

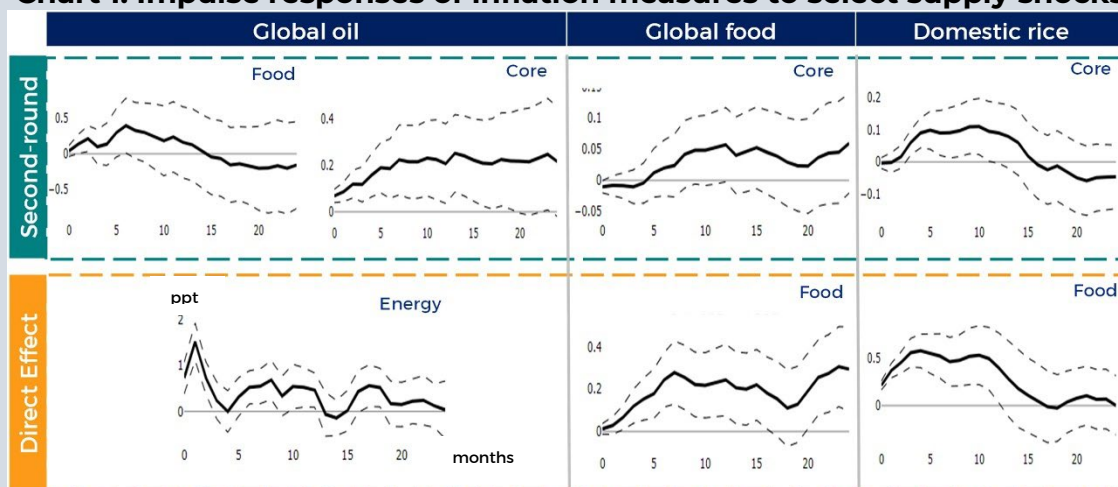
## Box article no. 2: Second-round effects of supply shocks on inflation<sup>1</sup>

The Philippines experienced successive supply shocks from 2021 to 2023 which exerted significant upward pressures on inflation. Given the large swings in oil and food prices, assessing the inflation outlook requires an understanding of how these price changes affect domestic inflation including the indirect or so-called second-round effects. The standard view is that monetary policy should look through transitory supply shocks if there are no observed second-round effects due to the lags in monetary policy transmission. However, looking through supply shocks in the presence of second-round effects may not be optimal since the central bank can bring inflation closer to the target with a corresponding policy response (Bandera et al., 2023).

This note estimates the direct and second-round effects of shocks to global oil, global food, and domestic rice prices on various measures of inflation as well as inflation expectations for the Philippines.<sup>2</sup> In the case of oil price shocks, the direct effect is defined as the impact on energy inflation, while the second-round effect is the weighted impact on core and food inflation. Meanwhile, for food shocks, the direct effect refers to the impact on food inflation, while the second-round effect reflects as the impact of the shock on core inflation. In addition, we examine whether there is some asymmetry in the pass-through of a price increase vis-à-vis a price reduction on headline, core, and inflation expectations.

### Oil and rice price shocks have significant and persistent second-round effects

Chart 1. Impulse responses of inflation measures to select supply shocks



Source: Allon-Pineda, Ocampo, and Santos (2024)

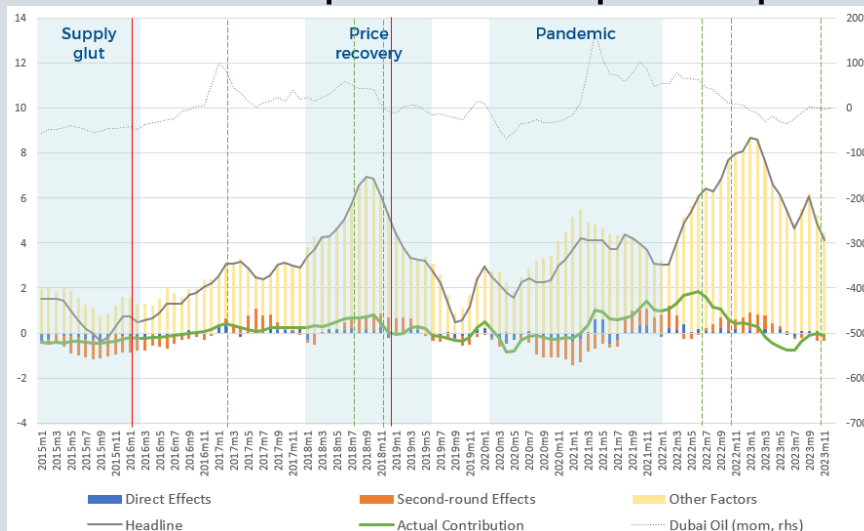
Chart 1 shows the impulse responses of core, food, and energy to oil and food price shocks. The first column suggests that a 10-percent increase in Dubai crude oil prices leads to second-round effects that are smaller than the direct effects but are longer-lasting. This combined impact on core and non-core food inflation builds and persists for 18 months and, at its peak, reaches 0.28 ppt on the 13<sup>th</sup> month. The combined direct and second-round effects of global oil price shocks on headline inflation last for a year and reach a peak of 0.40 ppt on the 11<sup>th</sup> month, consistent with the findings of Alp, Klepacz, Saxena (2023) and Choi et. al. (2018) for advanced economies.

