts of the Russia-Ukraine War Price Shocks on the Bangladesh Economy: Simulation vs Reality

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Research Background

- The spike in global commodity prices caused by the Russia-Ukraine war has created concern to many developing countries including Bangladesh that still heavily depends on several imported commodities.
- Despite having strong economic bounce after COVID-19 pandemic, this global trade shock still creates uncertainty on country's food security and its impacts on the poor who are vulnerable to any economic shocks.
- Global commodity price data indicated sharp increase for several Bangladesh key imported commodities
- Given the high dependency of Bangladesh economy on key imported commodities that are affected by Ukraine war, this study examines how global price shocks on petroleum products, fertiliser, and food affect domestic economy, sectoral activities, income distribution and its implication on poverty.
- This study also explores the impact of policy responses by the Bangladesh government (including subsidies for fuel and fertiliser) during the Russia-Ukraine war period.
- This study analyse the effects of a cash transfer program targeted to the lower-income household groups to offset the negative effects of higher food prices on household consumption and welfare.
- This study present an analysis of the combined effects of these shocks and policy interventions on vulnerable household groups as an estimate of the overall impact of the Russia-Ukraine war on Bangladesh

Global Price Trend:

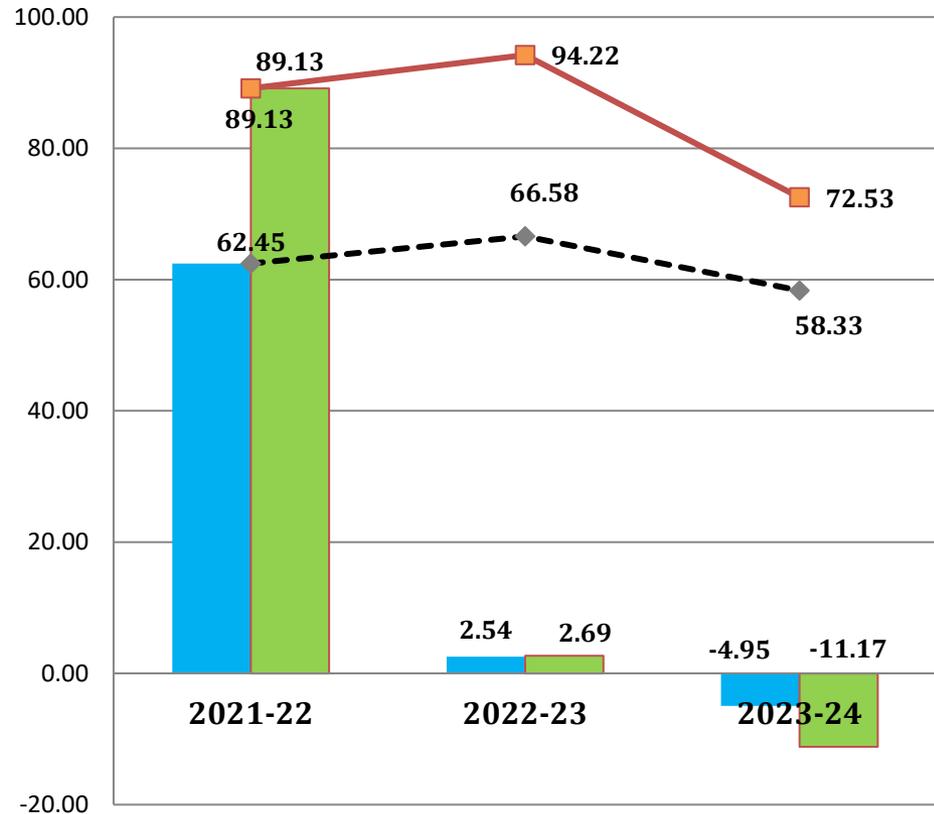
Domestic Price vs Global Price of Petroleum Products

- Domestic supply of petroleum products includes imported refined petroleum as well as domestically processed petroleum derived from crude oil.
- BPC is the institution to administer the domestic price of petroleum products .
- When international price of petroleum price increase; BPC tries to stabilize the domestic price to lessen the burden of petroleum users.
- Imports cost of crude oil and refined petroleum products per metric ton increased by 62.5% and 89% in 2022.
- However, retail price of refined petroleum products at domestic market, shows smaller increase (43.6%)[Diesel and Kerosene increased by 51 % & Octane and Petrol by 42.5 %].
- This gap between domestic & international price is due to BPC's policy that helped cushion the increase in retail price from any large swing of international price.
- In the current simulation (Sim1), we ignore the role of BPC in stabilizing energy domestic price and only consider the increase in international price of crude oil and refined petroleum products to introduce the price shock in the model
- However, instead of referring to nominal price, Price Shock (% change in real price)" **(47.69% for crude oil & 71.95 for refined products)**. has been calculated using the formula of real price by using US CPI as deflator
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Import Price of Petroleum Products in Bangladesh

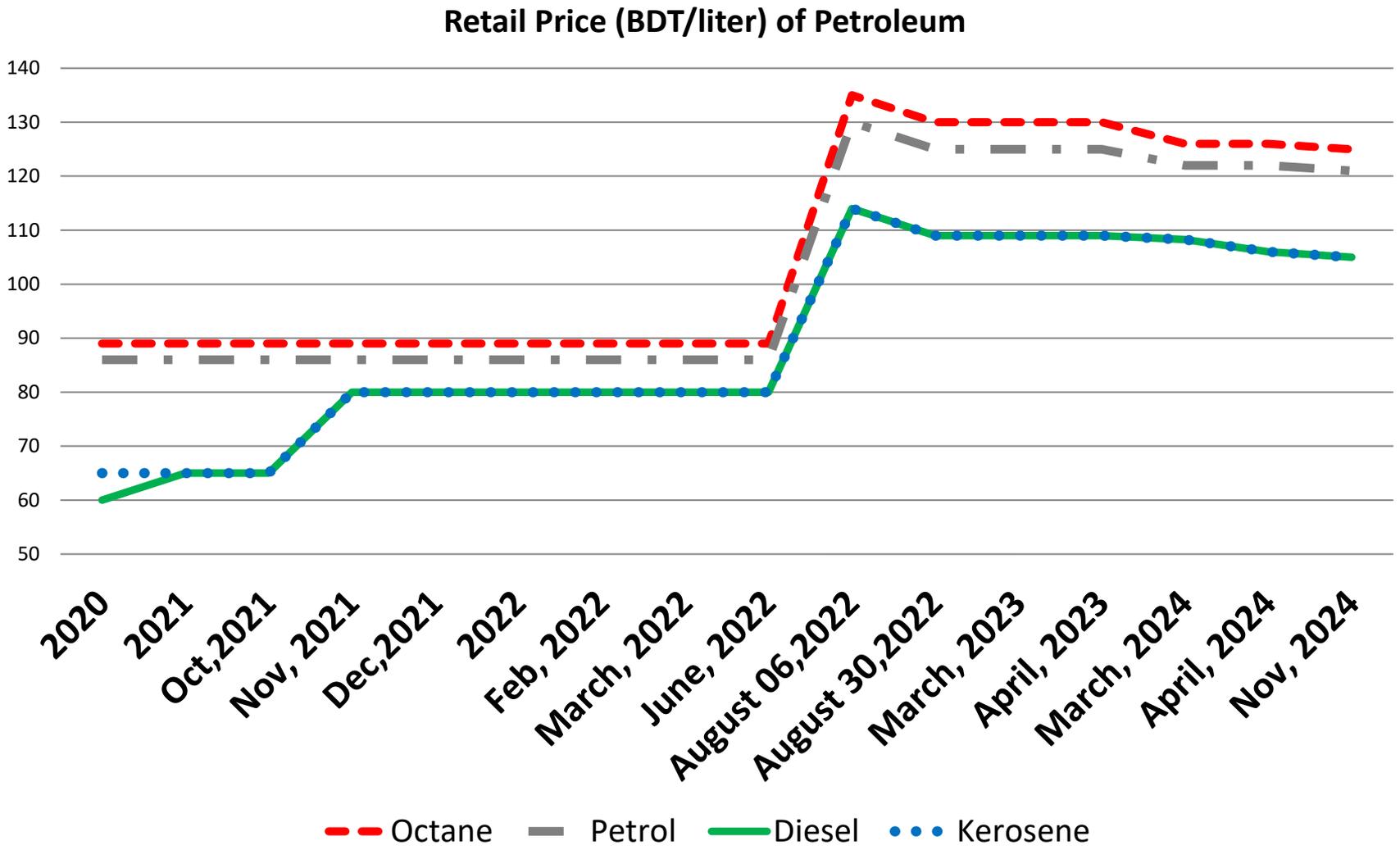
Import Price Change (%) of Petroleum Products in Bangladesh

