Commodity Special Feature: Market Developments and Commodity-Driven Macroeconomic Fluctuations

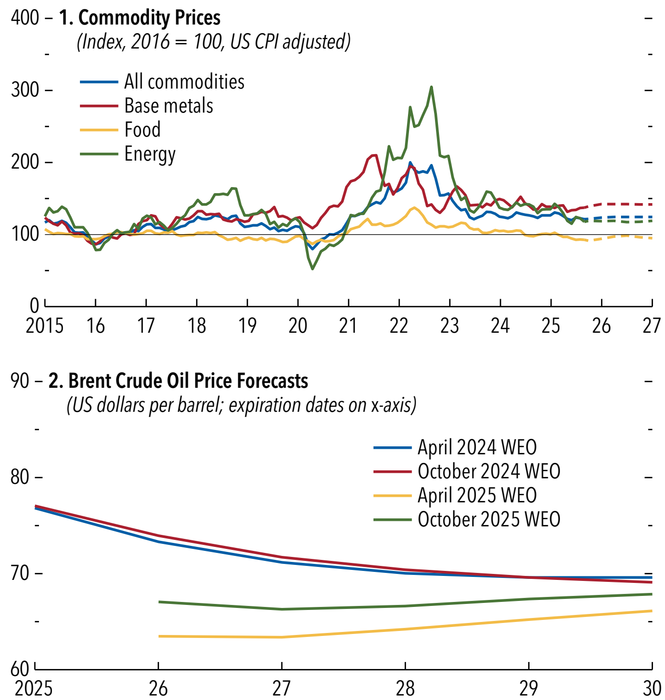
Primary commodity prices declined by 2.6 percent between March and August 2025, with large gains in precious metals partly offsetting a broad-based decline in other commodity groups, including energy, base metals, and agriculture. In oil markets, strong global supply and tepid global demand growth have contributed to bringing prices down, despite ongoing geopolitical ructions. Tariffs drove some commodities lower, especially base metals. This Special Feature analyzes the importance of interlinkages between commodity sectors and the rest of the economy in understanding cyclical fluctuations following commodity price shocks.

Commodity Market Developments

Oil prices decreased 5.4 percent between March 2025 and August 2025 as tepid global demand growth and strong supply growth from both OPEC+ and non-OPEC+ contributed to bringing prices down. Barring the temporary price spike in mid-June from the Israel-Iran war, oil prices have been range-bound, trading between \$60 and \$70 since the US announcement of tariffs in early April. The tariff announcements induced a decrease in global demand expectations and coincided with the start of an accelerated production schedule from OPEC+ (Organization of the Petroleum Exporting Countries plus selected nonmember countries, including Russia). Bearish fundamentals are now mostly in focus: The International Energy Agency is forecasting 0.7 mb/d (million barrels per day) of global demand growth in 2025 and 1.4 mb/d of non-OPEC+ supply growth, while the latest OPEC+ production schedule gradually brought back 2.5 mb/d through September,[1] one year ahead of schedule, with plans to further increase production. Talks to find a diplomatic solution to the war in Ukraine have stalled, increasing the risk of US secondary sanctions. US futures markets indicate that oil prices will average \$68.90 per barrel in 2025, a 12.9 percent decline from the previous year, before decreasing to \$65.80 in 2026 and steadily increasing to \$67.30 through 2030 (Figure 1.SF.1, panel 2). Risks around this forecast are balanced. While potential Russian supply disruptions present an upside risk to prices, the risk of accelerated OPEC+ supply increases, combined with the tariff-induced cloudy global economic environment, continue to pressure prices downward. All the while, higher-cost producers set a loose price floor, with some US break-even prices in the low to mid \$60s.

Natural gas prices fell reflecting tariffs and ample supply. Title Transfer Facility (TTF) trading hub prices in Europe dropped 16.6 percent between March 2025 and August 2025 to \$11.0 per million British thermal units (MMBtu). Despite a temporary spike in June amid the Israel-Iran war, TTF prices fell on lower

Figure 1.SF.1. Commodity Market Developments



Sources: Bloomberg Finance L.P.; Haver Analytics; IMF, Primary Commodity Price System; International Energy Agency; and IMF staff calculations.

