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Global Commodity Inflation Pass-through: Vulnerability of Small Island Developing States

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Global Commodity Inflation Pass-through: Vulnerability of Small Island Developing States
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ABSTRACT: We examine the vulnerability of inflation in Small Island Developing States (SIDS) to global food and fuel inflation changes, drawing on a large panel of 168 countries, including 31 SIDS. Estimates using the local projections methodology of Jordà (2005) reveal that inflation in SIDS is nearly twice as responsive to international food commodity inflation shocks as in non-SIDS counterparts. There is also evidence of asymmetry in food inflation pass-through, with food-inflation increases having larger pass-through than equivalently sized food-inflation decreases. Results hold even in the presence of country-specific fixed-effects and other control variables, most notably the weight of food and oil in a country's CPI basket, further strengthening the finding that there is something SIDS-specific leading to higher food inflation pass-through. In the case of shocks to international crude oil inflation, the disparity between SIDS and non-SIDS is less apparent. Our results can be interpreted as indicating that market structures, dependence on imports, and the health of supply chains impact food-inflation passthrough, and should thus be priority areas for policymakers in SIDS.

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WORKING PAPERS

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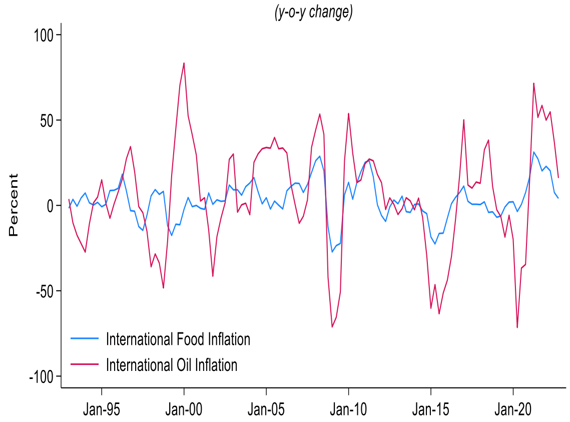
Introduction

Due to their small size and isolated geographic location, Small Island Developing States (SIDS) face extreme vulnerability to external economic and inflation shocks. These vulnerabilities have been highlighted over the last two decades, first during the 2008-2009 global financial crisis and more recently during the COVID-19 pandemic. During these periods, global commodity price shocks associated with disruptions to global supply chains or sharp changes in global demand conditions have had large effects on domestic inflation in SIDS. In this paper, we leverage a large global database of 168 countries (including 31 SIDS) to examine inflation pass-through from global commodity inflation shocks to SIDS using the local projections (LP) method of Jordà (2005). We find that: (i) pass-through from global food inflation shocks to domestic inflation in SIDS is considerably larger than for other countries, whereas the difference in pass-through from oil inflation shocks is less apparent; (ii) asymmetry in the pass-through from positive vs. negative global food price shocks is evident for both country groups, but is slightly larger for SIDS.

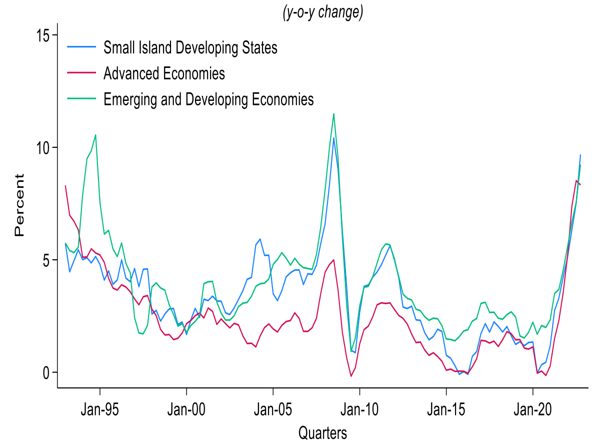
In Figures (1 & 2) we document the evolution of global food and oil inflation, alongside the evolution of headline inflation in SIDS as compared to other economic groupings commonly considered in the literature: Advanced (AE) and Emerging Market and Developing Economies (EMDEs). Inflation among SIDS is higher than in AEs, also exhibiting greater variation over time than other country groupings. This variability corresponds partly to the variability seen in global commodity prices, especially during episodes of large commodity inflation changes (e.g. post-GFC commodity-price declines in 2009, and post-COVID commodity-price increases in 2021-22).

Figure 1: Average Quarterly Point-to-Point International Food and Crude Oil Inflation
(y-o-y change)



Source:International Monetary Fund Primary Commodity Price Database & authors' calculations

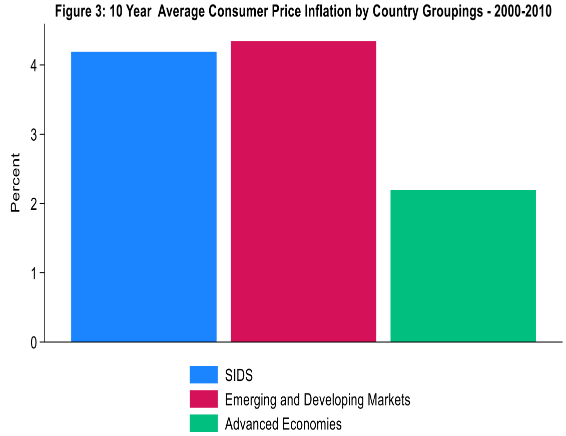
Figure 2: Average Quarterly Point-to-Point Domestic Headline Inflation
(y-o-y change)



Source:Ha et al.,(2023) & authors' calculations

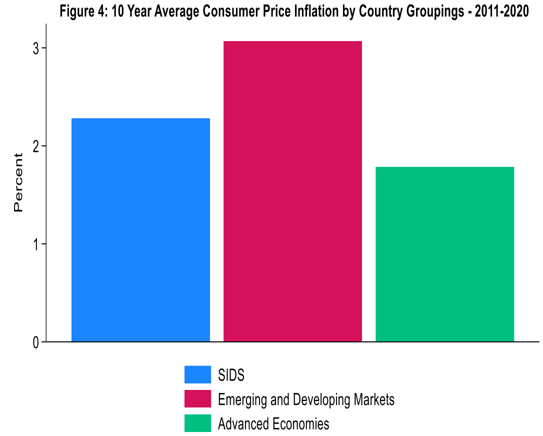
Over the course of the last two decades, inflation in SIDS has averaged 3.1 percent, 0.9 percentage points above the average inflation experienced in AEs and similar to the average of EMDEs. During the 2000-10 period, the gap between SIDS and AE average inflation was 1.6 percentage points (Figure 3). This potentially reflects market connectivity challenges faced by SIDS specific to this period, which may have exacerbated their exposure to global commodity-price shocks. The headline inflation gap of SIDS has closed in the last decade to about 0.5 percentage points, possibly reflecting connectivity improvements with global markets (i.e. supply chains).

Figure 3: 10 Year Average Consumer Price Inflation by Country Groupings - 2000-2010



Source:Ha et al.,(2023) & authors' calculations

Figure 4: 10 Year Average Consumer Price Inflation by Country Groupings - 2011-2020

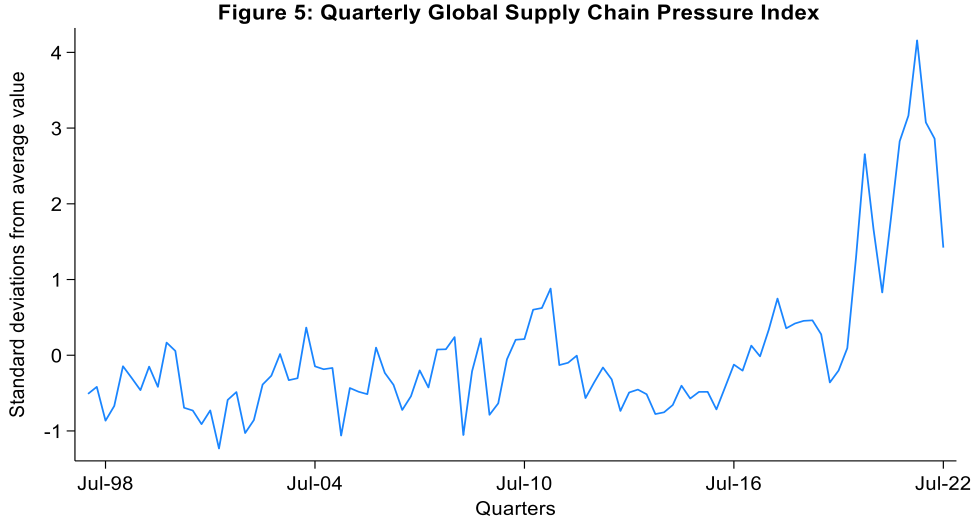


Source:Ha et al.,(2023) & authors' calculations

Among SIDS, Pacific Island and Caribbean countries were disproportionately impacted by the 2008 global food crisis. Several factors are readily identified as having contributed to the sharp rise in global food prices in 2008, including a levelling out of production growth, coinciding with an increase in global demand for food, demand from the bio-fuel sector and speculation in markets for food commodities (Brobakk & Almas, 2011). Another potential explanatory factor was export restrictions in some countries, which may have exacerbated the impact of low harvest levels for some agricultural products (Wright & Bobenrieth, 2009). However, these factors do not explain why SIDS were disproportionately impacted.