Import Price (USD/Metric ton) of Petroleum Products		
	Crude Oil	Refined Oil
2020-21	404.13	472.53
2021-22	656.51	893.69
2022-23	673.21	917.74
2023-24	639.87	815.26



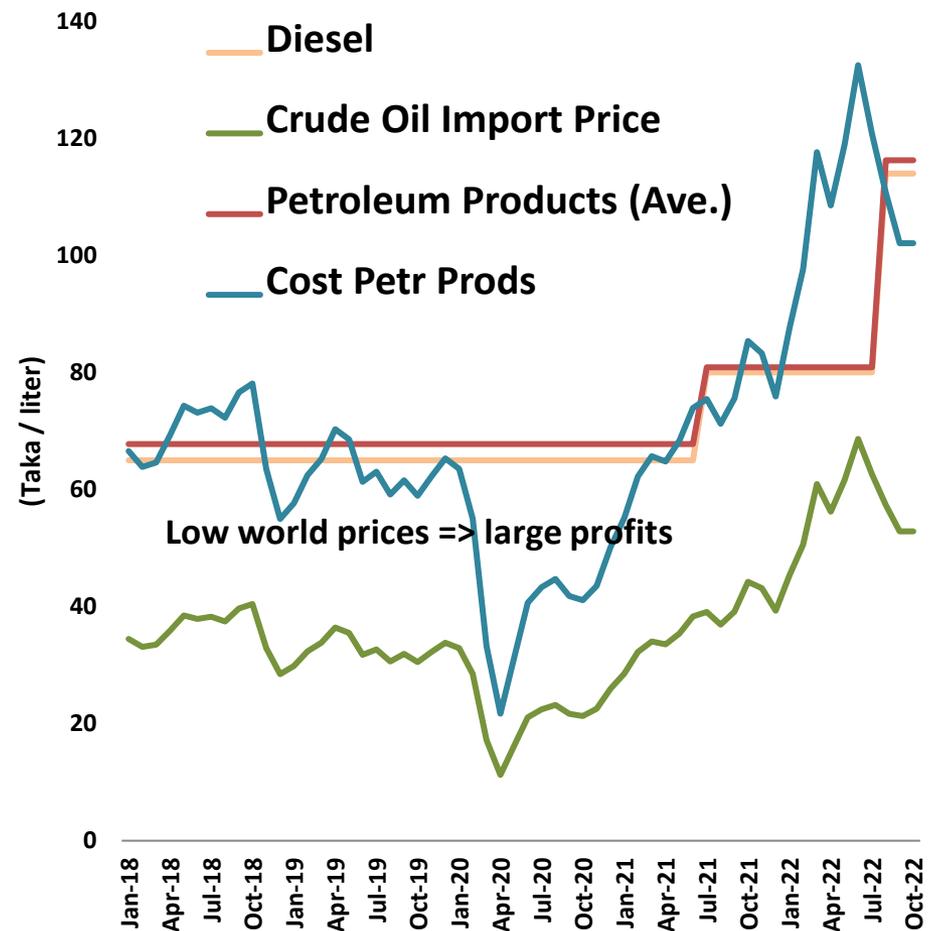
- Annual Price change (%) over previous year Crude Oil
- Annual Price change (%) over previous year Refined Oil
- ◆- Price change (%) compared to 2020-21 Crude Oil
- Price change (%) compared to 2020-21 Refined Oil

Retail Price (BDT/liter) of Petroleum in Bangladesh



Domestic Price vs Global Price of Petroleum Products

- Domestic price of petroleum products did not have much fluctuations (the flat lines)
- During 2018-2019: cost of petroleum products is pretty much moving along the fixed price line, which suggest the BPC did not incur any loss or gain profit.
- During 2020: the price of crude oil slump, BPC was potentially reaping profit given the cost of producing petroleum is less than the sale price.
- Price of petroleum was only increased in July 2021; further increased in July 2022 a few months after the Russia-Ukraine war started.
- Despite the sharp rise in the import price, the domestic price was not increased immediately,
- In January-June 2022 : BPC incurred losses given the cost of producing petroleum is higher than the sales price.
- BPC used half of its profits (210 billion BDT) from the 2020 year to finance the losses (The Daily Star, 2022).

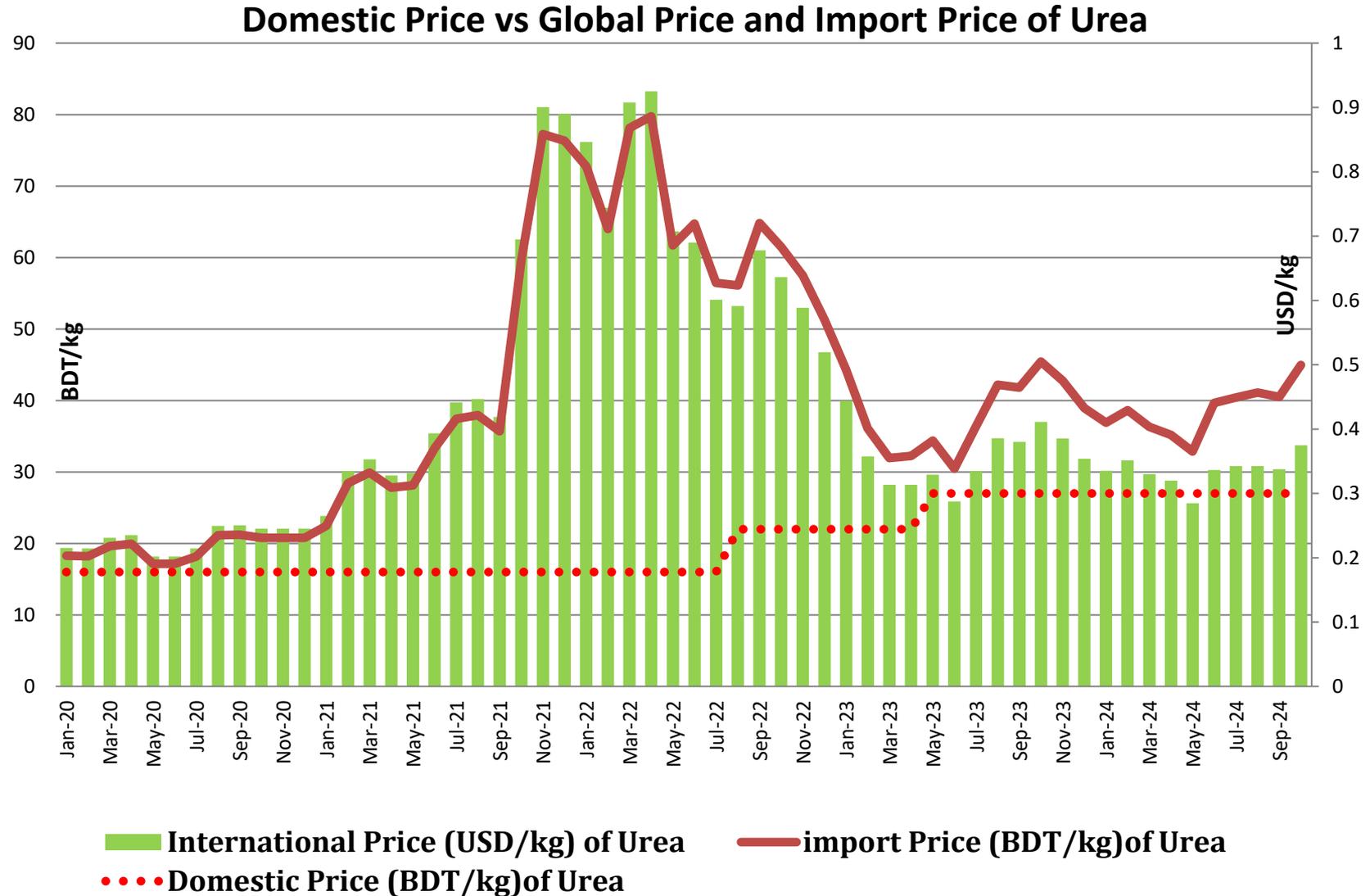


Global Price Trend:

