COMMODITY SPECIAL FEATURE: ONLINE ANNEX 1.1

Commodity-driven Macroeconomic Fluctuations: Does Size Matter?

Part. I Network Adjusted Value-Added Share (NAVAS)

Our analysis relies on a key statistic, the commodity sector's network-adjusted value-added share (NAVAS), as introduced in Silva and others (2024). NAVAS captures both upstream linkages, where the commodity sector acts as a purchaser of inputs, and downstream linkages, where it serves as a supplier to other industries[1]. It is defined as the weighted sum of the value-added shares (a), where value-added equals gross output minus purchase of intermediates, of all domestic sectors that supply intermediates to the commodity sector, directly or indirectly, and imported intermediates.[2] Thus, the commodity sector (N+1) NAVAS is denoted as

$$NAVAS_{N+1} = \sum_{i=0}^{N+1} \Psi_{N+1,i} a_i$$

where $\Psi_{N+1,i}$ captures the direct and indirect domestic intermediate input purchases of the commodity sector $N+1$ from sector i, where $\Psi = (I - \Gamma)-1$ is the Leontief inverse matrix, and Γ represents the input-output (IO) matrix. The element $\Gamma_{i,j}$ refers to the share of inputs from sector j used by sector i, as a fraction of sector i's gross output.

If $\Gamma_{N+1,i} = 0$, for all i, that is, the commodity sector does not buy any intermediate from any domestic sector (including itself) and production relies exclusively on factors labor and capital and imported intermediates, then NAVAS simply equals the commodity sector value-added share ($NAVAS_{N+1} = a_{N+1}$). Intuitively, if the sector itself does not purchase domestic intermediate inputs, then the factor shares are not adjusted by the network as this sector is isolated from the network. The upstream centrality, the importance of the commodity sector as supplier of intermediates, is completely irrelevant for the value of the NAVAS when $\Gamma_{N+1,i} = 0$, for all i . To see this, consider the following two domestic IO matrices from a simplified economy with three sectors, where the sectors are ordered as C (the commodity sector), A, and B:

Example 1: Two economies with differing supplier centralities, but no demand for domestic intermediates for the commodity sector

$$\Gamma_1 = \begin{matrix} 0 & 0 & 0 \\ 0.2 & 0.2 & 0.2 \\ 0.1 & 0.1 & 0.1 \end{matrix} \qquad \Gamma_2 = \begin{matrix} 0 & 0 & 0 \\ 0.4 & 0.1 & 0.1 \\ 0.2 & 0.05 & 0.05 \end{matrix}$$

1 The commodity sector's downstream linkages (as supplier of intermediates) matter for the commodity sector's NAVAS only if the commodity sector purchases intermediates from other sectors, and these intermediate sectors are themselves connected to the commodity sector's downstream customers.

In both cases, sector C (first row) does not purchase domestic intermediates (including from itself) and buys all intermediates from abroad. Assume further that the vector of value-added shares equals a = (0.3, 0.3, 0.6)', where the ordering reflects sectors C, A, and B, respectively. Note that in the economy characterized by Γ_2, the commodity sector is more central as a supplier for sectors A and B since A and B get a larger share of their intermediates from C than from the other two sectors.

The corresponding Leontieff inverse matrices $(I - \Gamma)^{-1}$ equal:

$$\Psi_1 = \begin{matrix} 1 & 0 & 0 \\ 0.2857 & 1.2857 & 0.2857 \\ 0.1429 & 0.1429 & 1.1429 \end{matrix} \qquad \Psi_2 = \begin{matrix} 1 & 0 & 0 \\ 0.4706 & 1.1176 & 0.1176 \\ 0.2353 & 0.0588 & 1.0588 \end{matrix}$$

To calculate sector C's NAVAS, we multiply the first row of Ψ_1 and Ψ_2 by the first element of the vector a. Thus, in both economies, that is regardless of C's supplier centrality, $NAVAS_C = a_C$=0.3.

