

Supply-Chain Shocks, Inflation, and Financial Stability

G20 Global Financial Stability Conference

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¹The views expressed are my own and do not represent the views of the Board of Governors of the Federal Reserve System.

Roadmap

This presentation looks at four channels of **rising interdependence**:

1. **GDP**: comovement increasingly associated with intermediate-input trade
2. **Inflation**: increasingly associated with domestic & foreign supply-chain stress
3. **Exchange rates**: Global value chains change the currency-trade nexus
4. **Sovereign yields**: Common factors shaping large part of recent changes

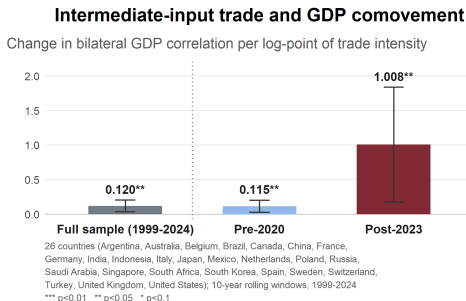
This is happening amid **geopolitical fragmentation**, creating tension points for international cooperation.

I. Rising Interdependence, Across Four Channels

GDP: comovement increasingly associated with intermediate input trade

- Trade raises GDP comovement, especially **intermediate-input** trade (de Soyres & Gaillard, 2022).
- **this association has risen sharply in recent years**, surviving financial-linkage controls.

$$\text{corr}(\text{GDP}_i, \text{GDP}_j)_w = \alpha_{ij} + \beta \underbrace{\ln(\text{trade}_{ij})_w}_{\text{bilateral intermediate-input trade intensity}} + \delta \underbrace{\ln(\text{CPIS}_{ij})_w}_{\text{bilateral portfolio investment (IMF CPIS)}} + \varepsilon_{ij,w}$$



Takeaway: production linkages across countries **increasingly** associated with GDP comovement

Inflation: an augmented Phillips curve

Phillips curve extended with a supply-chain-stress term and global energy-price controls:

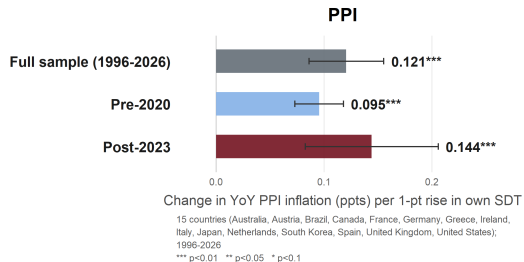
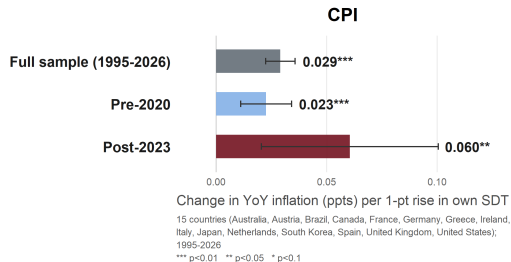
$$\underbrace{\pi_{i,t}}_{\text{Year-on-Year inflation}} = \alpha_i + \beta_1 \underbrace{\text{output gap}_{i,t}}_{\text{domestic slack}} + \beta_2 \underbrace{\text{SDT}_{i,t}}_{\text{supply-chain stress}} + \sum_{k=0}^3 \delta_k \underbrace{\text{Oil}_{t-k}}_{\text{global energy prices}} + \gamma \pi_{i,t-1} + \varepsilon_{i,t}$$

- **SDT**: Supplier Delivery Times, from the manufacturing PMI.
 - ▶ Reflects supply vs. demand imbalance, either due to supply or demand shocks.
- **Own SDT vs. Foreign SDT**:
 - ▶ **Own SDT**: a country's own supply-chain stress.
 - ▶ **Foreign SDT**: trade-weighted index of *foreign suppliers'* SDT.

Two versions side by side: CPI (consumer prices) and PPI (producer prices).