An important contributing factor to the higher inflation rates among SIDS is likely their historically more limited integration within the global supply chain, reflecting their remoteness and small market size. This is especially true among Pacific and West African SIDS, while SIDS in the Caribbean region benefit from a relative geographic advantage in relation to the main East-West container shipping routes, (United Nations Conference on Trade and Development, 2014).

Figure 5: Quarterly Global Supply Chain Pressure Index



Source: Federal Reserve Bank of New York, Global Supply Chain Pressure Index, https://www.newyorkfed.org/research/policy/gscpi and authors' calculations

Our study contributes to several strands of the literature on global inflation, and inflation pass-through (or, spillovers). Most directly related is Gelos and Ustyugova (2017) who document commodity-price shock pass-through across different monetary policy regimes and country characteristics, finding that a higher food share in CPI, fuel intensity, and pre-existing high inflation imply higher spillovers, whereas strong governance and central bank independence support lower pass-through. Furceri and others (2016) examine inflation pass-through from global food price shocks, finding similar impacts between AEs and EMs albeit with some variation throughout their sample period (2000-2013), which uses annual data. Looking at oil-inflation pass-through across different country groups, Choi and others (2018) find similar effects for AEs and EMs, with some evidence of asymmetric pass-through depending on the sign of the shock (higher for positive shocks). The share of transportation in the CPI basket, as well as presence of energy-price subsidies, are identified as drivers of pass-through across countries. The presence of asymmetric pass-through across different supply-chain conditions is also documented by Tillmann (2024) for European countries. Relative to these studies, our contribution is to document higher inflation pass-through for SIDS relative to non-SIDS, primarily for food, and also showing that pass-through is asymmetric for positive vs. negative shocks.

More generally, a literature on ‘global inflation’ investigates the degree to which inflation rates across countries co-move due to common global factors. Notable papers suggesting that inflation has increasingly become global (with higher co-movement across countries in recent decades) include Mumtaz and Surico (2008), Ciccarelli and Mojon (2010), and Neely and Rapach (2011). In reaching this conclusion, these studies point to the importance of global and regional factors in explaining co-movement, generally among industrialized countries. Still, other studies view inflation as more domestically driven. Parker (2018), finds that so-called ‘global inflation’ does not extend to middle and low-income countries—while spillovers from global commodity price shocks play a role, there is no evidence of co-movement among inflation rates for non-tradeables (e.g. housing). Bems and others (2022) uphold the importance of domestic factors in explaining inflation rates in a set of 19 EMs. Complementing these results are a set of papers which look more directly at drivers of co-movement in inflation rates. Auer, Levchenko and Saure (2019) show that input-output linkages are important to explain cross-country inflation spillovers, while Carriere-Swallow and others (2023) point to the role played by shipping costs in driving inflation rates across countries.

Previous studies on the inflation dynamics in SIDS highlight the dominance of import-price and supply-side factors (Downes and others, 2020), while also finding a role for domestic factors such as the monetary policy stance. Earlier contributions by Downes, Holder and Leon (1987) and Cumberbatch (1995), affirm the significance of external prices, but also demonstrate the relevance of domestic influences such as consumer credit, wages, labour productivity and unemployment. More broadly, Greenidge and DaCosta (2009) find evidence of both cost-push and demand-pull inflation in the Caribbean countries of Barbados, Jamaica, Guyana and Trinidad and Tobago for the period 1970 to 2006. More closely related to our study, Bai, Tumbarello, and Wu (2016) focusing on twelve Pacific Island countries surmised that the effect of an international oil price shock was smaller, but more persistent than the effect of a food price shock, particularly for oil-producing countries, with the process being driven mainly from the demand-side. Regarding cross-country inflation convergence, Impavido (2018) found that Barbados’ inflation tends to converge to that of the United States, influenced by external forward-looking expectations, with other import prices such as oil prices playing a role in the short-term.

The remainder of the paper is structured as follows. Section II documents the data used for our analysis, and Section III presents our empirical methodology. Section IV presents our baseline results, as they relate to commodity-inflation spillovers to SIDS vs. non-SIDS, including testing for asymmetric effects across positive/negative shocks, as well as robustness tests which support the conclusions of the baseline analysis. Section V concludes with some discussion of the policy implications of our findings.

Data

We collect our quarterly data from various sources. Our main dependent variable is point-to-point domestic inflation, measured as the year-on-year change of the quarterly headline consumer price index, sourced from the global inflation database of Ha, Kose, and Ohnsorge, (2023). We use data beginning from 1992Q1, which implies an initial sample of 202 countries. We then eliminate outliers by purging from our sample the 34 countries which experienced episodes of hyperinflation at some point during the 1992Q1-2022Q4 period, defined here as point-to-point inflation above 50 percent.[1] Our final dataset therefore consists of 168 counties, of which 31 SIDS and 137 non-SIDS.

International point-to-point inflation rates for food and crude oil prices were calculated from the year-on-year change of the food and crude oil price indices in the International Monetary Fund's Primary Commodity Price Database, where the three-month simple average for each quarter was calculated to obtain the quarterly indices.

A proxy of global non-commodity inflationary pressure is utilized as a control for the possibility of so-called 'global' inflationary effects (Ciccarelli and Mojon, 2010, among others). This is done by including contemporaneous changes in the point-to-point core inflation rates of G7 countries. The G7 core price index, which is neither seasonally nor calendar-year adjusted, was obtained from the Classification of Individual Consumption (COICOP) 1999 dataset, through the Organization of Economic Co-operation and Development's (OECD) Data Explorer. To control for possible exchange-rate effects, each country's quarterly (period average) bilateral exchange rate, expressed in national currency units per US dollar, is obtained from the International Monetary Fund's International Financial Statistics Database. Additionally, to control for the effect of supply-chain shocks, beyond their impact on global commodity prices, we use the three-month simple average of the Global Supply Chain Pressure Index (GSCPI) provided by Benigno et al. (2022).

A challenge in working with SIDS data is obtaining a quarterly variable which captures the effect of domestic activity on inflation—a key element of a hybrid New Keynesian Phillips Curve. The absence of quarterly GDP data for the majority of SIDS, alongside a lack of reliable series on other possible proxies—for example, electricity consumption—precludes our ability to include such a control variable in our quarterly, baseline regression analysis.[2] To alleviate any concerns about the omission of this variable on our results, we conduct a robustness check using annual data—at which frequency GDP data readily exist—from which an output-gap series can be constructed. These results are discussed in the robustness section of the paper and support our baseline quarterly findings.

[1] The countries with episodes of hyperinflation include Albania, Angola, Armenia, Belarus, Brazil, Bulgaria, Croatia, Ecuador, Ghana, Guinea-Bissau, Indonesia, Kazakhstan, Lao PDR, Latvia, Liechtenstein, Lithuania, Malawi, Mongolia, Nigeria, North Macedonia, Romania, Russia, Serbia, South Sudan, Sri Lanka, Sudan, Suriname, Sao Tome and Principe, Turkey, Uganda, Ukraine, Venezuela, Zambia, Zimbabwe

[2] Tiedemann and others (2024), conclude that another possible candidate variable to measure demand conditions—cyclical unemployment—was a poor measure of labor market slack, especially in developing economies where informal employment is wide.

Finally, to consider the influence of relative CPI basket weights in explaining the sensitivity of country groupings to global commodity inflation shocks, we obtain the consumer basket weights for the food & beverage and transport components from the International Monetary Fund's Consumer Price Index (CPI) database, where countries report detailed indices and weights for twelve subgroups of consumption expenditure in accordance with the COICOP classification.