This case is hypothetical. In the data, the commodity sector typically buys domestic intermediate inputs, even in small amounts, so the role of the commodity sector as a supplier of intermediates cannot be neglected. Let's continue with the same simplified economy as before with three sectors (C, A, and B) and value-added shares given by a = (0.3, 0.3, 0.6)'. Note that, sector C and A have the same value-added share (0.3), while sector B uses twice as many factors in production (0.6) compared to sectors C and A. In the baseline case, each sector displays a share of imported intermediate inputs of 0.1. To better understand the critical role of the IO matrix structure in transmitting commodity price shocks throughout the production network—characterized by chains of buyers and suppliers—we consider two additional examples in this economy:

Example 2: Contrasting two economies with similar customer centrality but different supplier centrality

To explore the importance of supplier centrality heterogeneity for NAVAS, consider the following two IO matrices:

$$\Gamma_3 = \begin{matrix} 0.2 & 0.2 & 0.2 \\ 0.2 & 0.2 & 0.2 \\ 0.1 & 0.1 & 0.1 \end{matrix} \qquad \Gamma_4 = \begin{matrix} 0.2 & 0.2 & 0.2 \\ 0.25 & 0.2 & 0.2 \\ 0.15 & 0.1 & 0.1 \end{matrix}$$

Notice that sector C (first row) buys from all sectors equally (including itself). The total domestic intermediate input share is 0.6, implying an imported intermediate input share of 0.1 (given the value-added share of 0.3 and the constant returns to scale assumption). The two matrices differ by the assumed degree of supplier centrality of the commodity sector. In Γ_3, the input demands of sectors A and B (second and third rows) are evenly distributed across all suppliers. In contrast, in Γ_4 , sectors A and B (second and third rows) buy more intermediates from sector C (first column), and less from imported sources, making it more central as a domestic supplier of intermediates. The

2 The sum of value-added shares of all domestic sectors amounts to the sum of sectoral factor incomes (capital and labor) shares by the national accounting identity.

greater domestic supplier centrality of the commodity sector in Γ_4 leads to a higher NAVAS – thanks to expanded indirect labor use via input–output linkages: 0.81 for Γ_4 versus 0.78 for Γ_3 .

Example 3: Contrasting two economies with similar supplier centrality but different customer centrality

$$\Gamma_5 = \begin{matrix} 0.1 & 0.1 & 0.4 \\ 0.2 & 0.2 & 0.2 \\ 0.1 & 0.1 & 0.1 \end{matrix} \qquad \Gamma_6 = \begin{matrix} 0.1 & 0.4 & 0.1 \\ 0.2 & 0.2 & 0.2 \\ 0.1 & 0.1 & 0.1 \end{matrix}$$

Consider now a setting in which the commodity sector is not a major supplier to the other sectors (0.2 and 0.1 weights in the first column), but customer centrality varies across two cases in terms of where the commodity sector buys from. In Γ_5, the commodity sector allocates a greater share (0.4) of its purchases to a more labor-intensive supplier (sector B), while in Γ_6, it relies more heavily on a less labor-intensive one (sector A). When the commodity sector allocates a larger share of its intermediate input purchases toward the more labor-intensive sector B, NAVAS increases from 0.77 to 0.80, reflecting the larger contribution of labor embedded in upstream production.

Part II. Empirics

Data

Our analysis draws on an unbalanced annual panel consisting of 66 countries, classified into advanced economies (AE) and emerging and developing economies (EMDE) according to the IMF taxonomy. The sample spans from 1990 to 2018 (extended through 2023 where data permit), with 37 countries in the AE group and 29 in the EMDE group. The dataset integrates three primary sources. First, commodity price data are sourced from the IMF's Commodity Terms of Trade database. As a proxy for country-level export commodity prices, we use the Commodity Net Export Price Index, which is weighted by net exports as a share of GDP. To account for time-varying changes we use rolling windows to reflect potential shifts in the composition of commodity trade. Second, macroeconomic indicators and control variables are obtained from the Global Macro Database (GMD, Müller and others, 2025). All variables are denominated in U.S. dollars. Third, to capture the interlinkages of the commodity sector with the broader domestic economy, we rely on input-output data from the 2018 edition of the OECD Input-Output Tables (IOT).