Note: In panel 1, latest actual CPI value is applied to forecasts, represented by the dashed portions of the graph lines. CPI = consumer price index; WEO = *World Economic Outlook*.

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[1] 2.2 mb/d of gradual unwinding of production cuts, combined with a 0.3 mb/d higher production quota for the United Arab Emirates.

energy demand because of tariff-induced business uncertainty, weaker competing demand from Asia, and the approval of more flexible EU gas storage targets. Asian liquefied natural gas prices tracked the decreasing trend in European prices, falling by 12.2 percent. US Henry Hub prices fell by 30 percent to $2.9 per MMBtu owing to trade-policy-induced demand uncertainty and record-high domestic production. Futures markets suggest that TTF prices will average $12.1/MMBtu in 2025, steadily decreasing to $8.4/MMBtu in 2030, reflecting ample global liquefied natural gas supply in the medium term, with US export capacity expected to almost double through 2027. Henry Hub prices are expected to fluctuate around $3.5/MMBtu between 2025 and 2030.

Safe haven demand lifted precious metals, whereas tariffs drove base metal prices lower. The IMF's metals price index rose 6.8 percent between March and August 2025 (Figure 1.SF.1, panel 1). Precious metals drove this increase, with gold increasing 12.8 percent, reaching record highs above $3,400/ounce as investors sought safe haven assets amid rising geopolitical uncertainty and central banks increased gold reserves. US import tariffs had mixed effects on base metals. While US tariffs announced in early April pressured global prices downward, 50 percent tariffs on steel, aluminum, and copper triggered front-loading by the United States, providing some support to prices. Futures markets suggest modest increases of 0.3 percent in 2025 and 3.0 percent in 2026.

China's rare earth export controls trigger price spikes. Top producer China launched export licensing requirements for seven critical rare earth elements and their corresponding magnets in April, causing dramatic export slowdowns during April and May. Following a US-China trade agreement on June 11, Chinese magnet exports rebounded in June and had fully recovered by July, rising 5 percent year over year. Price impacts have persisted for key magnet materials however. Rare earth carbonate feedstock prices also jumped 30.2 percent as reduced US raw material exports to China tightened global supplies of processed rare earths amid strengthening demand.

After a strong start to the year, agricultural commodities declined, thanks to ample supplies and the tariffs. From March to August 2025, the IMF's food and beverages price index fell by 4.8 percent, led by sharp declines in coffee, cereal, and sugar prices. This reversed early-year gains, when coffee and cocoa prices surged because of bad weather in major exporters and tight global supply. Cereal prices dropped by 11.1 percent amid strong harvest prospects in major producing countries, such as the United States, Russia, Brazil, and Argentina. Coffee prices plunged by 16.7 percent, with the IMF Coffee Index retreating from its February historic high as supply prospects improved in top producer Brazil and as US tariff uncertainty grew. Despite this downward trend, prices surged briefly in August, following US tariffs on Brazil that caused trade disruptions. Meanwhile, corn prices fell 11.9 percent, pressured by Brazil's large harvest in the second quarter and promising crop conditions in the United States. Upside risks to the food price outlook could stem from new export restrictions, which might raise global prices by tightening international supply—even as they put downward pressure on food prices in some exporting countries—and because of potential bad weather resulting from La Niña in the fourth quarter. Larger-than-expected harvests and higher tariffs pose the main downside risk.

Commodity-Driven Macroeconomic Fluctuations in Advanced and Emerging Markets: Does Size Matter?

Commodities play a central yet often underappreciated role in shaping macroeconomic fluctuations across both advanced and emerging market and developing economies, with the latter generally experiencing greater macroeconomic volatility. In the context of today's climate-related supply shocks and geopolitical and trade tensions, understanding the macroeconomic impact of commodity price fluctuations matters more than ever. And this requires looking beyond the sheer *size* of the commodity sector. Crucial to understanding the effect of commodity price shocks on output and inflation is how *interconnected* the sector is with the rest of the economy and the rest of the world (for example, Baqaee and Farhi 2019; Bigio and La'O 2020; Silva 2024; Silva and others 2024; Romero 2025; Qiu and others 2025). These interlinkages shape the reallocation of labor and capital across sectors in response to a commodity price movement and play a critical role in driving fluctuations in real activity and inflation. The degree of interconnection between the commodity sector and the broader economy determines the extent of cyclical amplification and persistence following a commodity price shock—and how monetary policy should respond.