Domestic Price vs Global Price of Fertilizer

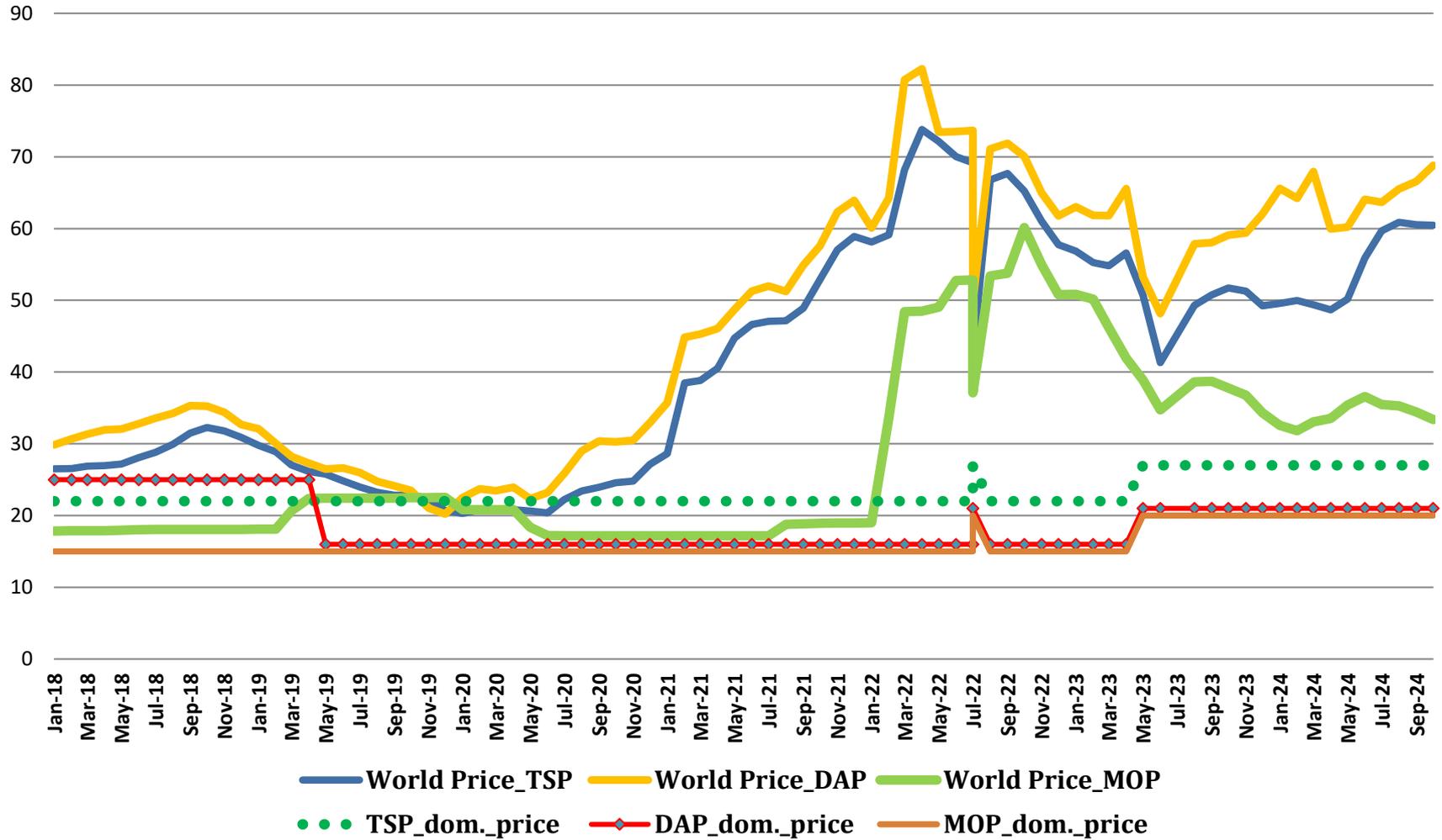
- Fertilizer price in Bangladesh is controlled by the government in order to maintain price stability.
- Despite the increased global price of urea and DAP in world markets in mid-2020; the domestic price was constant. This creates a large gap between domestic and border prices and it keeps rising substantially until mid-2022.
- But, the price gap on urea started to reduce in July 2022 when the world price started heading down while government increased domestic price of urea.
- January 2021 to June 2022: the international price of urea rose from Tk 27.8 to Tk 73.7 per Kg while the domestic price was at Tk 16.0 per Kg [ratio of the domestic price to the border price fell sharply from 0.58 to 0.22].
- Over burden on government with larger subsidy to maintain domestic urea price over time.
- July 2022: the government raised the price of urea to Tk 20.5 to reduce the cost of subsidy. But, the border price of urea dropped to Tk 65.2 per Kg in this same period pushing the ratio of the domestic price to the international price to 0.27, which still indicates the large amount of subsidy provided by the government.
- Government provided Tk 40 billion of fertilizer subsidy in 2022 which was used in our policy simulation.
- May 2023: Domestic price of urea was raised up to 27 t per g. despite fall in global price. However port price of urea decline disproportionately due to high depreciation of BDT against USD. Government still provided subsidy of around 16000 crore BDT on fertilizer in 2023-24.

Domestic Price vs Global Price and Import Price of Fertilizer (Urea)