Descriptive analysis

Online Annex Table 1.1.1. Descriptive Statistics in Advanced Economies

	Size				NAVAS			
	Energy	Metals	Agriculture	Aggregate	Energy	Metals	Agriculture	Aggregate
Mean	0.05	0.04	0.04	0.13	0.50	0.61	0.78	0.61
Median	0.04	0.04	0.04	0.13	0.48	0.6	0.78	0.62
Standard Deviation	0.05	0.03	0.03	0.06	0.23	0.13	0.07	0.15
Min	0.00	0.00	0.00	0.04	0.21	0.21	0.55	0.22
Max	0.23	0.11	0.12	0.31	0.94	0.88	0.90	0.89

Sources: Organisation for Economic Co-operation and Development; and IMF staff calculations.
Note: The table reports summary statistics for commodity sector size and NAVAS across energy, metals, and agriculture sectors, as well as country's total commodity sector for the year 2018. NAVAS = Network-Adjusted Value-Added Share.

Online Annex Table 1.1.2. Descriptive Statistics in Emerging Markets

	Size				NAVAS			
	Energy	Metals	Agriculture	Aggregate	Energy	Metals	Agriculture	Aggregate
Mean	0.14	0.08	0.15	0.39	0.66	0.73	0.86	0.80
Median	0.10	0.05	0.11	0.32	0.67	0.77	0.88	0.83
Standard Deviation	0.18	0.06	0.14	0.22	0.21	0.16	0.08	0.12
Min	0.00	0.01	0.01	0.12	0.23	0.37	0.65	0.50
Max	0.95	0.23	0.74	1.05	0.98	0.95	0.96	0.97

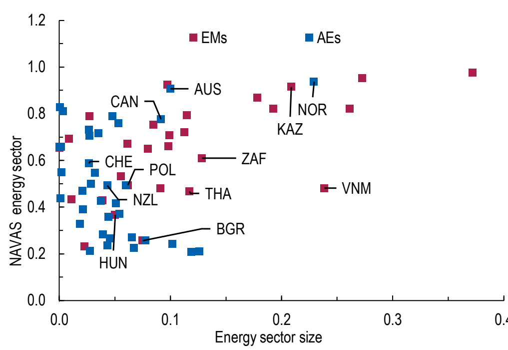
Sources: Organisation for Economic Co-operation and Development; and IMF staff calculations.
Note: The table reports summary statistics for commodity sector size and NAVAS across energy, metals, and agriculture sectors, as well as country's total commodity sector for the year 2018. NAVAS = Network adjusted value added share.

Size and Interconnectedness of Commodity Sectors in AEs and EMDEs

The relationship between commodity prices and aggregate consumption is analyzed running the following Local Projection regression (Jordà, 2005):

$$c_{i,t+h} - c_{i,t-1} = \alpha_h + \mu_i + \sum_j \delta_h^j \Delta x_{t-j} + \beta_h^{(0)} \varepsilon_{i,t} + \beta_h^{(1)} (\varepsilon_{it} \times NAVAS_i) + \gamma_h (\varepsilon_{it} \times size_i) + u_{i,t+h}$$

Online Annex Figure 1.1.1. Size and Interconnectedness of Commodity Sectors in AEs and EMs.