Relying on a mix of empirical analysis and general equilibrium modeling, this Commodity Special Feature will seek to answer three questions: (1) How do commodity sectors' linkages with the broader economy differ between emerging market and developing economies and advanced economies and across different commodities? (2) How do these linkages (up- and downstream) affect the propagation of commodity price shocks to the rest of the economy? and (3) How should monetary policy respond?

Size and Interconnectedness of Commodity Sectors in Advanced Economies and Emerging Market and Developing Economies

It is well established that, on average, emerging market and developing economies have much larger commodity sectors than advanced economies (for example, Kohn, Leibovici, and Tretvoll 2021).[2] The average *size*, or Domar[3] weight, of the commodity sectors in emerging market and developing economies is twice as large for metals, three times as large for energy, and almost four times as large for agriculture compared with advanced economies (see Online Annex Table SF.1.1 in Online Annex 1.1).[4] But are commodity sectors also more *interconnected* in emerging market and developing economies—and could this greater interconnectedness help explain their seemingly larger impact on economic fluctuations?

Answering this question requires examining their role within the broader production network—both upstream as suppliers to other sectors and downstream as purchasers of inputs. For example, an increase in copper prices encourages mining and extraction activities in countries that produce copper. This typically results in greater demand for industrial machinery, construction, transportation, and financial services, all inputs to the copper industry. Higher copper prices also affect a wide range of downstream industries. And this matters to the extent these industries may also ultimately influence the overall cost associated with copper extraction. For instance, higher copper prices will increase construction costs, which will in turn increase industrial machinery's production costs—an input to the production of copper. The degree of interconnectedness of the commodity sector is measured by its *network-adjusted value-added share* (NAVAS) (Silva and others 2024; Qiu and others 2025), or the sector's total (direct and indirect) exposure to the economy's factors of production (see Online Annex 1.1 for a formal definition).[5]

The commodity sector NAVAS is larger than its size (Domar weight) in both advanced and emerging market economies, but the differences in NAVAS across both groups tend to be smaller than the differences in size.[6] This suggests that its significance for macroeconomic fluctuations in advanced economies may be larger than it appears at first glance (Figure 1.SF.2). There is also a large overlap between the right tail of the distribution of the NAVAS in advanced economies and the left tail in emerging market and developing economies, meaning that commodity sectors in many advanced economies are more interconnected than in emerging market and developing economies and that commodity price shocks in these advanced economies may have a larger and more persistent effect on economic activity (Figure 1.SF.2, panel 2).

Understanding Consumption Patterns Depends on Commodity Sector Interconnectedness, Not Size

Figure 1.SF.3, panel 1, displays the relationship between the NAVAS (horizontal axis) and the correlation between countries' cyclical consumption and commodities' terms of trade (commodity net export price index). As suggested in the previous section, countries with a more interconnected commodity sector (higher NAVAS) display stronger annual correlation between aggregate consumption and commodities terms of trade, and some advanced economies (for example, Australia, New Zealand, Canada) have larger NAVAS and co-movement than emerging market and

[2]In this Commodity Special Feature, the commodity sectors are broken down into energy (mining and petroleum products), metals (mining and fabricated metal products), and agricultural products.