Global Price vs Domestic Price (BDT/kg) of TSP & MOP & DAP

Global Price vs Domestic Price (BDT/kg) of TSP & MOP & DAP

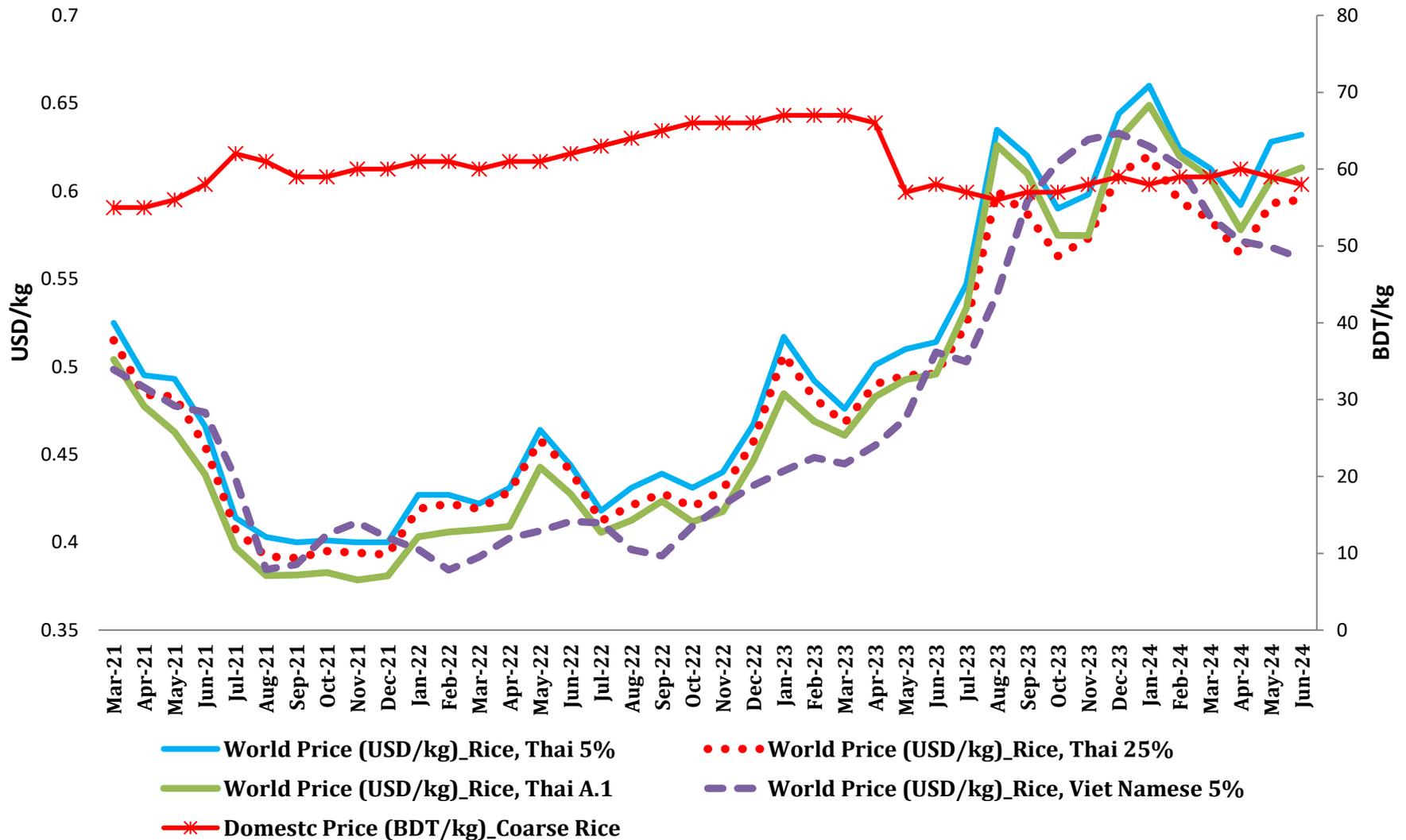


Global Price Trend: Domestic Price vs Global Price of Food

- Increased international price rice, wheat, maize, and edible oil increased import cost of Bangladesh up to April, 2022.
- But, domestic price of rice, maize, edible oil showed upward trend despite the fall in price of in international market starting from May 2022. And, domestic price of wheat followed a rising trend along with the persistent increase in price of wheat at international market.
- Unlike prices of petroleum and fertiliser, food prices are not set by the government. Thus, the global price shock, in theory, can be transmitted more easily into the domestic food market. In the simulations that follow, we increase the world prices (in real US dollars) of wheat, maize and edible oils by 47.1 per cent, 8.0 per cent, and 38.4 per cent respectively, and lower the world price of rice decreases by 15.6 per cent, reflecting average world price movements from April-June 2021 to July-September 2022 (WB, 2022).

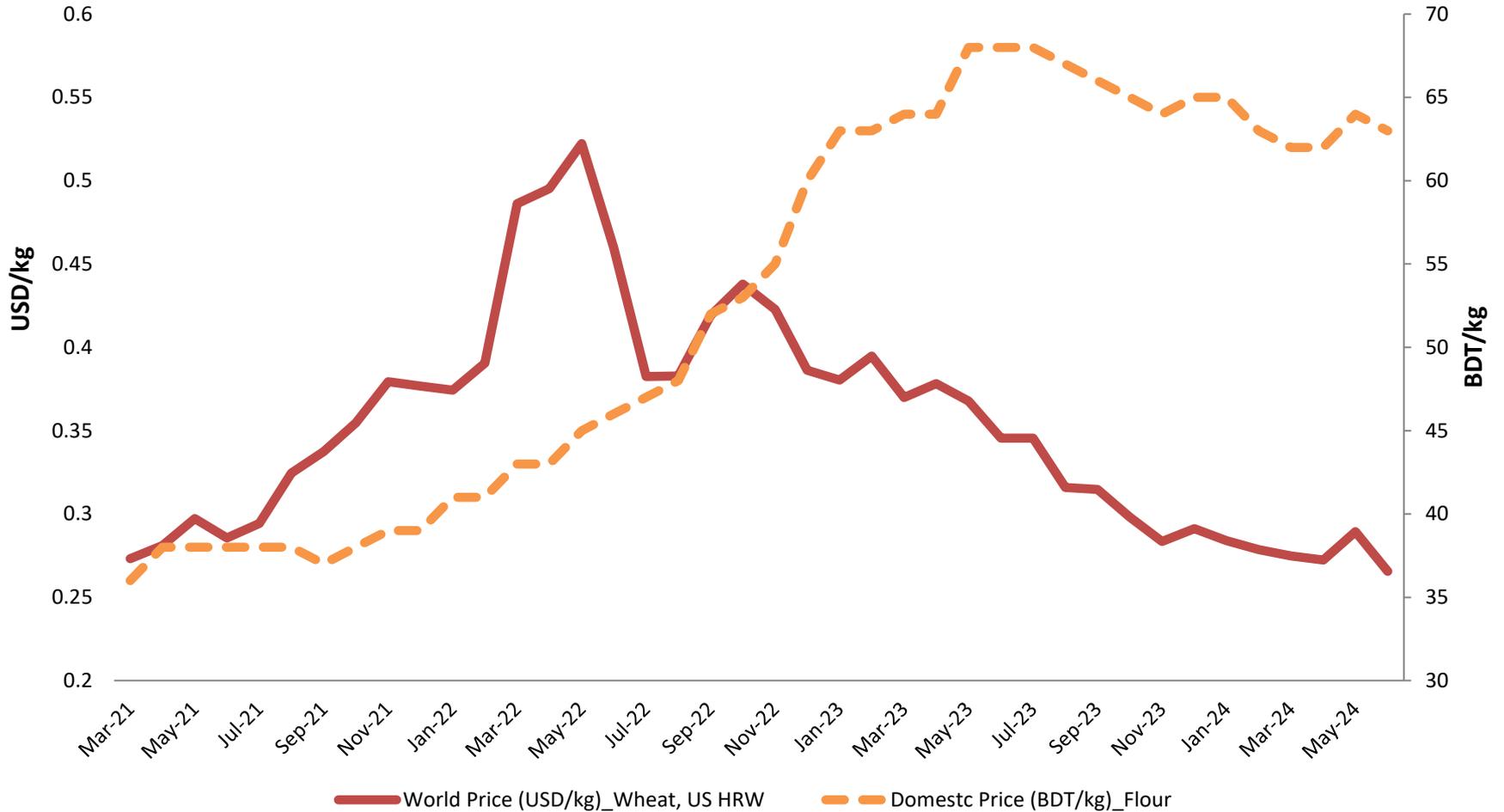
Global Price Trend: Domestic Price vs Global Price of Food

Domestic Price vs Global Price of Rice



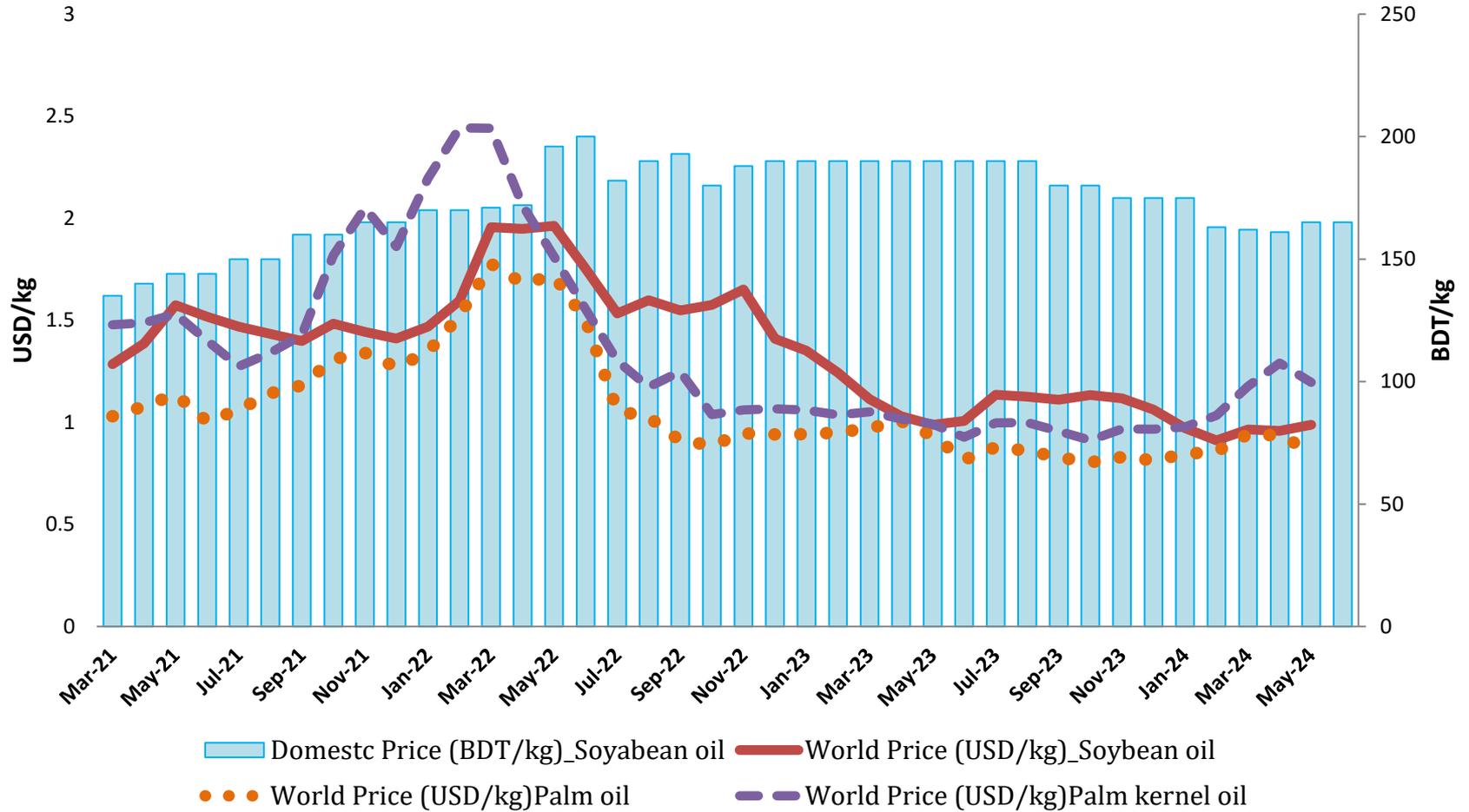
Global Price Trend: Domestic Price vs Global Price of Food