Inflation: own supply-chain stress

Phillips curve: own supply-chain stress and inflation

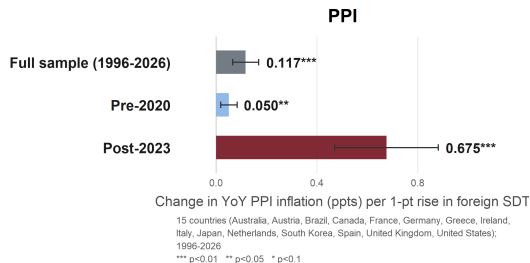
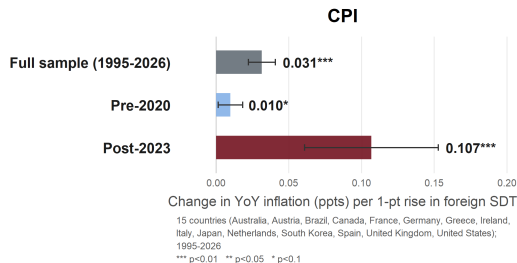


Takeaways:

- Inflation increasingly linked w/ supply-chain pressures, a form of scarcity the output gap may miss.
- The link is even stronger for producer prices.

Inflation: foreign supply-chain stress

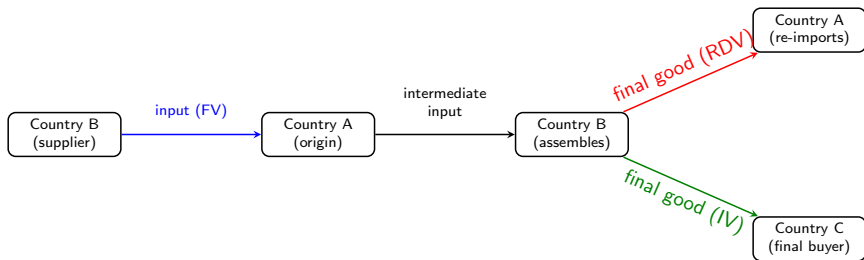
Phillips curve: foreign supply-chain stress and inflation



Takeaway: inflation increasingly associated w/ **foreign** supply-chain stress, esp. for PPI.

Exchange Rate: global value chains complicate the textbook channel

- **Standard argument:** A's currency depreciates, A's goods get cheaper abroad and A exports more.
- **With GVCs:** exports embed foreign inputs and are re-exported onward: nuanced picture.

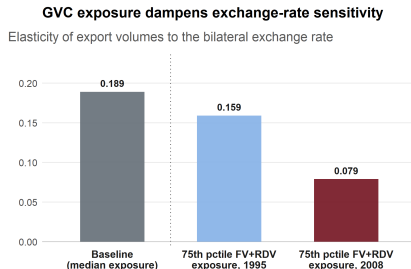


- **FV:** Foreign value added in exports **dampens** the export boost.
- **RDV:** A re-imports its own exports: again **dampened**.
- **IV:** re-exports onward to C: exports are sensitive to A-C's exch. rate, not A-B's.

Findings from de Soyres et al. (2021).

Exchange Rate: GVC exposure dampens the export response

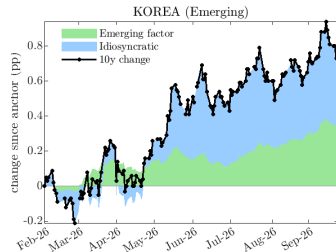
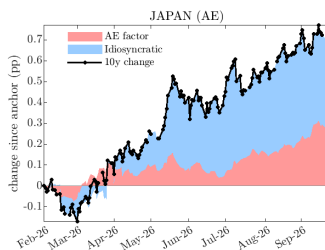
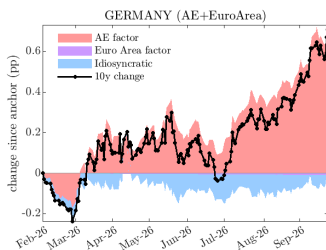
- Combined FV and RDV exposure **dampens** the textbook exchange-rate elasticity of exports.
- This dampening **grew stronger** as global value chains deepened.



IV (third-country) channel: commodity exporters with long supply chains (Russia, Australia, Brazil) are most sensitive to a *third* country's exchange rate. (from de Soyres et al. 2021)

Sovereign Yields: a shared global factor

A **dynamic factor model** (Cascaldi-Garcia, 2026) splits countries' 10-year yield into a common vs. a country-specific component since the Middle East conflict's start.