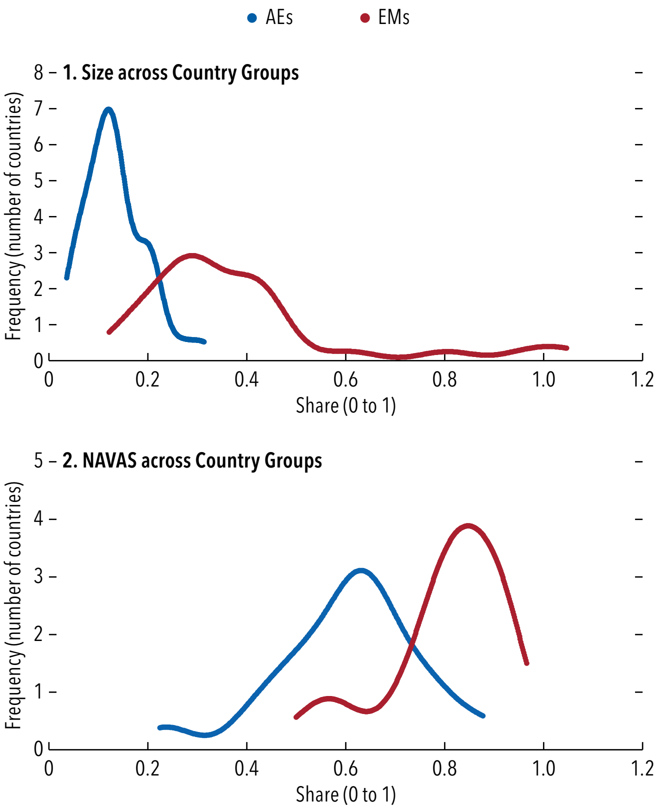
[3]Domar weights are defined as the ratio of sectoral gross output to national GDP (Domar 1961).

[4]All online annexes are available at www.imf.org/en/Publications/WEO.

[5]Online Annex 1.1 shows that varying the importance of the commodity sector as supplier of inputs to the rest of the economy has no impact on the NAVAS provided these sectors do not eventually feedback to the commodity sector's upstream suppliers.

[6]The average commodity sector is three times larger (Domar weight) in emerging market and developing economies than in advanced economies, but its network-adjusted value-added share (NAVAS) is only 31 percent higher, with energy exhibiting the biggest difference across country groups and metals and agricultural products the smallest.

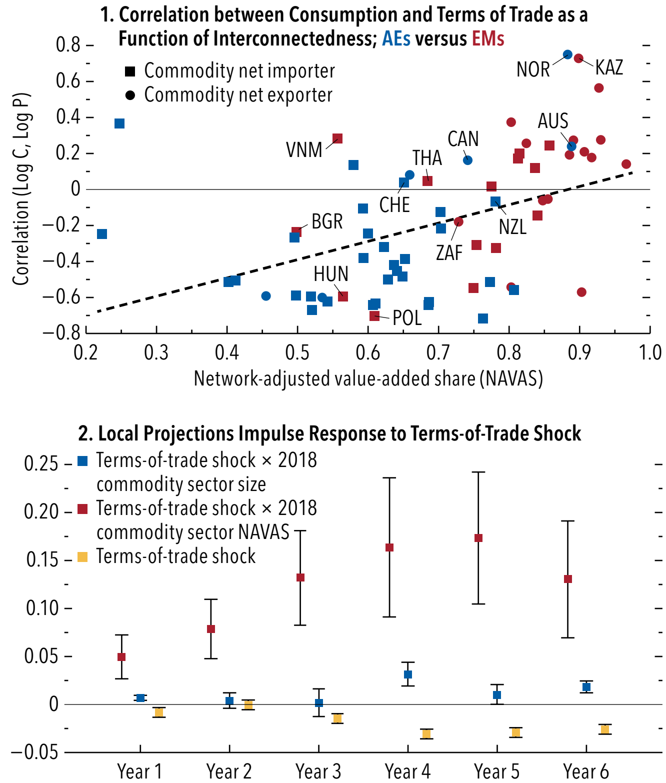
Figure 1.SF.2. Size and Network-Adjusted Value-Added Share across Country Groups



Sources: Organisation for Economic Co-operation and Development, Input-Output Tables, 2018; and IMF staff calculations.

Note: The Domar weight is the ratio of the nominal value of the commodity sector gross output to GDP. NAVAS is the sum of commodity sector value-added (VA) share and commodity suppliers' VA shares weighted by the Leontief inverse elements that capture downstream and upstream linkages of the commodity sector. AEs = advanced economies; EMs = emerging markets; NAVAS = network-adjusted value-added share.

Figure 1.SF.3. Importance of Interconnectedness over Size



Sources: Global Macro Database (Müller and others 2025); IMF, Commodity Terms of Trade Database; and IMF staff calculations.