Domestic Price of Flour vs Global Price of Wheat



Global Price Trend: Domestic Price vs Global Price of Food

Domestic Price vs Global Price of Edible Oil



Design of Model Simulations

- We calculate the magnitudes of the external price shocks for each commodity **as the percentage change of the three-month average prices** from April-June 2021 to July-September 2022 (a fifteen-month period).
- **Price Shocks:** Simulations 1, 2 and 3 model the 2022 international prices shocks on petroleum, fertiliser, and food commodities, respectively. Simulation 4 models the combined effects of Simulations 1, 2 and 3 to capture the full impact of the global price shocks during the Russia-Ukraine war period.
- **Policy Options:** We simulated different policy options to mitigate the negative effects of each price shock. We assume the government provides subsidies to the affected sectors and provides cash transfers to poor households in the lowest 20 per cent income bracket.
- **Decline in global prices:** We also consider the impact of the decline in global prices in 2023 as the conflict in Ukraine subsided and commodity trade flows stabilized. In these scenarios, we assume that the policy interventions to offset global price rises are removed.

Methodology

Simulation Analysis using Bangladesh RIAPA Model

Model

Data

Global
Commodity Price
Data

Government
Subsidy Data

Bangladesh
Social
Accounting
Matrix (2019)
86 sectors
13 factors
15 households

Bangladesh
HIES 2017



CGE Model

Global Price
Shocks



Policy
Responses



Outcomes (against baseline)

Macroeconomic Variables

Total Absorption (C+I+G)
Total Exports and Imports
Real Exchange rate

Sectoral GDP

Agriculture
Industry
Services

Household and Poverty

Rural-Urban Households
Poverty rate
Poverty headcount

Simulation Design

Global Commodity Price Shocks

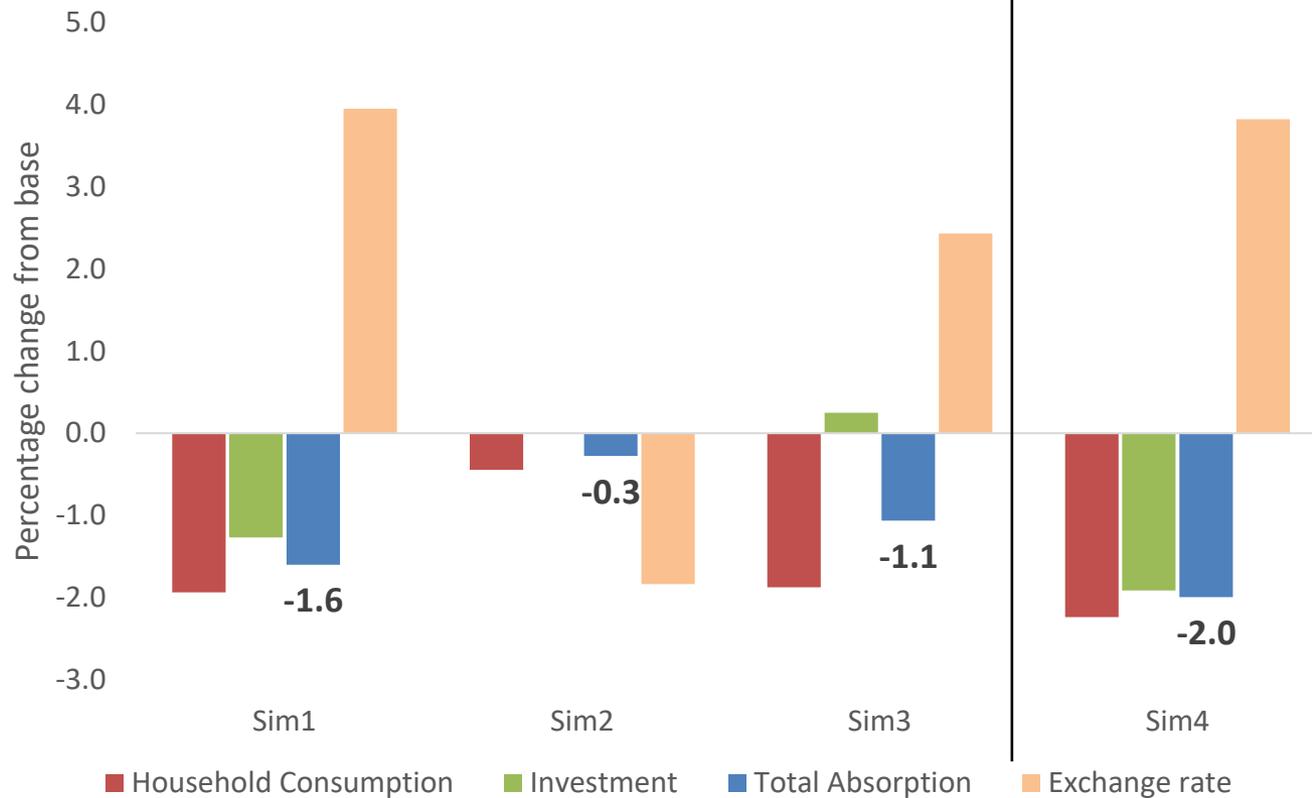
- **Simulation 1:**
Increase in international price for **crude Oil (47.69%)** & **petroleum (71.95%)**
- **Simulation 2:**
Increase in international price for **fertilizer (59.1%)** following and reduce **crops productivity**
- **Simulation 3:**
Increase in international price on **food commodities** (i.e., rice **(-15.6%)**, wheat (47.1%), maize (8%) and edible oils **(38.4%)**)
- **Simulation 4:**
International price shocks introduced in simulation 1, 2 and 3 with exchange rate devaluation.
- **Simulation 9:**
Decrease in international price for **crude Oil (-20%)** & **petroleum (-21%)**
- **Simulation 10:**
Increase in international price for **fertilizer (46.3%)** following and reduce **crops productivity**.
- **Simulation 11:**
Increase in international price on **food commodities** (i.e., rice **(-23.3%)**, wheat (29.6%), maize **(-23.9%)** and edible oils **(-33.3%)**).
- **Simulation 12:**
International price shocks introduced in simulation 9, 10 and 11 with exchange rate devaluation

Economic Policy Response

- **Policy 1 (Simulation 5):**
Simulation 1 plus **subsidy on petroleum products** amount for 110 billion Taka.
- **Policy 2 (Simulation 6): :**
Simulation 2 plus **subsidy on fertilizer products** amount for 40 billion Taka and **increase crops productivity**.
- **Policy 3 (Simulation 7): :**
Simulation 3 plus **targeted cash transfer** to the bottom 20% of households amount for 26 billion.
- **Policy 4 (Simulation 8): :**
Simulation 4 plus all policy responses introduced in Policy 1, 2 and 3.