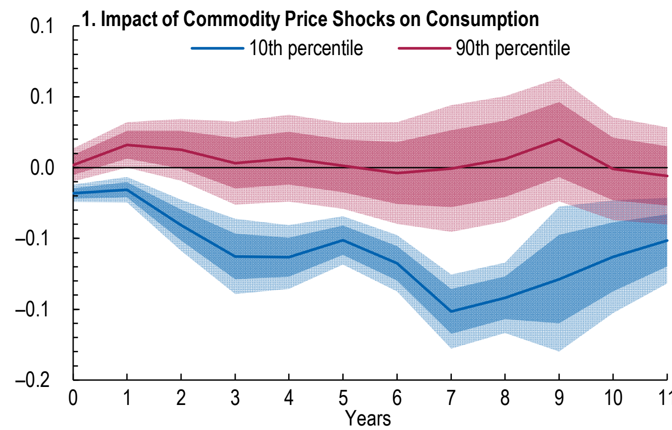


Sources: Organisation for Economic Co-operation and Development Economic Outlook; and IMF staff calculations.
Note: NAVAS is the Network-adjusted value-added share of the energy sector. Size is calculated as the ratio of the nominal value of the energy sector and it's gross output to GDP. EMs = emerging markets. AEs = advanced economies.

Where c is defined as the cumulative change in detrended log real consumption for country *i*. To control for unobserved heterogeneity, the specification includes country fixed effects (μ_i). NAVAS is country i's network-adjusted value-added share of the commodity sector; size is the Domar weight of the commodity sector; and x a vector of controls including lags of the dependent variable and lags of the shock. To capture the country-specific sensitivity of NAVAS to the shock of interest, we incorporate interaction terms. $\beta_h^{(0)}$ captures the average direct effect of commodity price shocks. The interaction terms, with NAVAS, $\beta_h^{(1)}(\varepsilon_{it} \times NAVAS_i)$, and with size, $\gamma_h(\varepsilon_{it} \times size_i)$, capture the heterogenous effect of commodity price shocks depending on the country's commodity sector's NAVAS and size, respectively. By including both interaction terms, we ensure that $\beta_h^{(1)}$ captures the amplifying or dampening effect of the production network on commodity price shocks that are independent of the commodity sector's size. The shock $\varepsilon_{i,t}$ is identified following Schmitt-Grohe and Uribe (2018). This approach rests on the assumption that small open economies do not affect the global price of a particular commodity. In particular, at the country level, the shock is the residual from an AR(1) process designed to fit log commodity price changes. These residuals display properties akin to white noise, as confirmed by standard diagnostic tests such as Ljung-Box statistic. Gomez-Gonzalez and others (2025) provide alternative identification strategies using instrumental variables and show that the results are robust.

Online Annex Figure 1.1.2. illustrates the effect of commodity price shocks on consumption over annual horizons, across varying levels of NAVAS. By examining responses along the NAVAS distribution, the analysis reveals how consumption dynamics differ between economies with highly interconnected commodity sectors and those that are less so. The results show that increases in commodity prices create a stronger increase (or milder decrease) in aggregate consumption in countries with higher NAVAS. Since NAVAS is normalized by its cross-country sample mean, this implies an overall positive consumption response for countries in the 90th percentile, and a negative response for those in the 10th percentile of the distribution. Importantly, while NAVAS appears to be a robust driver of cross-country heterogeneity in consumption responses, the interaction with commodity sector size (see Figure SF.1.3, panel 2) yields a smaller and statistically weaker coefficient. This suggests that size is less relevant than the commodity sector's network position in explaining the heterogeneity in countries' responses to commodity price shocks.

Online Annex Figure 1.1.2. Impulse Responses of Consumption Following a Commodity Price Shock



Source: IMF staff calculations.
Note: The figure shows cumulative impulse responses of consumption following a one-standard-deviation shock in commodity prices with 68 and 90 percent confidence intervals. The overall impact, which includes both direct and indirect effects through countries' network-adjusted labor share, is depicted for the 10th and 90th percentiles (shown in blue and red, respectively).

Part III. Model

The model in the Commodity Special Feature (CSF) uses the multi-sector dynamic small-open economy model of Silva and others (2024) and Gomez-Gonzalez and others (2025). These models feature households and production.