Note: Panel 1 shows the correlation between countries' cyclical consumption and cyclical terms of trade, computed for 66 countries covering the period 1990–2023 with an annual frequency. The network-adjusted value-added share (NAVAS) used is from the year 2018. Sectoral value-added shares are measured using the ratio between gross output minus intermediate input usage and gross output. Terms of trade are measured by the Commodity Net Export Price Index, weighted by net exports as a share of GDP and deflated using the US consumer price index. Advanced economies are shown in blue, while emerging markets are shown in red. In addition, squares represent commodity net importers, while circles indicate commodity net exporters. Panel 2 presents consumption coefficient estimates from panel local projections at annual horizons, along with their respective standard deviations, in response to a one-standard-deviation terms-of-trade shock. The terms-of-trade shock is constructed following Schmitt-Grohé and Uribe (2018) using the residual of an autoregressive process of order one for each country's log terms-of-trade index, deflated by US consumer price index. Estimates are shown for the direct terms-of-trade shock, its interaction with the NAVAS, and its interaction with the Domar weight in yellow, red, and blue, respectively. See Online Annex 1.1, Parts I and II for further details. Data labels in the figure use International Organization for Standardization (ISO) country codes. AEs = advanced economies; EMs = emerging markets.

developing economies (for example, Bulgaria, Hungary, Poland, South Africa).

Interestingly, and maybe counterintuitively, the correlation is sometimes negative, even for commodity net exporters (for example South Africa); this point will be discussed further in the next subsection using a general equilibrium model.

Figure 1.SF.3, panel 2, confirms that interconnectedness (NAVAS) matters for the effect of commodity price shocks on consumption, even after controlling for the role of size (Domar weights). Coefficient estimates at different horizons (based on local projection analysis; Jordà 2005) show that the NAVAS interaction coefficient—which measures the marginal impact of deeper interconnectedness on the response of consumption to terms-of-trade changes—is substantially larger than the coefficient for the size interaction and is always significant.

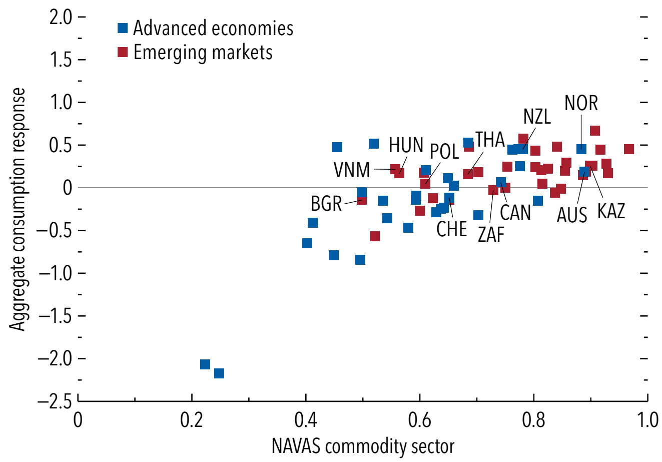
Specific country examples tend to confirm this finding. For instance, although Thailand's commodity sector is six times larger than Switzerland's, their NAVAS values are almost identical (0.68 in Thailand and 0.65 in Switzerland), resulting in a very similar impact of terms-of-trade shocks on consumption (see Figure 1.SF.3, panel 1). Similarly, the Norwegian energy sector exhibits a NAVAS of 0.94, significantly larger than Vietnam's (0.48), despite their similar size. And as expected, shocks to energy prices are more correlated with consumption in Norway than in Vietnam (Online Annex 1.1, Online Annex Figure 1.SF.1).