Takeaway: in Germany, the common factor pushes yields up while the idiosyncratic component actually pulls them down; in Japan and Korea, both common and idiosyncratic components push up.

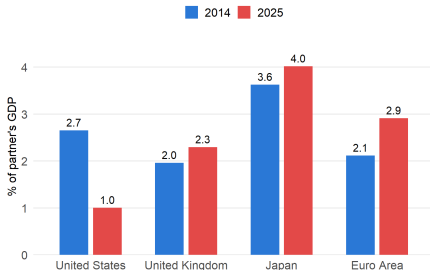
II. Interdependence vs. Fragmentation

Fragmentation is selective: China's centrality and asymmetric trade

- Trade between opposing blocs fell **9–24%** after 2022 (Gopinath et al., 2024; Airaudo et al., 2025).
- Yet, China is increasingly central in trade network: **“China shock 2.0”** (de Soyres et al., 2026).

Chinese import penetration in advanced economies

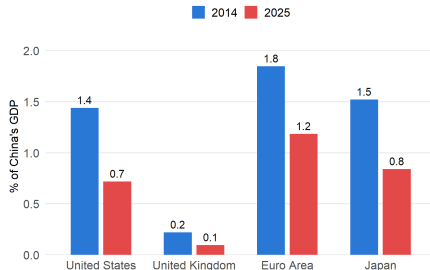
China's exports to partner, as % of partner's own GDP



Source: IMF DOT and WEO, via Haver Analytics. Euro Area used in place of a single EU aggregate.

Advanced-economy import penetration in China

Partner's exports to China, as % of China's GDP

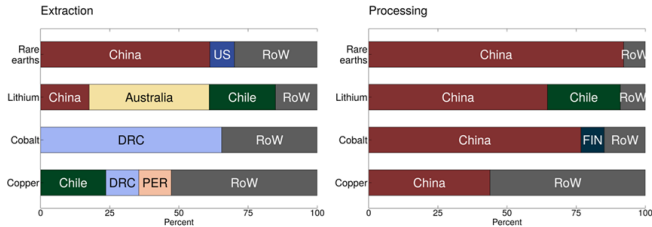


Source: IMF DOT and WEO, via Haver Analytics. Euro Area used in place of a single EU aggregate.

Takeaway: fragmentation is asymmetric. China's exports to AEs mostly keep rising (except the US) while its imports from them fall.

A concrete illustration, and an open question

China dominates *processing* more than extraction, and has **weaponized this dominance**: gallium/germanium (Jul 2023), graphite (Oct 2023), antimony (Sep 2024), rare earths (Oct 2025).



Share of extraction/processing where it exceeds 10%; RoW = rest of world. Source: IEA, via author's prior presentation (OECD, June 2026).

Open question: these same minerals feed semiconductors and other advanced-technology products at the center of today's policy debates, and dependence of this kind can be weaponized.

Conclusion: increasing interdependence

Both the **size** and the **geography** of international spillovers are changing.

Three topics for future discussions:

- **Exposure & geopolitical alignment:** trade fragmentation collides with increasing interdependence.
- **What is resilience** in an interdependent world? A purely domestic notion may no longer fit.
- **Domestic or foreign?** Are policymakers correctly attributing inflation and growth developments to domestic versus foreign sources?

Backup Slides

Appendix: references

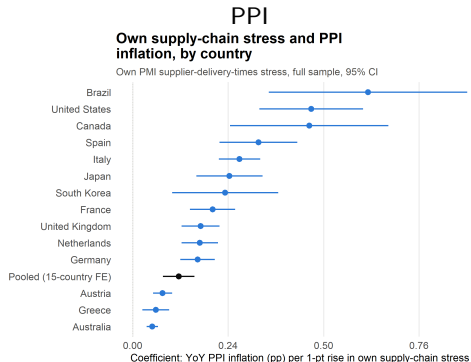
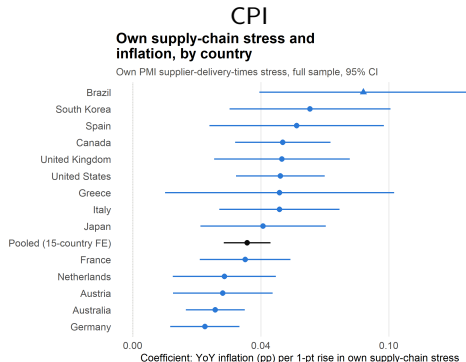
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- Cascaldi-Garcia, Danilo. Dynamic factor model of sovereign bond yields. Ongoing work.