Empirical Methodology

Our empirical analysis explores two different topics. First, we examine the persistence of, and potential difference between, global food- and oil-inflation shocks on domestic headline inflation in SIDS vs. non-SIDS. Next, we investigate possible asymmetries in commodity-price pass-through between positive and negative global commodity-price shock episodes.

In each of these empirical exercises we apply the local projections method (Jordà, 2005) to an adapted Phillips curve, and present the resulting impulse response functions. This is done using our large global panel of 168 countries, including 31 SIDS, for the period 1992Q1 to 2022Q4. To first explore food versus oil inflation pass-through to SIDS vs. non-SIDS, our local projections specification is:

$$\pi_{t+h,i} - \pi_{t-1,i} = \alpha_i + \gamma_{i,t}\pi_{t-1,i} + \beta_h^{\text{SIDS,oil}} D_i^{SIDS} X_t + \beta_h^{\text{Non-SIDS,oil}} D_i^{Non-SIDS} X_t + \beta_h^{\text{SIDS,food}} D_i^{SIDS} F_t + \beta_h^{\text{Non-SIDS,food}} D_i^{Non-SIDS} F_t + \theta Y_{i,t} + u_{i,t} \tag{1}$$

Where π_{t+h} represents the year-on-year headline CPI inflation in each country (i), h-quarters ahead. X_t is the year-on-year change in global oil prices, and F_t is the year-on-year change in global food prices. This specification is widely used in the local-projections literature and allows us to differentiate between the effect of global commodity inflation shocks on SIDS vs non-SIDS, by the introduction of two dummy variables which take the value 1 if a country is a SIDS (D_i^{SIDS}) and zero otherwise, or take the value 1 if a country is non-SIDS ($D_i^{Non-SIDS}$) and zero otherwise. Then, the coefficients β_h^{SIDS} and $\beta_h^{\text{Non-SIDS}}$ capture the cumulative impact of each global inflation (oil; food) variable on domestic inflation in SIDS and non-SIDS over the following *h* periods. $Y_{i,t}$ is a vector of control variables, including the bilateral nominal exchange rate, a measure of global supply-chain pressures, and a control for global core inflation. Lagged inflation captured by $\gamma_{i,t}$, is included in the equation to control for domestic inflation persistence, and α_i denotes country fixed effects which account for differences in countries' average values of the dependent variables. For example, these fixed effects would capture cross-country differences in CPI basket weights, distance to source markets, and other such time-invariant country-specific factors. Finally, $u_{i,t}$ is an error term, which is *iid*.

In the baseline specification the number of lags has been set to one.[3] Equation (1) is estimated for each horizon h = {0,…,8} using the ordinary least squares estimator. The impulse response functions are computed using the estimated coefficients β_h, where confidence bands around these estimates are derived from Driscoll and Kraay (1998) standard errors, implying that the equation's errors are robust to very general forms of spatial and temporal dependence as T becomes large, for the β_h coefficients estimated for each horizon *h*.

[3] Though not reported here, results are robust to instead including two lags.

Next, to investigate the possibility of asymmetric effects of commodity-inflation shocks on domestic inflation, we follow Tillmann (2024) and differentiate between positive and negative commodity-inflation shocks. Relative to equation (1) the only addition is the differentiation between each country group (SIDS; non-SIDS) and commodity shock (oil; food) depending on whether the commodity shock is positive or negative. This is accomplished by the inclusion of four dummy variables (two each for oil and food), as opposed to the two dummies used in equation (1) such that in the case of international food inflation shocks:

$$\begin{aligned} D^{food+} &= 1 \; if \; \pi_t^{food} > 0, = 0 \; otherwise, \\ D^{food-} &= 1 \; if \; \pi_t^{food} < 0, = 0 \; otherwise, \end{aligned} \tag{2}$$

Where π_t^{food} represents the year-on-year international food price change. The dummy variables for international oil inflation are constructed in the same fashion such that:

$$\begin{aligned} D^{oil+} &= 1 \; if \; \pi_t^{oil} > 0, = 0 \; otherwise, \\ D^{oil-} &= 1 \; if \; \pi_t^{oil} < 0, = 0 \; otherwise, \end{aligned} \tag{3}$$

In this approach, we can compare the impact on domestic inflation in periods *t+h* of positive vs. negative shocks in period *t* to both international food and crude oil inflation, for SIDS and their global counterparts. The response of domestic inflation is perfectly symmetric for a country group if these coefficients are equal, in absolute terms. Again, confidence bands are constructed using Driscoll and Kraay standard errors.

Next, following Choi and others (2018), we consider the influence of relative consumer basket weights by pre-weighting the respective global commodity inflation shocks explored in equation 1 with each country's food & non-alcoholic beverage and transport weight, respectively.[4] While consumer basket weights exhibit little time variability, we nevertheless opt to reduce our sample time period to 2000Q1-2022Q4 when conducting this exercise, due to limited CPI basket-weight data. Our baseline local projection specification therefore takes the following form:

$$\begin{aligned} \pi_{t+h,i} - \pi_{t-1,i} = {} & \alpha_i + \gamma_{i,t}\pi_{t-1,i} + \delta_{i,t}^{\text{SIDS,transport}} \beta_h^{\text{SIDS,oil}} D_i^{SIDS} X_t \; + \; \delta_{i,t}^{\text{SIDS,transport}} \beta_h^{\text{Non-SIDS,oil}} D_i^{Non-SIDS} X_t \; + \\ & \delta_{i,t}^{\text{SIDS,food\&beverage}} \beta_h^{\text{SIDS,food}} D_i^{SIDS} F_t \; + \; \delta_{i,t}^{\text{SIDS,food\&beverage}} \beta_h^{\text{Non-SIDS,food}} D_i^{Non-SIDS} F_t + \theta Y_{i,t} + u_{i,t} \end{aligned} \tag{4}$$

π_{t+h} continues to represent the year-on-year headline CPI inflation in each country (i), h-quarters ahead. X_t is the year-on-year change in global oil prices, and F_t is the year-on-year change in global food prices. $\delta_{i,t}$ represents the share of food & non-alcoholic beverages and transport in the domestic consumption basket, proxied by the share of these components in the CPI basket of each country.[5] The coefficients β_h^{SIDS} and $\beta_h^{\text{Non-SIDS}}$ capture the cumulative impact of each global inflation variable (oil; food) on domestic inflation in SIDS and non-SIDS over the following *h* periods. We continue to construct confidence band using Driscoll and Kraay standard errors. Our baseline asymmetry specification is also augmented with the relevant CPI basket pre-weighting of the positive and negative commodity inflation shocks.

[4] The availability of both food & alcoholic and transport consumer basket weights becomes increasingly challenging, especially before 2010. To address this, we impute the missing values with the nearest observation. In the case of data gaps, we interpolate with a simple average of earliest and latest basket weight in relation to the gap.

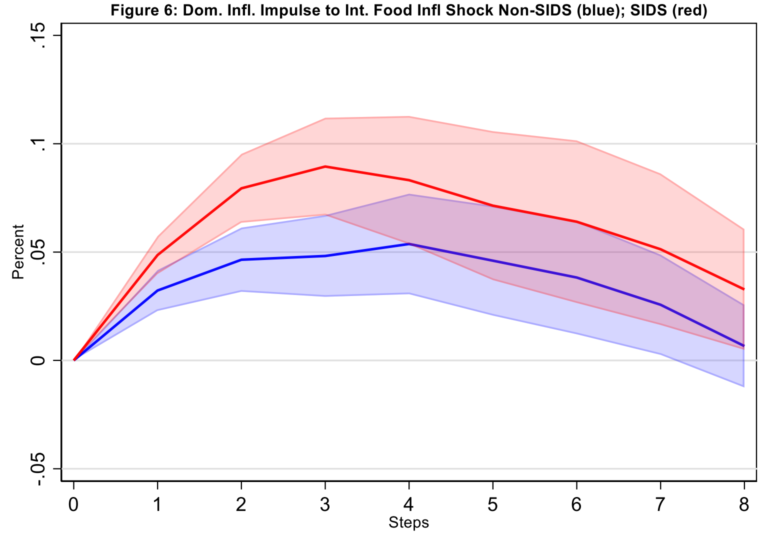
[5] The consideration of consumer basket weights reduces the sample size to 135 countries, of which 23 SIDS.