Looking at the second column, a one percent increase in global food inflation is found to have a significant and persistent direct impact on non-core food inflation but minimal second-round effects with the impact on core inflation being insignificant over the horizon. The weak pass-through may be attributed to the

global food price index not being able to adequately capture domestic price movements. For instance, rice prices comprise only 2.2 percent of the food basket in the IMF’s index, compared to the 8.9 percent share in the domestic CPI, suggesting that the former may not be representative of the latter. By contrast, the impact of a one percent increase in domestic rice prices leads to significant second-round effects that appear by the third month and persist for a year with a peak of 0.11 ppt on the 10<sup>th</sup> month. The significant indirect effect as well as the larger direct effect is due to the importance of rice in the Filipino food basket.

**Second-round effects of oil price shocks outweigh their direct effects**

**Chart 2. Historical decomposition of the impact of oil price shocks**

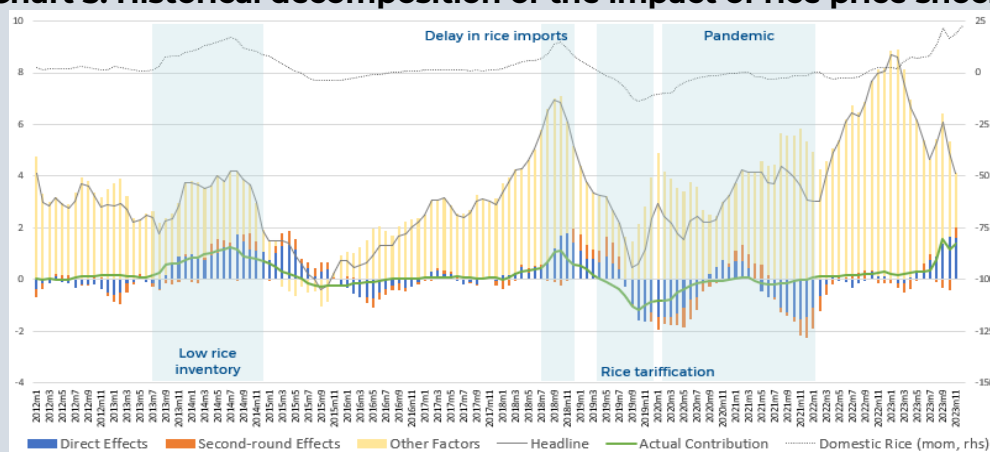


Note: -- upward PUJ fare adjustments; -- downward PUJ fare adjustments  
 Source: BSP staff estimates

Chart 2 decomposes headline inflation into the impact of historical oil price shocks. Second-round effects appear to outweigh the contribution of direct effects to headline inflation since oil serves as an intermediate input to the production of other goods and services. Gasoline and diesel prices account for only 2.4 percent of the CPI basket while items affected by higher oil prices such as transport services have higher CPI weights. When matched with known oil shock episodes, negative second-round effects are observed a few months into the global oil supply glut of 2014-2015, the start of the pandemic in 2020, and two of the four times when public utility jeepney (PUJ) fares went down. Meanwhile, positive second-round effects appeared during the global oil price recovery in 2018 as well as in six of the eight times when PUJ fares increased. To further validate the estimates, the direct effects of oil price shocks on headline inflation are observed to align with the actual changes in Dubai crude oil prices and the actual contribution of gasoline and diesel prices.