Model-Based Analysis

The small open economy dynamic stochastic general equilibrium model developed in Silva and others (2024) and Gomez-Gonzalez and others (2025) is employed to unpack the channels through which production network structure affects the transmission of commodity price shocks to the rest of the economy. In the model, households consume a final good produced with labor, commodities, and imported and domestic intermediate goods. Households save in foreign assets, which accumulate according to the small open economy's successive current account surpluses or deficits. The real interest rate is given and fixed. Calibration uses the same Organisation for Economic Co-operation and Development data featured in Figure 1.SF.2, covering 66 countries and 44 sectors and is set to match each country's sectoral final consumption shares, input-output shares, and the commodity sector's net exports, all in 2018.[7] Once calibrated, the model is used to run two experiments. First, it looks at the relationship between NAVAS and the co-movement between consumption and commodity terms of trade. Model simulations (Figure 1.SF.4) show very similar results to raw data (Figure 1.SF.3, panel 1): The slope is positive (emerging market and developing economies tend to have higher NAVAS and higher correlation of cyclical consumption and terms-of-trade shocks), and some advanced economies do display higher NAVAS and stronger co-movement than emerging market and developing economies. There is some variation in the correlation of consumption with commodity price shocks for the same level of interconnectedness (NAVAS), which suggests a complex propagation mechanism, which is analyzed further below.

[7]The model's rich network structure and dynamic consumption decision make it well equipped to study the transmission of commodity price shocks through factor prices and the valuation of debt. While it abstracts from factors such as unemployment and time-varying profit margins, these simplifications allow for a focused analysis of network propagation mechanisms. Because six commodity sectors are aggregated into one here, the benchmark calibration has 1 commodity sector and 38 non-commodity sectors.

Figure 1.SF.4. Model-Based Consumption Response to a 1 Percent Terms-of-Trade Price Shock
(Percent change)

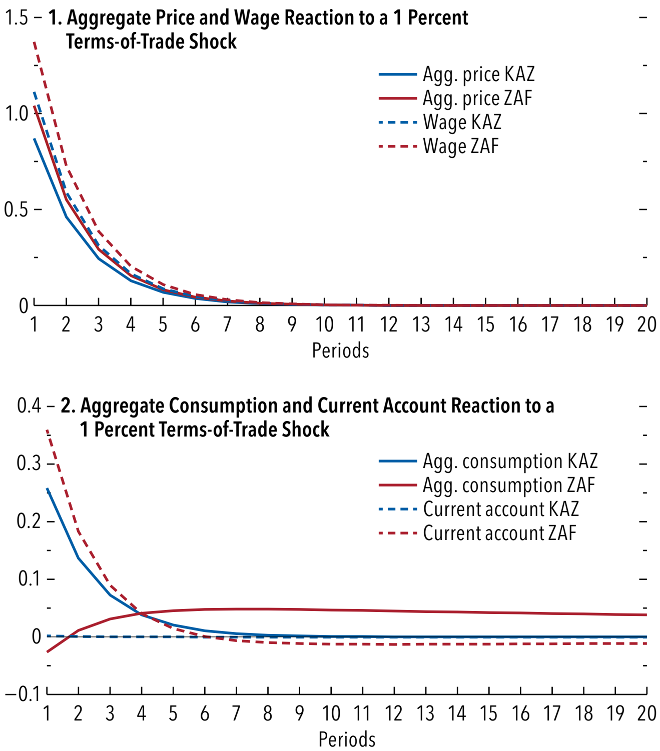


Sources: Organisation for Economic Co-operation and Development; and IMF staff calculations.
Note: NAVAS is the network-adjusted value-added share of the commodity sector. Consumption response is the first-period reaction of real consumption to a 1 percent terms-of-trade shock. Data labels in the figure use International Organization for Standardization (ISO) country codes.

Second, the model is used to look under the hood and better understand the transmission mechanism of shocks to commodity prices. To emphasize the importance of the NAVAS in driving co-movements between commodity terms-of-trade shocks and consumption (Figure 1.SF.3, panel 1), the model is run for two commodity net exporters whose commodity sectors are of similar size (39 percent of GDP)—Kazakhstan and South Africa—but with the Kazakh commodity sector more strongly interconnected (NAVAS of 0.90 versus 0.73 for South Africa). Figure 1.SF.5—which displays impulse response functions to a 1 percent commodity terms-of-trade shock—shows that the impact on aggregate consumption of a commodity price shock is *positive* and large in Kazakhstan but is *negative* in South Africa. Analysis of the transmission mechanism—which runs through both prices and wages—is essential to understanding this seemingly counterintuitive result.