Empirical Results

Impact of International Food Inflation Shocks

Figure 6 presents the cumulative response of domestic headline point-to-point inflation to a one percentage point increase in international food inflation for both SIDS and non-SIDS, together with 68 percent confidence bands, based on standard errors clustered at the country level.[6] The results indicate that across all SIDS in our sample the impact of the shock is both larger and more persistent relative to non-SIDS for at least the first year after the shock. A 10-percentage point shock to international food inflation culminates in domestic inflation increasing by 0.9 percentage point in SIDS at its peak after three quarters, before dissipating after about two years from the initial shock. The impact for inflation in non-SIDS is by comparison relatively muted, reaching just below 0.5 percentage point a full year after the shock, before effectively disappearing after two years. These results clearly indicate that SIDS are inherently more vulnerable to international food price shocks than their global counterparts, in the short-term especially, with the impact also persisting for longer.

Figure 6: Dom. Infl. Impulse to Int. Food Infl Shock Non-SIDS (blue); SIDS (red)



Note: x-axis in quarters; t=0 is the quarter of the shock (1% to global food inflation). The solid lines are the local projection impulse response functions (reported in percentage points), where small island developing states (SIDS) are represented by red and non-SIDS are represented by blue. The corresponding shaded areas represent their 68 percent confidence bands.

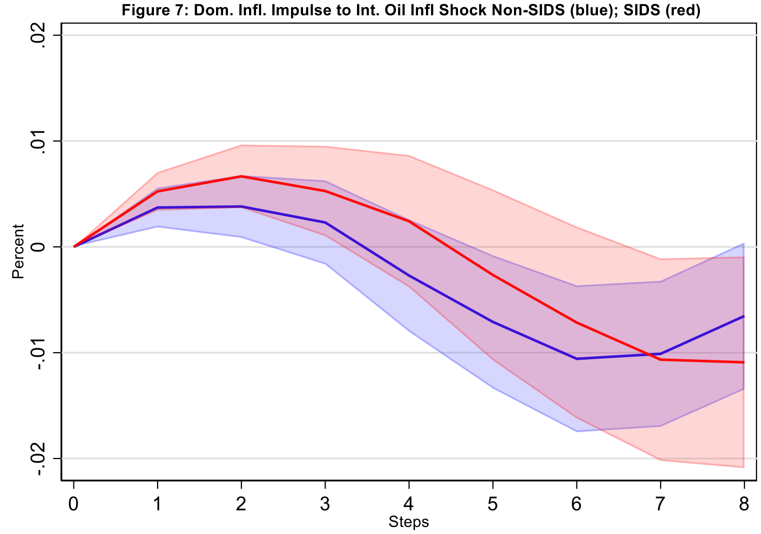
To confirm that the responses of SIDS vs. non-SIDS to a global food inflation shock are statistically significantly different from one another, we conduct F-tests for parameter equivalence. Results support the conclusion that the estimated pass-through is statistically significantly different at the 5 percent (or greater) level of significance in each of the first 4 quarters following the global food-inflation, with the difference dissipating thereafter (Table 1).

[6] Impulse Response Functions with both 68% and 90% and confidence bands are depicted in the appendices.

Impact of International Crude Oil Inflation Shocks

In the case of shocks to international crude oil inflation, the disparity between SIDS and non-SIDS is less apparent. F-tests (shown in Table 1) indicate no statistically significant difference between the two responses at any period following the shock. The results from an oil price shock, presented in Figure 7, are notably smaller for both SIDS and non-SIDS as compared to the impact of food price shocks. This mirrors the results of Gelos and Ustyugova (2017) for a smaller set of countries than we cover in our study, and also Belke and Dreger (2015) for a group of Middle East-North African countries. In the case of SIDS, the cumulative impact on domestic headline inflation peaks after two quarters, with domestic inflation increasing by 0.1 percentage point following a 10-percentage point shock in international crude-oil inflation, and the impact returns to zero after about a year. The comparatively smaller influence of domestic oil price shocks for both economic groupings resonates with other findings on the effects of domestic policies on oil-price pass-through (e.g. subsidies, price ceilings, and other forms of intervention)—see for example Jongwanich and Park (2011), and Kojima (2013) for discussion on the prevalence of regulated fixed prices and subsidies. The impacts at longer horizons are less conclusive.

Figure 7: Dom. Infl. Impulse to Int. Oil Infl Shock Non-SIDS (blue); SIDS (red)



Note: x-axis in quarters; t=0 is the quarter of the shock (1% to global oil inflation). The solid lines are the local projection impulse response functions (reported in percentage points), where small island developing states (SIDS) are represented by red and non-SIDS are represented by blue. The corresponding shaded areas represent their 68 percent confidence bands.

Table 1: F-test statistics for parameter equivalence across country groupings

Baseline Results SIDS vs. Non-SIDS

	t=1	t=2	t=3	t=4	t=8
International Food Inflation Shock	**0.0062*** **	**0*** **	**0*** **	**0.0392** **	**0.0856* **
International Oil Inflation Shock	0.4283	0.1988	0.2127	**0.0545* **	0.4224

Food Commodity Price Shock Asymmetry

	t=1	t=2	t=3	t=4	t=8
International Food Inflation Shock (SIDS)	**0*** **	**0*** **	**0*** **	**0*** **	**0.0965* **
International Food Inflation Shock (Non-SIDS)	**0.0011*** **	**0.0001*** **	**0.0004*** **	**0.0011*** **	0.2351

Notes: p-values; bolded and starred values denote rejection of parameter equivalence across the two regimes, at the 10 (*), 5 (**), and 1 (***) percent level of significance.

Values shown for t = 1 to 4 and 8 quarter(s) after shock.

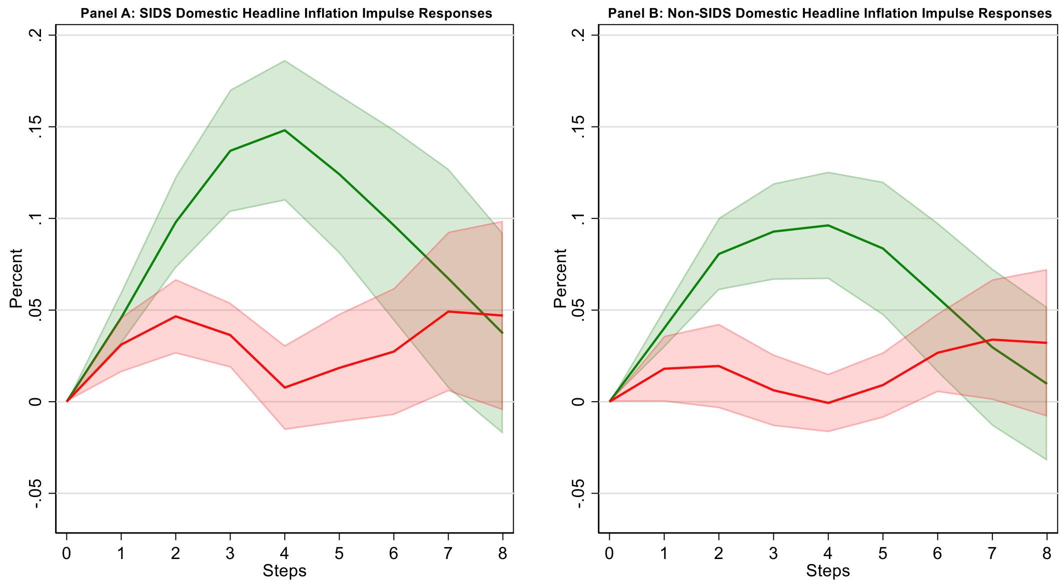
Asymmetric Inflationary Response of SIDS vs non-SIDS to Global Shocks

Small Island Developing States possess characteristics that are conducive to asymmetric pass-throughs of global shocks, such as imperfect market structures and high import dependencies, making them more likely to exhibit higher degrees of non-linearities, reflecting more persistent and volatile inflation responses. To explore this phenomenon, we estimate the impulse responses of domestic inflation to international food and crude oil inflation shocks using Equation (2), again distinguishing between the inflationary dynamics of SIDS and non-SIDS, but this time differentiating between positive and negatively signed shocks to commodity prices.