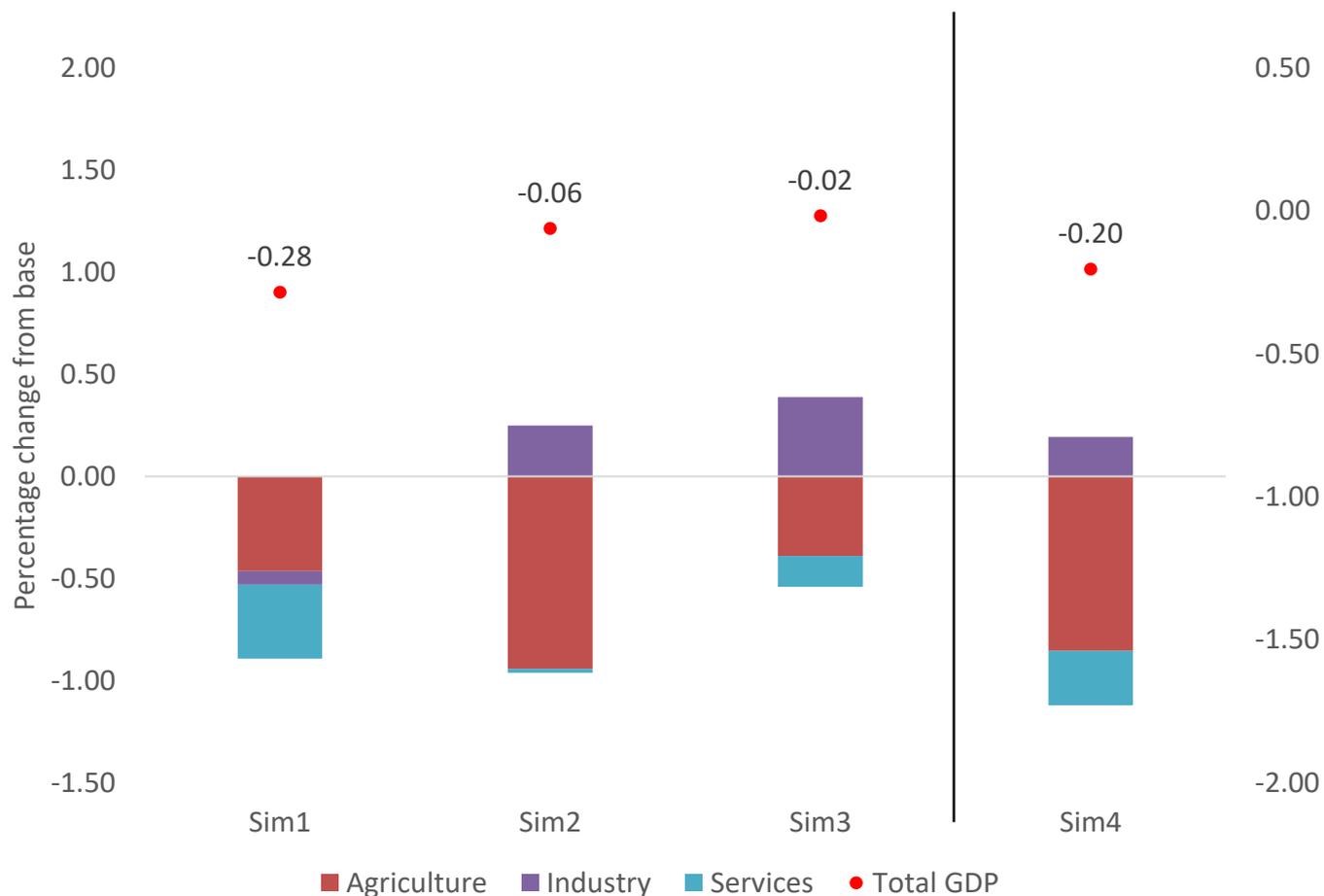
Global Price Shocks on Macroeconomic Variables

Reduction in national welfare (absorption) mainly driven by reduction in household consumption