Households: The household maximizes its lifetime discounted utility of consumption:

$$\max_{\{C_t,B_t\}_{t=0}^{\infty}} E_0 \sum_{t=0}^{\infty} \delta^{\,t} \frac{C_t^{1-\rho}-1}{1-\rho}$$

subject to its budget constraint:

$$P_t C_t + P_{N+1,t}\big(B_t + g(B_t)\big) \le \bar{L}W_t + (1+r)P_{N+1,t}B_{t-1},$$

given B_{-1}, and where ρ is the (inverse) of the intertemporal elasticity of substitution, δ is the discount factor, P_t and C_t are the aggregate price index and aggregate consumption, B_t is the foreign asset position denominated in units of the commodity good, $P_{N+1,t}$, and $g(B_t) = \frac{\psi}{2}\left(B_t - \bar{B}\right)^2$, a bond holding adjustment cost that depends on the steady-state level of debt $\bar{B}$, ensuring a unique solution and a bounded path for bond holdings. Finally, W_t is the (nominal) wage rate, r is the interest rate on foreign assets, and $\overline{L}$ is the labor supply assumed to be fixed.

Given a path for aggregate consumption, the household chooses the allocation across goods minimizing costs:

$$PC = min_{\{C_i\}_{i=1}^{N+1}, C_M} \sum_{i=1}^{N+1} P_i\, C_i + P_M C_M$$

Subject to

$$\left(\prod_{i=1}^{N+1} \left(\frac{C_i}{\beta_i}\right)^{\beta_i}\right) \left(\frac{C_M}{\beta_M}\right)^{\beta_M} \geq C,$$

where $\sum_{i=1}^{N+1} \beta_i + \beta_M = 1$ and βs are consumption shares. Sectors $i = 1$ to $N + 1$ are domestic sectors, with sector $N + 1$ representing the commodity sector, while sector M represents the bundle of imported goods.

Production Each sector in the economy produces using labor and a bundle of intermediates comprised of domestic and imported intermediates. In what follows, a bar on top of a variable denotes its steady-state value. The production function in sector i is given by:

$$\frac{Q_i}{\overline{Q_i}} = Z_i \left(a_i \left(\frac{L_i}{\overline{L_i}}\right)^{\frac{\sigma_i - 1}{\sigma_i}} + (1 - a_i) \left(\frac{M_i}{\overline{M_i}}\right)^{\frac{\sigma_i - 1}{\sigma_i}} \right)^{\frac{\sigma_i}{\sigma_i - 1}}$$

where a_i is the labor share in production and σ_i is the elasticity between labor and the intermediate bundle, which equals:

$$\frac{M_i}{\overline{M_i}} = \left(\omega_i^D \left(\frac{M_i^D}{\overline{M_i^D}}\right)^{\frac{\epsilon_i - 1}{\epsilon_i}} + (1 - \omega_i^D) \left(\frac{M_{i,M}}{\overline{M_{i,M}}}\right)^{\frac{\epsilon_i - 1}{\epsilon_i}} \right)^{\frac{\epsilon_i}{\epsilon_i - 1}}$$

and where ω^D is the expenditure share on domestic intermediates as a fraction of total intermediate input expenditure and ε_i is the elasticity of substitution between the bundle of domestic intermediates (M_i^D) and imported intermediates ($M_{i.M}$).

Finally, the domestic intermediate bundle is given by the following expression:

$$\frac{M_i^D}{\overline{M}_i^D} = \left[\sum_{j=1}^{N+1} \omega_{ij} \left(\frac{M_{ij}}{\overline{M}_{ij}}\right)^{\frac{\epsilon_{D,i}-1}{\epsilon_{D,i}}}\right]^{\frac{\epsilon_{D,i}}{\epsilon_{D,i}-1}}$$

where ω_{ij} is the expenditure share on domestic good i as a fraction of total domestic intermediate input expenditure that satisfies $\sum_{i=1}^{N+1} \omega_{ij} = 1$ and $\epsilon_{D,i}$ is the elasticity of substitution among domestic intermediate inputs.