Asymmetric International Food Inflation Shocks

In the case of international food price shocks, we find evidence of an asymmetric pass-through for both SIDS and non-SIDS, shown in Figure 8, Panel A and B, respectively. In these charts, the IRFs for negative shocks have been inverted to allow for easier comparison to those for positive shocks. A positive shock to international food inflation impacts domestic inflation more than a negative international food-price shock. While asymmetry is evident in both cases, SIDS are unique in that asymmetries appear to be more strongly statistically significant with positive shocks having larger inflationary effect on domestic prices, relative to global counterparts. The cumulative impact from the positive shock is larger for SIDS, peaking at around 0.15 percentage points after 4-5 quarters. This compares to a peak inflation response of below 0.1 percentage point for non-SIDS when faced with a positive shock to international food inflation. Asymmetries become less apparent beyond two years after the shock, consistent with another study conducted in the case of Malaysia, (Hasan & Masih, 2018). The results reiterate the vulnerabilities of countries to international food price shocks, highlighting that over time even if the net incidence of positive- and negative-signed food-inflation shocks is zero (i.e. as many positive as negative shocks), the cumulative impact on domestic inflation is likely to be positive.

Figure 8: Impulse Response of Domestic Headline Inflation to a Int. Food Inflation Shock +ve (green); -ve (red)



Note: x-axis in quarters; t=0 is the quarter of the shock (1% to global oil inflation). The solid lines are the local projection impulse response functions (reported in percentage points), where positive shocks are represented by green and negative shocks are represented by the color red. The corresponding shaded areas represent their 68 percent confidence bands. Negative impulse responses and corresponding confidence bands are inversed to facilitate the visual comparability of positive and negative shocks.

Baseline Robustness Checks

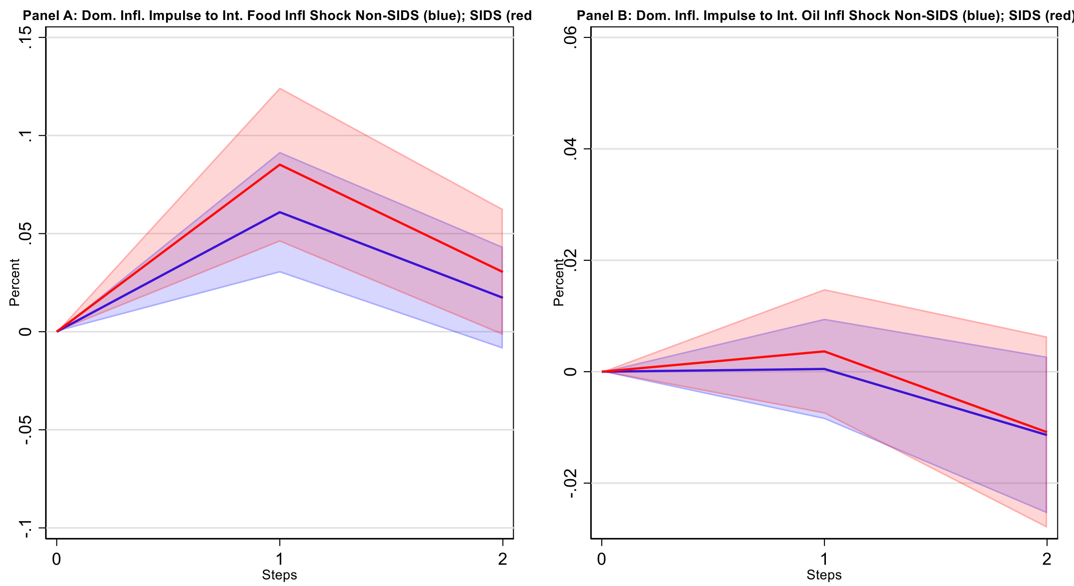
One concern regarding the quarterly impulse responses presented in our baseline analysis is the lack of a control for domestic business cycles, which would generally be expected to influence domestic inflation. As noted previously, our omission of such a proxy within the quarterly specification is due to data constraints among SIDS. To address this, we turn to an annual specification, which allows us to construct a proxy of excess demand or domestic economic slack, as done in other papers in the literature (Gelos and Ustyugova (2017), Tiedemann, Bizimana, and Dalmau (2024)). This output gap measure was constructed using the Hodrick Prescott filtered real GDP series, extracting the cyclical component.[7] The baseline specification is therefore extended to include the output gap proxy, alongside the other control variables included in the vector $Y_{i,t}$ in equation (1), and the local projections are conducted at an annual frequency.

While the inclusion of this output gap measure helps mitigate concerns regarding omitted variable bias, utilizing annual frequency prohibits us from assessing the persistence of inflation in as detailed a fashion as we did with quarterly data. The annual results are shown in Figure 9. The key findings from our baseline results are preserved, with differences in inflation dynamics between SIDS and non-SIDS in response to food shocks remaining marked and large in magnitude (Panel A). Furthermore, the test for parameter equivalence for food shocks is rejected at the 10 percent level of significance 1 year after the shock. On the other hand, responses to oil inflation shocks are more muted, with less differentiation between SIDS and non-SIDS (Panel B). As

[7] The smoothing parameter $\lambda = 6.25$ was utilized, as commonly used for data at the annual frequency.

observed in the quarterly baseline results, differences between SIDS and non-SIDS impulse responses are most apparent within 1 year, with impacts fading towards zero thereafter.

Figure 9: Annual Impulse Responses of Domestic Headline Inflation to Global Shocks - SIDS vs non-SIDS



Note: x-axis in quarters; t=0 is the year of the shock (1% to global food inflation (LHS) and global oil inflation (RHS)). The solid lines are the local projection impulse response functions (reported in percentage points), where small island developing states (SIDS) are represented by red and non-SIDS are represented by blue. The corresponding shaded areas represent their 68 percent confidence bands.

Finally, given the magnitude of global inflation shocks during the pandemic and its aftermath, we also conduct estimates introducing a COVID dummy (taking a value =1 for the period 2020Q2 through 2022Q4), and we conduct a quarterly specification with two lags. The results are not reported here for succinctness, but our baseline quarterly results are robust to these alternate specifications.

One other potential issue relates to potential endogeneity of domestic and global commodity-price inflation. This would only be a concern if global commodity price shocks were demand-driven, and in any case could only plausibly apply to non-SIDS (since SIDS are too small to drive global demand for food or oil, and thus global prices). There is considerable evidence that supply-side factors, particularly for food and oil price shocks, as well as supply-chain disruptions are key drivers to global inflation (Diaz and others (2024); Asab (2025)), partly mitigating concerns of potentially endogeneity. This is particularly the case with food prices, as observed by Adjemian and others (2023) in the case of U.S. food prices, where supply-oriented factors like energy prices, labor and farm product supplies, and weather conditions (e.g. droughts or flooding) explain a majority of price fluctuations, even as the significance of demand-oriented factors (money supply and per-capita income) increased after the onset of the pandemic. In addition, Furceri and others (2016) and Choi and others (2018) find that inflation pass-through estimates are negligibly impacted by a multitude of approaches to controlling for potential endogeneity of domestic and international food and oil inflation, further reducing concerns that our estimates of food inflation pass-through to non-SIDS could be biased by this potential endogeneity. Finally, even if some variation in global food prices is endogenous to variation in domestic inflation in non-SIDS, our results would be biased towards overstating the degree of pass-through for these countries (by mistakenly attributing too much domestic inflation movement to global food inflation), thereby implying that the true difference between SIDS and non-SIDS food inflation pass-through would be even larger than what we show in our analysis.