## Direct effects of domestic rice price shocks larger than second-round effects

**Chart 3. Historical decomposition of the impact of rice price shocks**

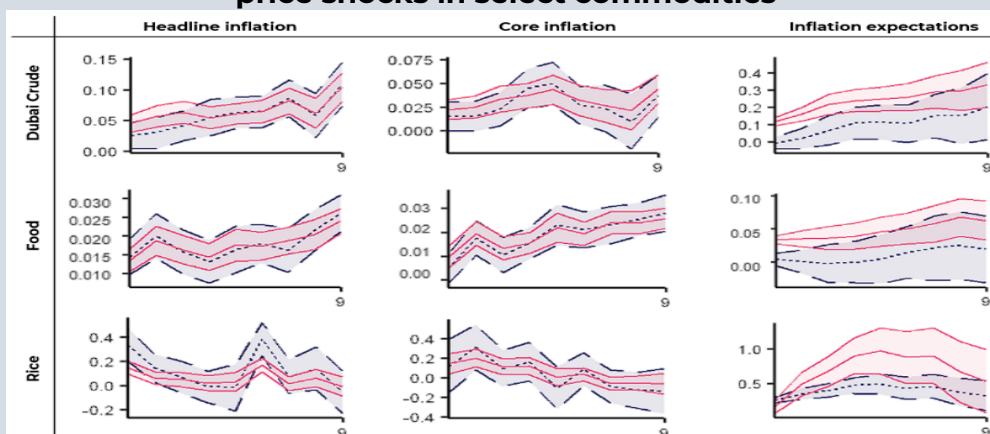


Source: BSP staff estimates

Compared with the impact of oil price shocks, the impact of domestic rice price shocks has larger direct effects on headline inflation relative to the contribution of second-round effects (Chart 3). Moreover, the estimated direct effects of rice price shocks on headline inflation are aligned with the actual contribution of rice prices. The larger direct impact can be attributed to the significant share of rice in the CPI basket and its limited role in the production of other goods and services. When matched with known rice price shock episodes, positive direct and second-round effects are observed in the latter part of the low rice inventory episode in 2013-2014<sup>3</sup> and the delays in rice imports in late 2018. Meanwhile, negative direct and second-round effects appeared months following the enactment of the rice tariffification law and continued well into the pandemic.

## Price shocks tend to induce an asymmetric response to inflation expectations

**Chart 4. Impulse response functions of inflation to price shocks in select commodities**



Note: Red lines indicate positive price shocks on commodities, while blue lines indicate negative price shocks. To facilitate direct comparison, we flip the signs of the impulse response functions of a negative price shock. All results are reported using 95 percent confidence intervals based on robust standard errors.

Chart 4 shows the impulse responses of headline inflation, core inflation, and inflation expectations to both positive and negative supply shocks coming from domestic rice, global food, and Dubai crude oil prices.<sup>4</sup> Given the overlap in the confidence intervals seen in the first two columns, there appears to be no asymmetry, in terms of magnitude and speed, in the inflationary response to positive or negative price shocks to both headline and core inflation.

However, looking at the third column, inflation expectations, as measured by the month-ahead inflation forecasts of professional analysts, appear to respond asymmetrically towards price shocks coming from global food and Dubai crude oil. Comparing shocks of the same magnitude, positive price shocks tend to raise inflation expectations more than negative price shocks tend to decrease inflation expectations. Additionally, the median response of inflation expectations towards a positive price shock tends to be slightly higher, possibly indicating that expectations are stickier in the face of downward price adjustments. In the case of domestic rice price shocks, positive price shocks trigger an increase in inflation expectations that is more dispersed, possibly indicating higher uncertainty.

#### Endnotes:

1/ The authors of this box article are Joan Christine Allon-Pineda, Jan Christopher Ocampo, and Eduard Renzo Santos of the Department of Economic Research. A full version of this study will be forthcoming in the BSP Discussion Paper Series.

2/ As suggested in Alp, Klepacz & Saxena (2023), we measure the impact and duration of the second-round effects of key price shocks on domestic inflation using a local projections approach. As an extension from the said reference note which only looked at oil price shocks, the estimations in this paper also consider global food and domestic rice price shocks, as well as the impact of such shocks on inflation expectations. Headline inflation is also historically decomposed into the direct and indirect contributions of each selected shock using the estimation technique outlined in Benigno et. al. (2022).

3/ Typhoon Haiyan and government actions against agri smugglers and hoarders led to low rice inventories in 2013-2014.

4/ The impulse response functions are derived using a state-based local projections model, with the “state” being an upward or downward adjustment in the shock variables.

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