Exogenous Processes

The commodity price in foreign currency ($P^*_{N+1,t}$) and the exogenous productivity $Z_{i,t}$ are given by the two following exogenous processes:

$$\log P^*_{N+1,t} = \rho_{N+1} \log P^*_{N+1,t-1} + \varepsilon_{N+1,t}$$
$$\log Z_{i,t} = \rho_Z \log Z_{i,t-1} + \varepsilon_{i,t}$$

Market Clearing

Goods and labor markets clear, that is:

$Q_{i,t} = C_{i,t} + \sum_{j=1}^{N+1} M_{ji,t}$ for i=1,2,...,N

$$Q_{N+1,t} = C_{N+1,t} + X_t + \sum_{j=1}^{N+1} M_{j,N+1,t}$$

$$\overline{L} = \sum_{i=1}^{N+1} L_{i,t}$$

The accumulation of net foreign assets (NFA) relates to the trade balance as follows: $B_t = (1+r)B_{t-1} - g(B_t) + X_t - \frac{P_{M,t}}{P_{N+1,t}}\left(\sum_{i=1}^{N+1} M_{i,M,t} + C_{M,t}\right)$

Calibration

The model is calibrated using the OECD input-output data described in Part II. It has 38 non-commodity sectors and one commodity sector (N+1) that aggregates six commodity sectors in the OECD data into one in the model. It is set to match each country's sectoral final consumption shares, IO shares, and the commodity sector's net exports, all 2018. The rest of the parameters such as the discount rate, the elasticities of substitution in production, the persistence and volatility of shocks are from Silva and others (2024). The model is solved using a first-order log-linear approximation around the non-stochastic steady state.

Income and Wealth Effects

From the household's budget constraint, we can solve for consumption and get some intuition about the main drivers of consumption in the dynamic model:

$$C_t = \frac{W_t \bar{L}}{P_t} + \frac{P_{N+1,t}}{P_t}\big((1+r)B_{t-1} - B_t - g(B_t)\big)$$

As indicated by this equation, global shocks to commodity prices influence aggregate consumption through various channels. First, via the real wage (an income effect); second, via valuation effects of the net foreign assets captured by the relative commodity price, $\frac{P_{N+1}}{P}$, a proxy for the terms of trade, and third, via adjustments in the net foreign assets.

We note here that solving for real wage and the relative price of commodity $\frac{P_{N+1}}{P}$, highlights that the commodity sector NAVAS ($\widetilde{a_{N+1}}$) dampens the income effect, whereas it amplifies the valuation effect. To see this, note that as derived in Gomez-Gonzalez and others (2025):

$$d\log\frac{W_t}{P_t} = \frac{1-\beta'\tilde{a}}{\widetilde{a_{N+1}}}$$

$$d\log\frac{P_{N+1,t}}{P_t} = \frac{\widetilde{a_{N+1}}}{\beta'\tilde{a}}$$

From these expressions, it is clear that, for a given economy-wide "average NAVAS" ($\beta'\tilde{a}$), where β is the vector of consumption expenditure shares, the income effect is decreasing in the commodity sector NAVAS, while the valuation effect (wealth effect) is increasing in the commodity sector NAVAS.

These equations also show that for a given commodity sector NAVAS ($\widetilde{a_{N+1}}$), differences in economy-wide "average NAVAS" ($\beta'\tilde{a}$) can explain why consumption reacts differently in economies with similar commodity NAVAS. This insight explains the pattern observed in Figure 1.SF.4 in the CSF whereby countries that are similar in terms of their commodity sector NAVAS may still display heterogeneous responses to commodity terms of trade shocks. Note that in the data, there is greater cross-country heterogeneity in commodity NAVAS than in average NAVAS. Therefore, the commodity sector NAVAS is the primary driver for cross-country heterogeneity in consumption responses to terms of trade shocks in the model.

Part IV. Implications for Monetary Policy

Qiu and others (2025) extend the model in Silva and others (2024) and incorporates sticky prices and endogenous labor supply. One difference with Silva and others (2024) is that Qiu and others (2025) assume households do not save nor borrow, thereby eliminating the intertemporal wealth effect. Qiu and others (2025) follow Rubbo (2023) and derive new optimal sectoral inflation weights that help rebase the CPI. Stabilizing this newly rebased "divine coincidence" price index following a commodity price shock is optimal to the extent that it closes the output gap. The key difference with respect to Rubbo is that in a small-open economy sectoral imports and exports intensities matter for how much a central bank should worry about inflation originating in a particular sector.