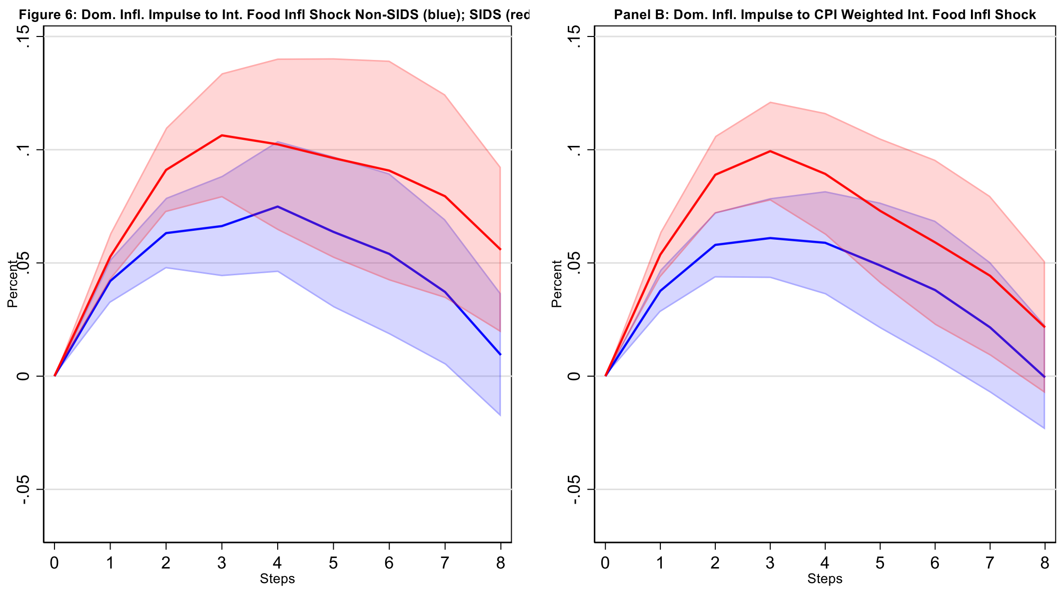
Impact of Consumer Basket Weights

The size of consumer basket weights is potentially a significant driver of inflation pass-through—insofar as SIDS tend to have higher CPI basket weights of food, one could expect these to suffer from larger pass-through. We investigate the significance of consumer basket weights in driving our baseline results by following an approach taken elsewhere in the literature (e.g. Choi and others, 2018). We pre-weight the global commodity price shock with the respective CPI basket weight, that is food and beverage weights and the transport weights, as described in Equation (4). Similarly, the presence of asymmetry is tested under this pre-weighted specification.

Food and non-alcoholic basket weight

The impulse response functions presented in Figure 10 compare these basket-weighted results (Panel B) to the baseline results reported previously (Panel A) for global food inflation shocks. Results indicate that accounting for CPI basket weights does not materially alter the baseline results—SIDS's greater share of food in the CPI basket does not meaningfully explain their higher susceptibility to global food inflation shocks. Examining the IRFs, in the case of SIDS the cumulative impact on a global food-price shock on domestic headline inflation peaks after three quarters, with domestic inflation increasing by about 1 percentage point following a 10-percentage point shock in international food inflation, and the impact returns to zero after two years, once the appropriate CPI basket weights are considered. F-tests verify that the disparity is concentrated within 1 year of a shock, with the statistically significant difference in SIDS vs. non-SIDS responses dissipating after 3 quarters from the initial shock (Table 2). Interestingly, while consumer basket weights of food do appear to explain some modest aspects of the vulnerabilities of SIDS to global food inflation shocks (especially in the second year following a shock), a significant proportion remains unexplained, pointing towards SIDS-specific considerations such as their global supply chain connectivity and domestic market structures as potential explanatory factors.

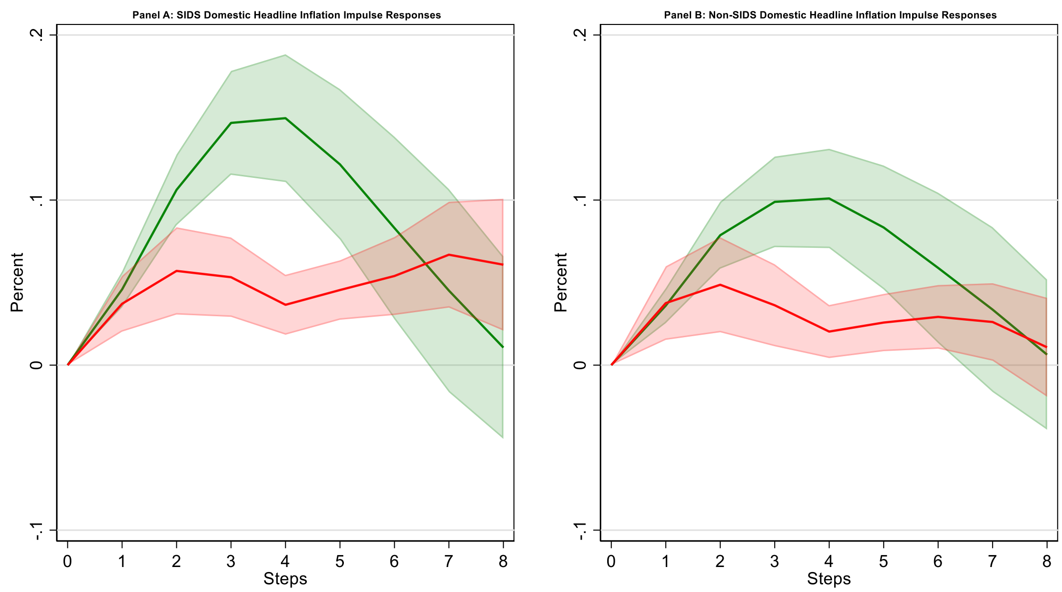
Figure 10: Impulse Response of Domestic Headline Inflation to Int. Food Infl Shock; CPI Pre-weight (RHS),Non-SIDS (blue); SIDS (red)



Note: x-axis in quarters; t=0 is the quarter of the shock (1% to global food inflation). The solid lines are the local projection impulse response functions (reported in percentage points), where small island developing states (SIDS) are represented by red and non-SIDS are represented by blue. The corresponding shaded areas represent their 68 percent confidence bands. To promote comparability between the basket-weighted results and those in the baseline, for the results shown in Figure 10: (i) the baseline sample is restricted to coincide with what is used in the basket-weighted analysis; and (ii) the basket-weighted results are re-scaled by the inverse of the average CPI basket weight for food, for SIDS and non-SIDS.

Controlling for CPI basket weights, we continue to find evidence of asymmetric pass-through across country groupings, with domestic inflation in SIDS being more responsive to positive international food-price shocks than their global counterparts (Figure 11). As expected, the sizes of food consumer basket weights have no bearing on the asymmetry of responses, where it is likely that more nuanced market imperfections are culpable in explaining vulnerabilities.

Figure 11: Impulse Response of Domestic Headline Inflation to CPI Pre-weight Int. Food Infl Shock +ve(green); -ve(red)



Note: x-axis in quarters; t=0 is the quarter of the shock (1% to global food inflation). The solid lines are the local projection impulse response functions (reported in percentage points), where positive shocks are represented by green and negative shocks are represented by the color red. The corresponding shaded areas represent their 68 percent confidence bands. Negative impulse responses and corresponding confidence bands are inversed to facilitate the visual comparability of positive

Table 2: F-test statistics for parameter equivalence across country groupings – CPI Weighted Commodity Shocks

SIDS vs Global Counterparts

	t=1	t=2	t=3	t=4	t=8
International Food Inflation Shock	**0.0139****	**0.0031*****	**0.0069*****	**0.0599***	**0.0797***
International Oil Inflation Shock	0.4236	0.2943	0.4247	0.2835	**0.0881***

Food Commodity Price Shock Asymmetry

	t=1	t=2	t=3	t=4	t=8
International Food Inflation Shock (SIDS)	**0.0001*****	**0*****	**0*****	**0*****	0.1767
International Food Inflation Shock (Non-SIDS)	**0.002*****	**0.0001*****	**0.0001*****	**0.0005*****	0.6946

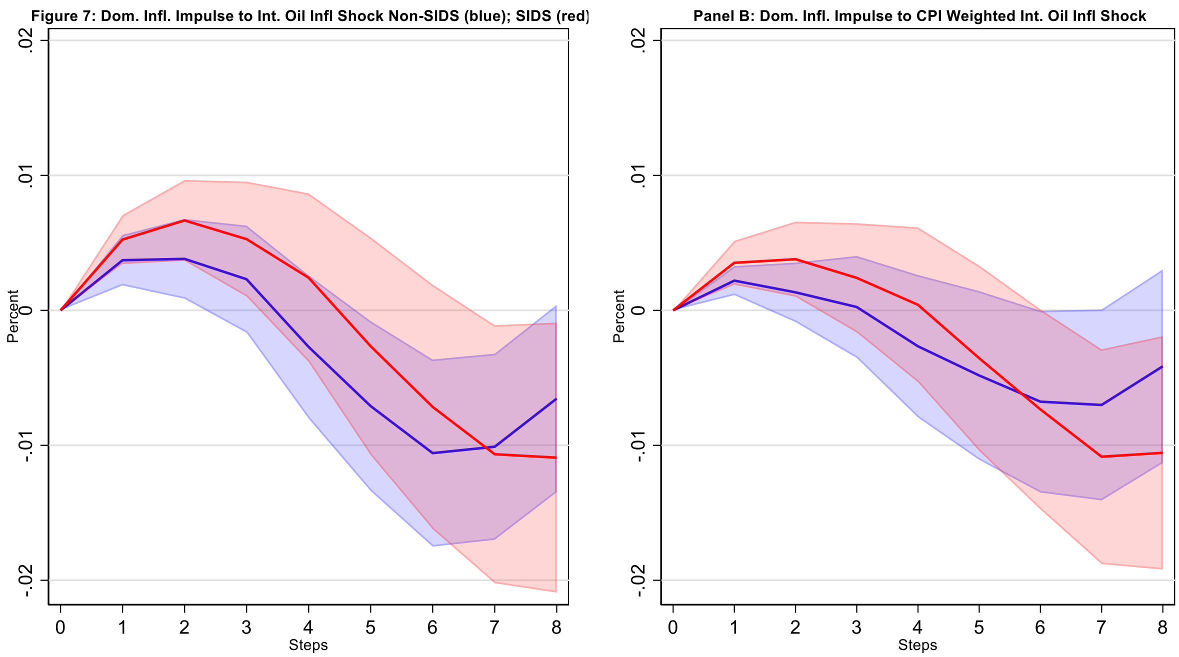
Notes: p-values; bolded and starred values denote rejection of parameter equivalence across the two regimes, at the 10 (*), 5 (**), and 1 (***) percent level of significance.