Note first that real wages increase in both countries (nominal wages increase more than prices) because higher revenues in the commodity sector boost labor demand and real wages in equilibrium. However, the final impact of the shock on consumption does not depend only on labor income but also on the impact of the shock on households' real wealth (net foreign

Figure 1.SF.5. Model-Based Impulse Responses to a 1 Percent Terms-of-Trade Shock
(Percent change)



Sources: Organisation for Economic Co-operation and Development; and IMF staff calculations.

Note: The figure illustrates the impact of a commodity price shock on two distinct exporting economies, both calibrated to start with an equal initial trade balance. The calibration is based on each economy's input-output structure. Agg. = aggregate; KAZ = Kazakhstan; ZAF = South Africa.

assets denominated in units of real commodity goods).[8] In South Africa, the aggregate price index increases more than commodity prices on impact (more than 1 percent; see Figure 1.SF.5, panel 1), leading to a *decline* in the real value of net foreign assets—a negative wealth shock from the perspective of South African consumers—and a decline in consumption.[9]

But what explains this larger increase in aggregate prices in South Africa? The key lies in the way factor price changes propagate and become diluted through the production network. In general equilibrium, any exogenous increase in commodity prices will be met by a commensurate increase in marginal costs in the commodity sector until excess profit is driven to zero. Because higher marginal costs stem from both *factor prices* (wages in the model) and *intermediate input prices*, a higher NAVAS implies greater interconnectedness of the commodity sector, a larger contribution of intermediate input prices to marginal cost fluctuations, and thus a smaller increase in wages required for any given rise in marginal costs. In low-NAVAS economies, such as South Africa, commodity price shocks feed more directly into factor costs—rather than being diluted along the supply chain via intermediate input prices—resulting in larger aggregate price increases.[10] Low-NAVAS countries will tend to see larger increases in aggregate prices, lower *real* net foreign assets, and therefore a smaller *wealth* effect.

To sum up, differences in commodity sector linkages as measured by the NAVAS drive the differences in macroeconomic responses to commodity price fluctuations.[11] On balance, the wealth effect could even be negative and could more than offset the positive income effect, leading to a drop in consumption, as in South Africa (Figures 1.SF.3, panel 1, and 1.SF.5), and this is true regardless of the size of the sector as measured by Domar weights.

Implications for Monetary Policy in Small Open Economies

While higher commodity prices typically exert upward pressure on inflation, their effect on consumption varies with the commodity sector's NAVAS—amplifying or dampening the transmission, depending on the economy's structure. This raises important questions about how monetary policy should respond to commodity price shocks.

Standard theory suggests that monetary policy should respond only to inflation occurring in sticky price sectors and should ignore fluctuations in

[8]This relates to Drechsel and Tenreyro (2018) and Di Pace, Juvenal, and Petrella (2025), who show that increases in export prices have positive effects on net foreign asset position.

[9]The negative co-movement between consumption and commodity terms-of-trade prices in South Africa aligns with the empirical evidence in Figure 1.SF.3.

[10]An increase in marginal costs in the commodity sector can arise either from small increments in intermediate input prices—driven by modest wage increases along the supply chain—or from a large direct increase in wages that takes place in all sectors simultaneously given perfect labor mobility across sectors. The latter exerts a stronger effect on aggregate prices.

[11]For more details see Gomez-Gonzalez and others (2025), in which the authors show how these effects change when the country is instead a commodity importer and when considering productivity shocks to the commodity sector. The authors also discuss the heterogeneity in energy, metals, and agricultural commodity linkages across groups of economies. Finally, the authors show that the relationship between NAVAS and the consumption response to terms-of-trade shocks is robust to denominating foreign assets in units of the importable goods instead of in units of the exportable goods.

commodity prices because these sectors display flexible prices that are not influenced much by monetary policy (Aoki 2001; Woodford 2003). However, while it is true that *global* commodity prices are flexible and highly responsive to shocks, the pass-through to *domestic* commodity sectors is incomplete, and domestic commodity prices are stickier.[12]

The question then becomes how much weight policymakers should assign to commodity price fluctuations in the conduct of monetary policy. As shown by Rubbo (2023), Domar weights may be a good guide in a closed economy.[13] But relying on them to design monetary policy in small open economies, instead of the *network-adjusted weight* (NAW)—which depends on the NAVAS—would lead to welfare losses that are inversely proportional to the NAVAS (Qiu and others 2025).[14] The reason is that when the commodity sector's NAVAS is low—meaning it relies more on foreign than on domestic factors of production (directly and indirectly)—there is no need to respond to commodity price fluctuations since they do not lead to commensurate output gap fluctuations.