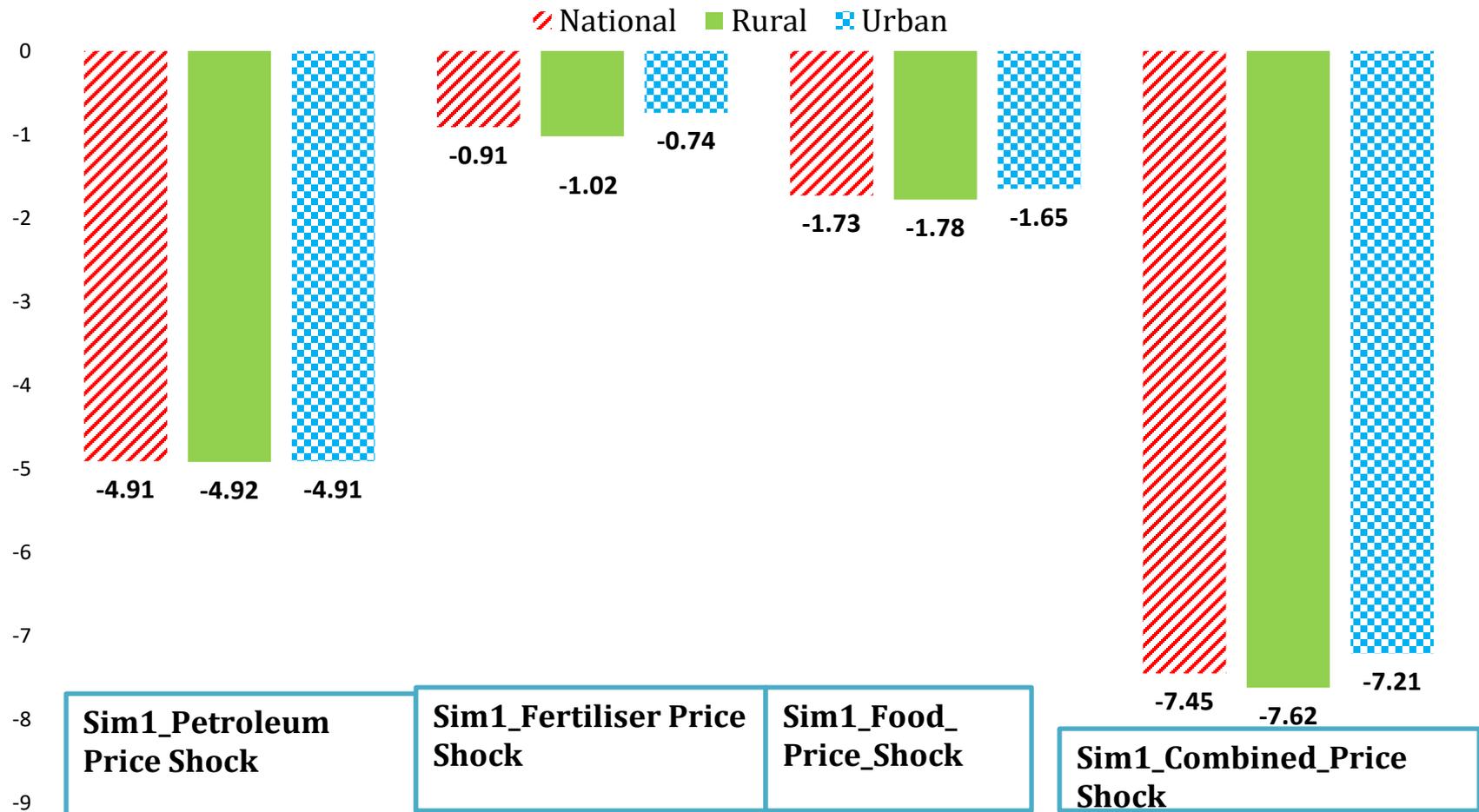
Global Price Shocks on Sectoral GDP

Agricultural GDP is the most affected sectors under all scenarios



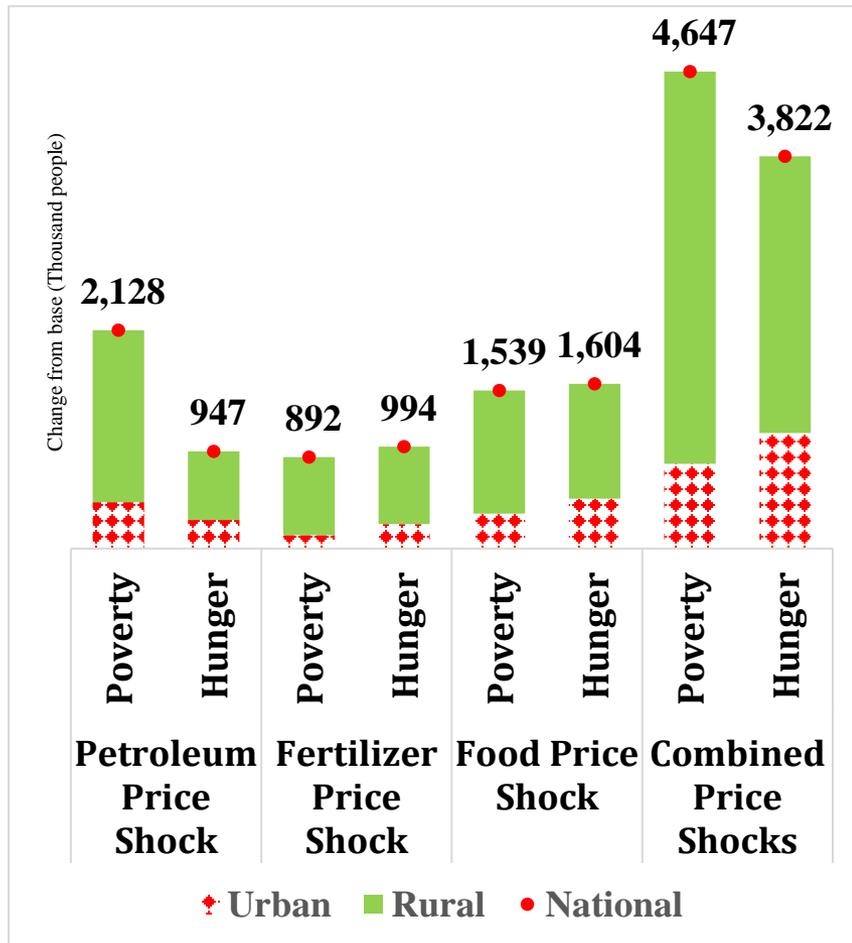
Global Price Shocks on HH Income

SIMULATED EFFECTS OF INITIAL PRICE SHOCKS ON HOUSEHOLD INCOMES IN BANGLADESH (% CHANGE)