Values shown for t = 1 to 4 and 8 quarter(s) after shock.

Transport basket weight

Accounting for transport CPI weights has limited impact on our baseline results regarding pass-through from global oil-price shocks. As in the baseline scenario, we find that international oil-price shocks have similar instantaneous effects on SIDS and their global counterparts. This result is consistent with the findings of Choi and others (2018) in comparing 34 advanced and developing countries, where a similar share of oil in these economies' consumption baskets is identified as the most robust determinant of the response of inflation across countries. In the case of SIDS, the cumulative impact on domestic headline inflation peaks after two quarters, with domestic inflation increasing by 0.04 percentage points following a 10-percentage point shock in international crude-oil inflation, and the impact returns to zero within the first year (Figure 12).

Figure 12: Impulse Response of Domestic Headline Inflation to Int. Oil Infl Shock CPI Pre-weight (RHS),Non-SIDS (blue); SIDS (red)



Note: x-axis in quarters; t=0 is the quarter of the shock (1% to global oil inflation). The solid lines are the local projection impulse response functions (reported in percentage points), where small island developing states (SIDS) are represented by red and non-SIDS are represented by blue. The corresponding shaded areas represent their 68 percent confidence bands.

Conclusion

In recognition of the well-documented vulnerabilities of SIDS to global and environmental shocks and evidence of shifting global inflation dynamics, estimates obtained with local projections for a sample of 168 countries suggest inflation in SIDS is approximately twice as vulnerable to international food inflation shocks as in non-SIDS. The level of vulnerability and disparity between SIDS and non-SIDS is less apparent with respect to international crude oil inflation shocks. These results hold under a range of alternate specifications and robustness tests, and point to the potential of global-supply-chain connectivity issues and domestic market structures as major contributing factors to the inflation vulnerabilities of SIDS. In particular, the relative lack of pricing power of firms in SIDS may cause them to be more prone to global food inflation shocks.

One striking result of our analysis is the evidence of strong asymmetry in the food inflation pass-through, particularly for SIDS, as international food inflation increases have larger pass-throughs than equivalently sized food inflation decreases. This indicates a net inflationary impact of global food inflation developments over time for SIDS.

While the empirical result of higher food-inflation pass-through to SIDS is well-established in our analysis, the channel responsible for the result is not. In our view, the most likely potential channel relates to market structures in SIDS as compared to their larger, more well-connected counterparts. If food imports into SIDS are supplied by a small number of firms, or a number of smaller firms (relative to non-SIDS counterparts) this would imply a greater degree of market power (and hence pricing power) for these firms. De Loecker and Eeckhout (2017) provide evidence that smaller firms may tend to have larger markups than larger firms, at least under some circumstances, and Gal (2003) discusses how competition policy should be approached for small economies, whose market structures differ from those in larger economies. Applying these insights to SIDS, one could further argue that for firms to operate profitably in these countries, where order sizes tend to be small due to limited market size, larger markups and greater profits are needed to compensate for the heightened uncertainty and greater profitability risks associated with supplying remote island nations (e.g. variable shipping costs; risks of product spoilage; etc). Next, SIDS consumers may have fewer substitutes available, given limited breath of consumer goods supplied to SIDS, and thus be forced to accept higher prices when some global food prices increase.

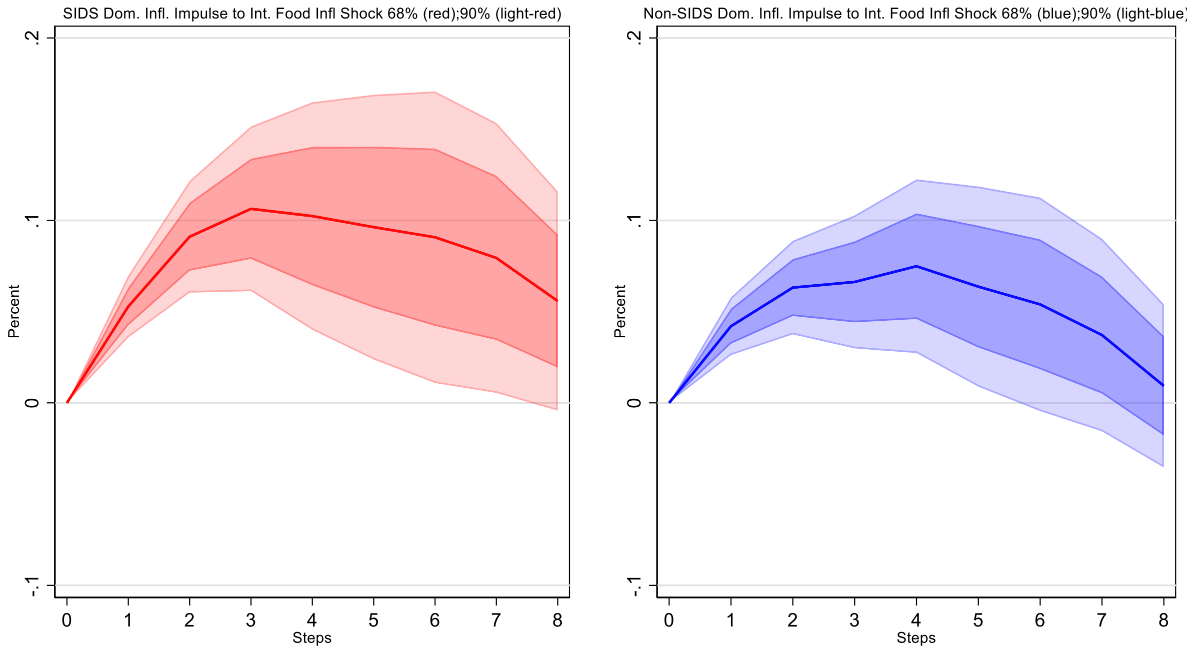
The notion that market power can play a significant role in the pass-through of inflation shocks is consistent with the “sellers’ inflation” hypothesis. Weber and Wasner (2023) observed that during the pandemic, industrial firms with larger market shares not only passed through the entirety of cost shocks, but increased prices more than warranted by capitalizing on temporary monopoly power created by bottlenecks. Similarly, Brauning and others (2022) found that more concentrated US industries displayed a 25 percent higher pass-through of costs to consumer prices than in other industries.

There may not be an easy or obvious policy solution to the heightened global food-inflation pass-through facing SIDS. One option would be a collaborative policy effort to enhance connectivity and accessibility, including by redoubling focus on food security, inclusive of the efficiency and orientation of domestic production towards diversification and food self-sufficiency. This is a point made by Blanchard and Hoarau (2020), who note that addressing food dependency dramatically reduces the exposure of small island economies to structural vulnerability. Geographic limitations will remain a binding constraint, and therefore regional and international collaboration in addressing food security remains important. In this regard, pooling orders at the regional level—such as by creating a regional food hub which can exercise greater market power in making purchases—could help.