A small open economy policymaker following the prescription for a closed economy (adjusting monetary policy guided by Domar weights) would typically be *overestimating* the importance of commodity price fluctuations in the conduct of monetary policy, and the degree of overreaction would be inversely proportional to the NAVAS. Using the data presented in Figure 1.SF.2, Figure 1.SF.6 reports the distribution of the "policy mistake" made by relying on size instead of the NAW. The figure shows that both groups of economies would make monetary policy mistakes by overweighting the commodity sector by roughly a third.[15]

[12]For more on incomplete pass-through, see, for example, Choi and others (2018) for oil (among many others), Miranda-Pinto and others (2024) for metals, and Hyun and Lee (2023) for agricultural products.

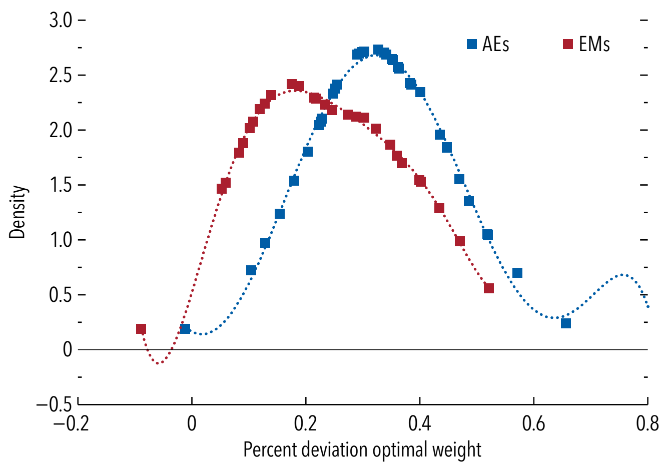
[13]Rubbo (2023) shows that—using sectoral (Domar) weights (and measures of sectoral price stickiness) to adjust the consumer price index (CPI)—a new CPI can be constructed. Stabilizing this new price index also closes the output gap and is therefore optimal from the point of view of monetary policy.

[14]The welfare losses from following a closed economy policy prescription in a small open economy environment are described by the monetary policy mistake (PM), defined as $PM = k(1 - NAVAS) + \textit{export intensity} - \textit{expenditure switching}$. For more details, please refer to Online Annex 1.1, Part IV.

[15]For instance, the average size of the commodity sector in advanced economies is 13 percent, but because the average monetary policy mistake is 34 percent, the actual weight should be 8.6 percent. For emerging market and developing economies, the average size of the commodity sector is 39 percent, but given an average monetary policy mistake of 24 percent, the actual weight should be 30 percent.

Figure 1.SF.6. Monetary Policy Mistake Distribution, 2018
(Percent)

Kernel density estimate of the monetary policy mistake in the commodity sector.



Sources: Organisation for Economic Co-operation and Development; and IMF staff calculations.
Note: Underlying calculations, based on the work of Qiu and others (2025), illustrate the monetary policy errors that occur when the focus is solely on the size of the commodity sector. The horizontal axis represents the policy mistakes expressed as the difference between the Domar weight and network-adjusted weight as a proportion of the Domar weight. AEs = advanced economies. EMs = emerging markets.

Specifically, advanced economies tend to overestimate (by 32 percent, on average) the importance of the commodity sector in monetary policy design, compared with emerging market and developing economies (by 27 percent, on average).

Conclusion

The macroeconomic impact of commodity price shocks depends less on the size of the commodity sector than on how interconnected it is with the rest of the economy. The network-adjusted value-added share (NAVAS) captures this interconnectedness and explains cross-country differences in how consumption responds to commodity price fluctuations.

For policymakers, the main takeaway is that macroeconomic frameworks should be adapted to account for the structure of domestic production networks. In particular, central banks should account for production network structures when calibrating their response to commodity price movements. Doing so can reduce the risk of policy miscalibration and enhance macroeconomic stability across both advanced and emerging market economies, regardless of their net commodity trade position.