Appendix: own supply-chain stress and inflation, by country

Specification: country fixed effects, output gap, 4 lags of oil-price inflation, one lag of inflation:

$$\pi_{i,t} = \alpha_i + \beta_1 \text{output gap}_{i,t} + \beta_2 \text{SDT}_{i,t} + \sum_{k=0}^3 \delta_k \text{Oil}_{t-k} + \gamma \pi_{i,t-1} + \varepsilon_{i,t}$$

Sample: 15-country **quarterly** panel.

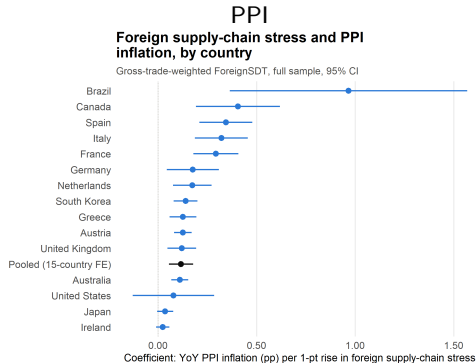
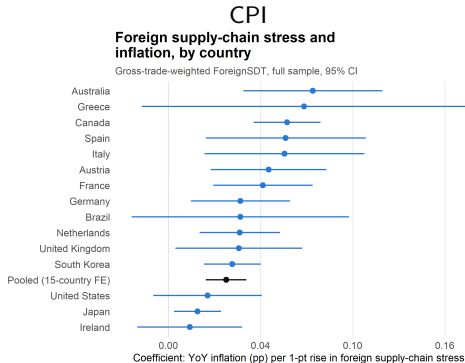


Appendix: foreign supply-chain stress and inflation, by country

Specification: country fixed effects, ForeignSDT replacing own-SDT, output gap, one lag of inflation (no oil control; own-SDT also dropped):

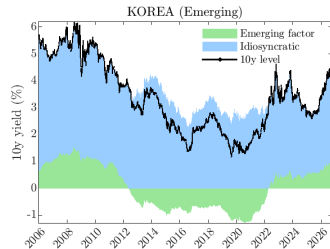
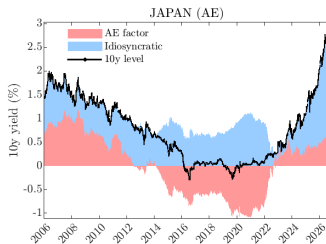
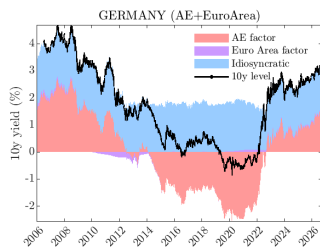
$$\pi_{i,t} = \alpha_i + \beta_1 \text{output gap}_{i,t} + \beta_2 \text{ForeignSDT}_{i,t} + \gamma \pi_{i,t-1} + \varepsilon_{i,t}$$

Sample: 15-country **quarterly** panel, gross-trade-weighted ForeignSDT.



Appendix: sovereign yields, dynamic factor model

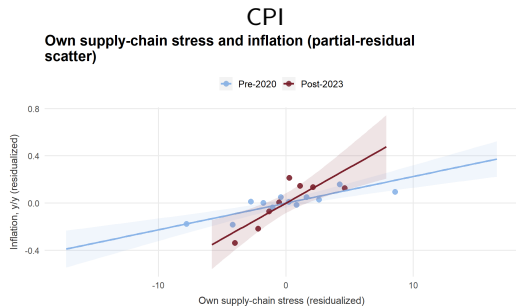
The analysis (Cascaldi-Garcia, 2026): a dynamic factor model splits each of 31 countries' **daily** 10-year yield into a common, cross-border component and a country-specific residual.