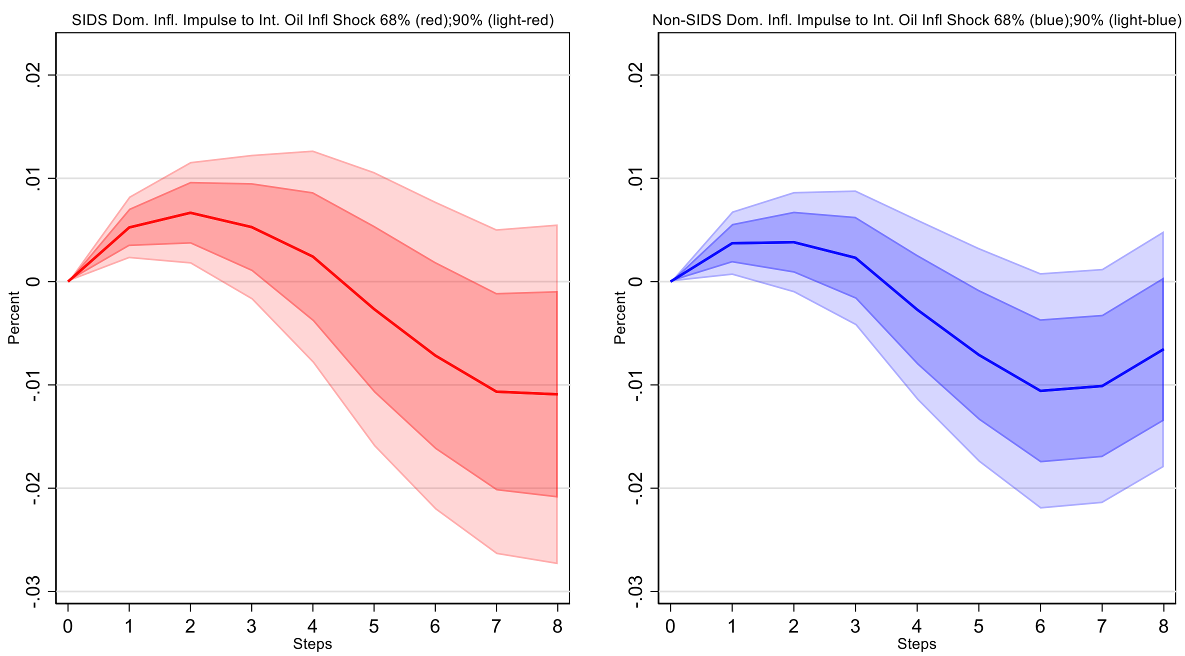
While these results have been instructive in uncovering the dynamics of inflation within SIDS, further work is needed to identify drivers of pass-through and the best options for policy reforms. For instance, further research on second round effects of global commodity-price shocks would serve to uncover the persistence of inflationary effects over the medium term, as well as how inflation for different goods within the CPI basket is impacted by global price fluctuations. Adding to the challenge from a policy perspective is the fact that SIDS are generally limited with respect to their range of short- to medium-term policy options, due to their dependence on imports and use of exchange-rate pegs.

Appendix

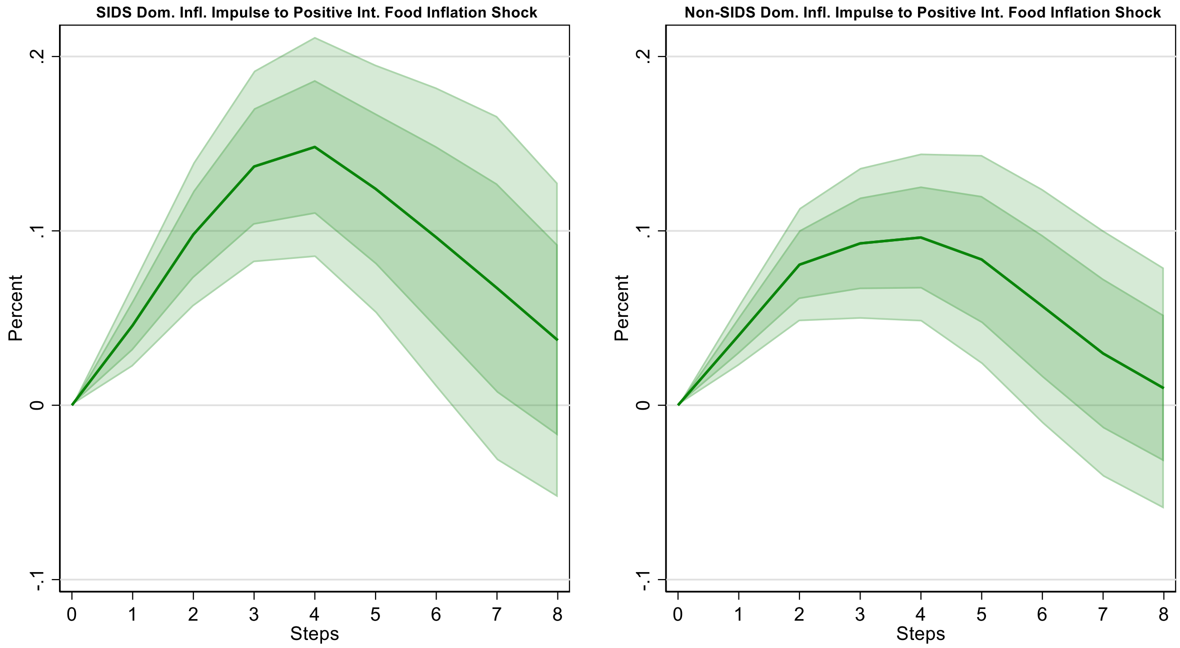
Appendix 1: Impulse Response of Domestic Headline Inflation to Int. Food Inflation Shock



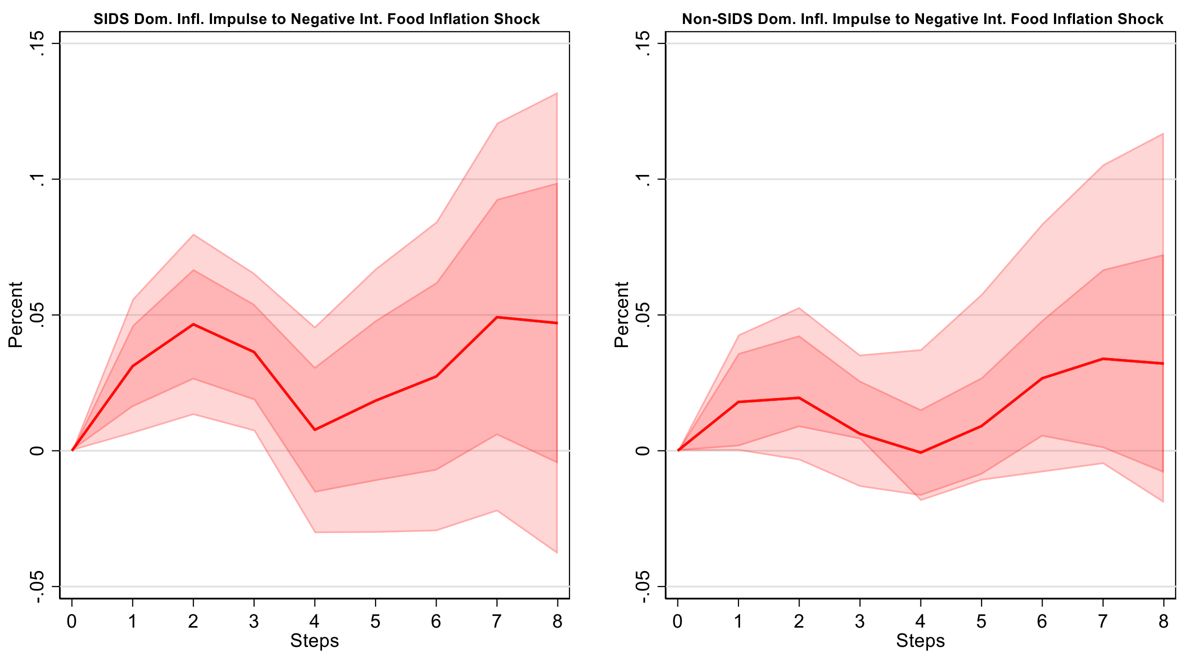
Appendix 2: Impulse Response of Domestic Headline Inflation to Int. Oil Inflation Shock



Appendix 3: Impulse Response of Domestic Headline Inflation to a Positive Int. Food Inflation Shock



Appendix 4: Impulse Response of Domestic Headline Inflation to a Negative Int. Food Inflation Shock



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