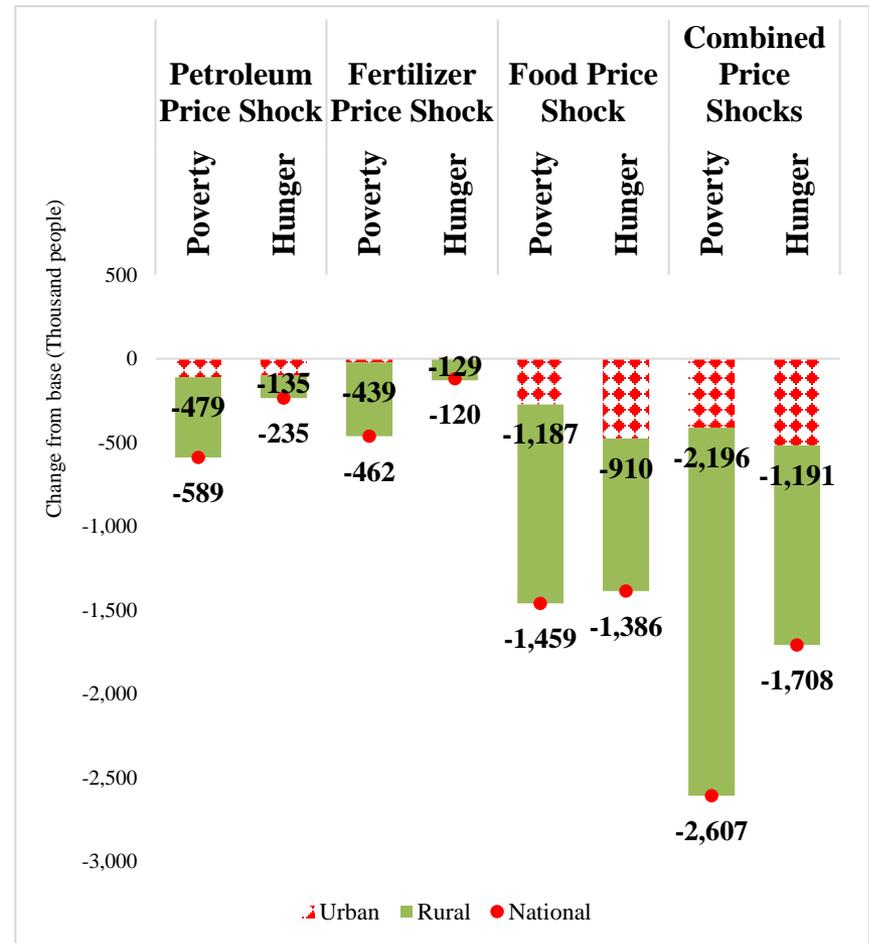


Impacts of Increased Price Shock vs Lower World Prices on Poverty and Hunger

Simulated Impacts of Increased Price Shock on Poverty and Hunger, 2022

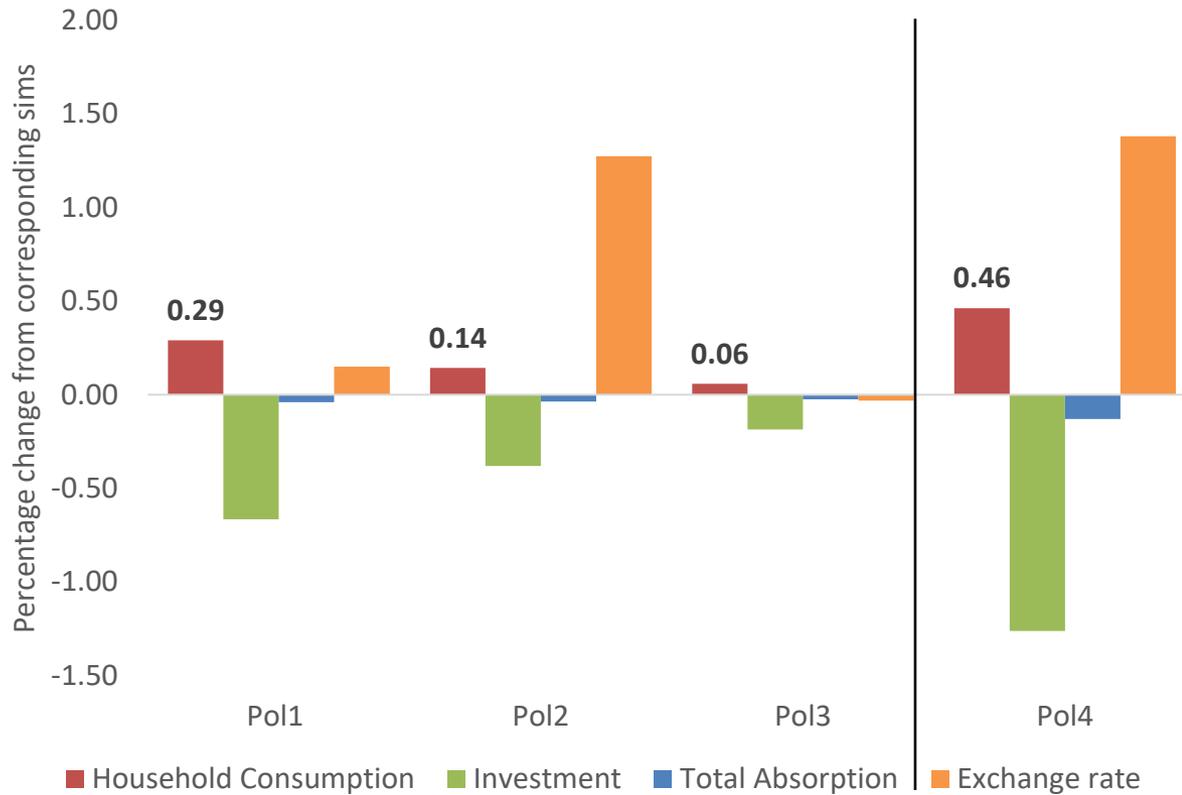


Simulated Impacts of Lower World Prices on Poverty and Hunger, 2023



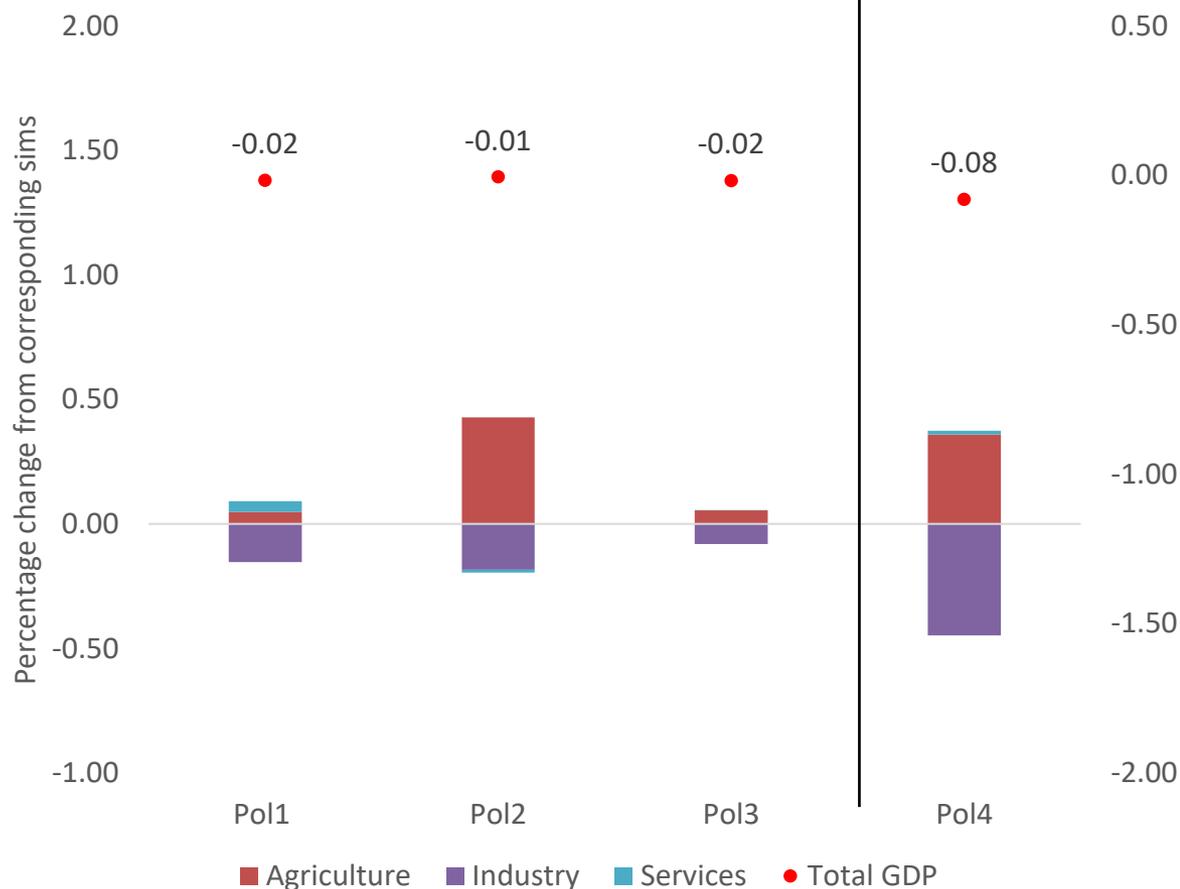
Policy Impacts on Macroeconomic Variables

Fuel subsidy increases consumption the most but with the expense of reduction in investment



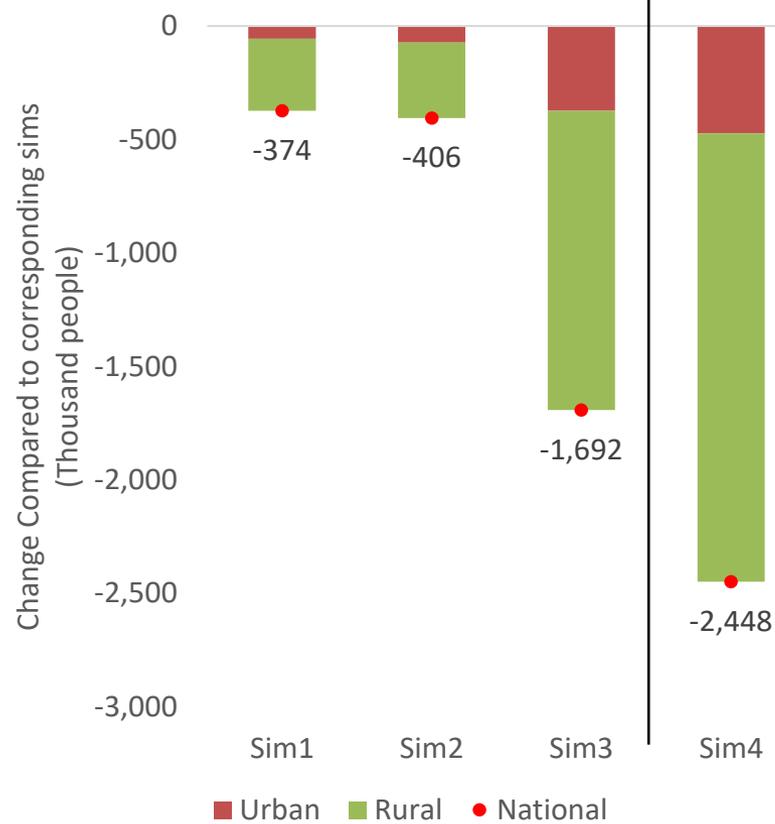
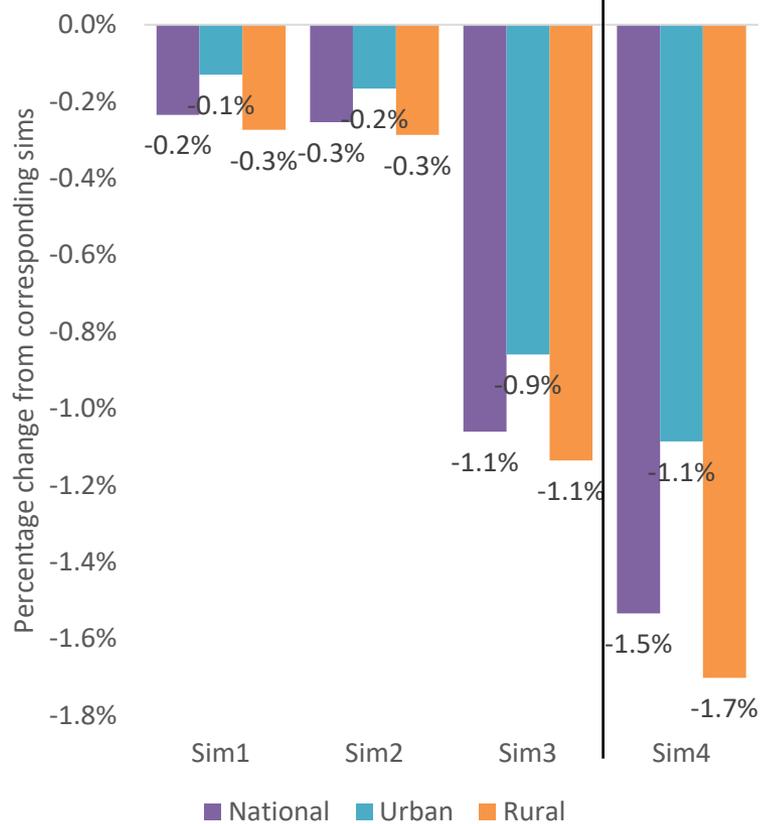
Policy Impacts on Sectoral GDP

Agricultural sector is benefited the most under fertilizer subsidy



Policy Impacts on Poverty

Targeted cash transfer program is more effective in reducing poverty



Conclusion and Policy Implications

- Spike in global commodity prices caused by Ukraine war negatively affected Bangladesh economy, reducing national welfare by 2 percent pushing an estimated 4.7 million people into poverty and added 4 million people to the total hunger.
- Agriculture sector is the mostly affected sector given the strong interlinkages with the affected sectors.
- Rural household especially the vulnerable groups who earn most income from agriculture are worst affected, pushing around 3 million people into poverty.
- Increase in subsidy on fuel products help spur consumption, but with the cost of reduction in investment demand.
- Adding fertilizer subsidy helps spur agriculture production the most, while cash transfer is most effective in reducing poverty.
- Cash transfer program requires the least government budget than the subsidy programs but providing the highest impact in reducing poverty.
- Subsidy programs usually do not target certain population group and difficult to reverse once it's increased.
- reductions in petroleum and fertiliser prices between the years 2022 and 2023 resulted in declines in both poverty and hunger rates.
- the price reduction helps around half a million people escape from poverty, and there are around one to two hundred thousand people who get away from hunger status.
- The more significant impact on poverty and hunger reduction is observed in the global food price reduction scenario , with almost one and a half million people escaping from poverty and hunger.

Thank You !