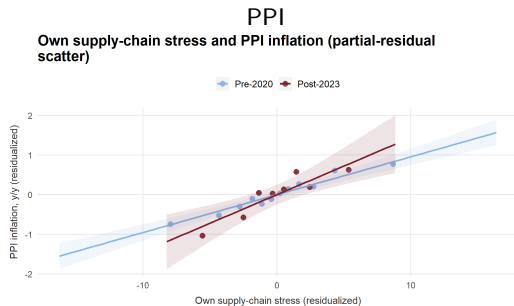
Takeaway: the common component explains 83% of advanced-economy yield variation versus 38% for emerging markets; Korea's yield is mostly idiosyncratic.

Appendix: own supply-chain stress and inflation, scatter view

15-country **quarterly** panel.



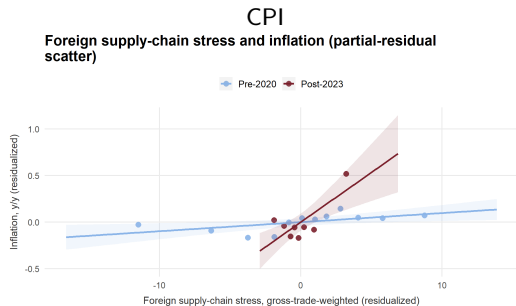
Across 15 countries, each dot is the average of many country-quarters (binned to make the pattern easier to see): the relationship between a country's own supply-chain stress and its CPI inflation, after removing the effects of the output gap, oil prices, last quarter's inflation, and country-specific differences.



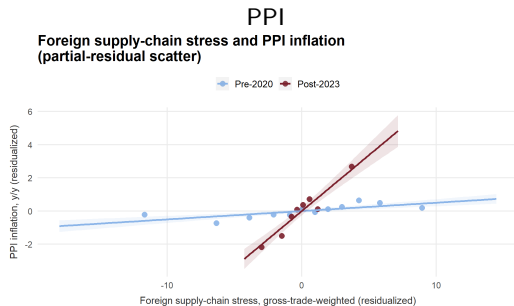
Across 15 countries, each dot is the average of many country-quarters (binned to make the pattern easier to see): the relationship between a country's own supply-chain stress and its producer-price (PPI) inflation, after removing the effects of the output gap, oil prices, last quarter's PPI inflation, and country-specific differences.

Appendix: foreign supply-chain stress and inflation, scatter view

15-country **quarterly** panel.



Across 15 countries, each dot is the average of many country-quarters (binned to make the pattern easier to see): the relationship between stress on a country's foreign suppliers (weighted by gross trade flows) and its CPI inflation, after removing the effects of the output gap, last quarter's inflation, and country-specific differences.

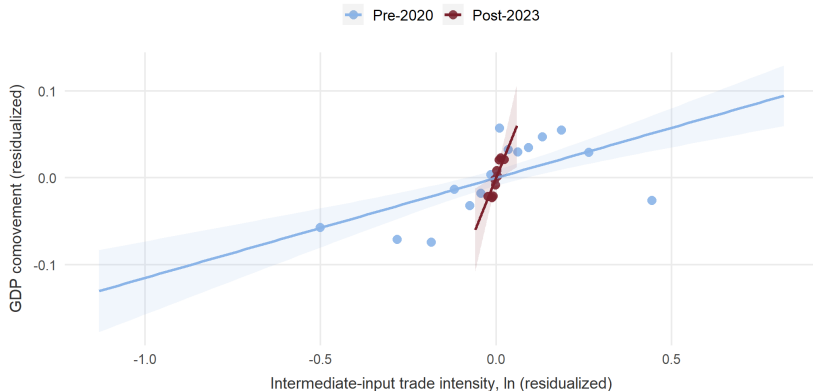


Across 15 countries, each dot is the average of many country-quarters (binned to make the pattern easier to see): the relationship between stress on a country's foreign suppliers (weighted by gross trade flows) and its producer-price (PPI) inflation, after removing the effects of the output gap, last quarter's PPI inflation, and country-specific differences.

Appendix: intermediate-input trade and GDP comovement, scatter view

26-country **annual** panel, 10-year rolling windows.

Intermediate-input trade and GDP comovement



Covering 325 country pairs (26 countries, every two-country combination), each dot is the average of many country-pair-windows (binned to make the pattern easier to see); how much the two countries trade in intermediate inputs against how closely their GDP growth moves together, after removing the effect of their bilateral portfolio-investment linkage and pair-specific differences.