In a closed-economy, Rubbo (2023) shows that the optimal sectoral weight is the sectoral Domar weight (λ_i). However, Qiu and others (2025) show that in a small open economy the optimal weight needs to be modified. The authors show that the aggregate output gap is a weighted average of sectoral markup wedges that originate from sticky prices. They derive a network-adjusted weight (NAW_i), a new weight that downplays inflation originating in sectors that mainly export their product (directly or indirectly through production networks), as this inflation will barely affect

domestic CPI. It also gives more weight to sectors with high NAVAS, that (directly or indirectly through production networks) use more domestic factors.
Here we present the definition of NAW:

$$NAW_i = \underbrace{\widetilde{\lambda_{D,\iota}}}_{CPI\ channel} + \underbrace{\kappa_S \cdot \widetilde{\rho_{ES,\iota}}}_{Expenditure\ Switching} - \underbrace{\kappa_S \lambda_i (1 - \mathrm{NAVAS_i})}_{Profit\ Channel}$$

The first term, $\widetilde{\lambda_{D,\iota}}$ measures how sectoral wedges (due to sticky prices) increase the domestic aggregate price index and reduce the real wage, which reduces labor supply, and the output gap. This channel is stronger when the sector is more important as a supplier of intermediates to domestic sectors. The second term $\kappa_S \cdot \widetilde{\rho_{ES,\iota}}$, is the expenditure switching channel. This term increases with the NAVAS of the commodity sector and the NAVAS of the commodity sector customers, since changes in the relative price of domestic to foreign goods will generate stronger domestic factor demand and create a positive output gap. Hence, a sector with high NAVAS, and/or a sector with customers that present high NAVAS, will have a larger weight in monetary policy. The third term, $\kappa_S \lambda_i (1 - \mathrm{NAVAS_i})$, profit-channel, describes how negative sectoral markup wedges---generated from the fact that firms cannot adjust prices even when there is sectoral inflation---increase domestic sectors' costs of imported inputs relative to the sectoral sales, which decreases domestic producers' profits, contributing negatively to the aggregate output gap.

Having defined the optimal sectoral weight, Qiu and others (2025) define the monetary policy mistake as the following:

$$\left(\frac{\lambda_i - NAW_i}{\lambda_i}\right) = \kappa_s \,(1 - NAVAS_i) + \frac{\lambda \widetilde{F_\iota}}{\lambda_i} - \kappa_s \left(\frac{\widetilde{\rho_{ES,\iota}}}{\lambda_i}\right).$$

The first term, $\kappa_s \,(1 - NAVAS_i)$, highlights that domestic producers rely not only on labor and domestic inputs but also on imported inputs which free up domestic factors. Low NAVAS implies more reliance on imported intermediates which reduces the importance of that sector in driving domestic aggregate output gap.

The second term $\lambda_{\tilde{F}_i}$ reflects the export intensity of the sector *i*, represented by the ratio of foreign network-adjusted supplier centrality that is the interaction of the sectoral export shares and the Leontief inverse for the sector as a supplier $\frac{\lambda \widetilde{F_\iota}}{\lambda_i}$ divided by the Domar weight. This ratio accounts for both domestic output and the extent to which domestic sectors supply inputs to foreign economies, directly and indirectly through intermediates. When the export intensity is high, most of that sector's inflation ends up in foreign inflation rather than domestic inflation, which reduces the domestic relevance of such a sector.

Finally, the third term $\kappa_s \left(\frac{\widetilde{\rho_{ES,\iota}}}{\lambda_i}\right)$, is the expenditure switching channel. Where $\widetilde{\rho_{ES,\iota}}$ measures how deflation in sector *i* leads to a reallocation of spending from foreign to domestic goods, both directly and indirectly, as consumer of domestic labor. A higher NAVAS amplifies this expenditure switching channel. Therefore, as in the profit channel, a higher NAVAS increases the importance of that sector for monetary policy design.

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