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Chokepoint disruptions and their macroeconomic consequences

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Checkpoint disruptions and their macroeconomic consequences

Key takeaways

- *Rising geopolitical tensions, including trade restrictions and conflicts, are increasingly disrupting global supply chains, posing significant risks at critical chokepoints.*
- *Strong substitution effects and the use of inventories have helped to mitigate adverse output effects of chokepoint disruptions, but they often come at the cost of higher input prices.*
- *An effective policy response to chokepoint disruptions requires a tailored approach that takes account of the cause, centrality and the private sector's ability to substitute and draw on buffers.*

The Covid-19 pandemic, the rising use of trade restrictions and the recent disruptions around the Strait of Hormuz have exposed weaknesses in global supply chains. When shocks hit critical links – chokepoints with limited substitutability – the effects can propagate well beyond the firms and the countries directly affected. This Bulletin documents these chokepoints, assesses how their disruption affects the macroeconomy and draws policy implications.

On average, disruptions at chokepoints are associated with larger output losses and stronger price pressures than comparable disruptions elsewhere. Yet the realised impact in any episode depends on the affected product and available adjustment margins, including the ease of substitution, inventory buffers and pricing margins.

The policy prescription to look through first-round effects on inflation remains appropriate as long as the risk of inflation expectations de-anchoring stays low. However, policy calibration might have to consider the disruption's position and centrality in the supply chain, the ease of substitution, the state of buffers (inventories, spare capacity, margins) and demand.

Geopolitical tensions bring chokepoints into focus

Geopolitical factors are playing an increasingly prominent role in driving supply chain disruptions. This trend is evident in firms' earnings calls, which highlight the rising incidence of geopolitically driven disruptions, alongside a renewed surge in logistics concerns that had previously spiked during the pandemic (Graph 1.A). These developments have drawn fresh attention to the critical vulnerabilities posed by chokepoints in global supply chains.

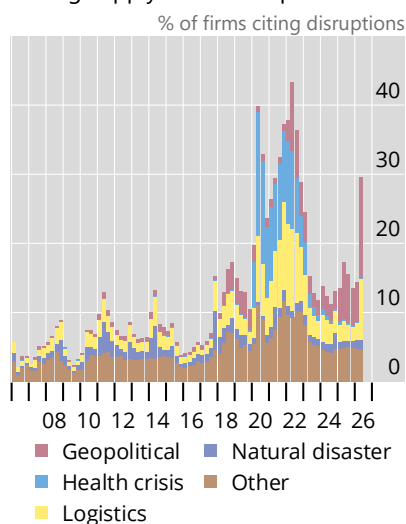
A supply chain chokepoint is an economically important product or node – such as a firm, industry in a country, production location or transport route – for which substitutes are limited or cannot be activated quickly. While a disruption to an ordinary node may be temporary and localised, a disruption to a chokepoint can spread more broadly through production networks. Its economic importance may stem from the direct use of an output across many sectors, as with refined oil products, or from significant indirect effects through supply chain connections, as with semiconductors, which are critical inputs for industries as diverse as automotive manufacturing and modern food production.

A key form of chokepoint arises from production network centrality – when nodes lie on numerous production paths, making them critical to the functioning of global supply chains. Many of these nodes are concentrated in large economies and in manufacturing sectors (Graph 1.B). Notable examples include German machinery manufacturing, Chinese manufacturing of electrical machinery and fertiliser production in the Middle East, all of which have become more central over time.

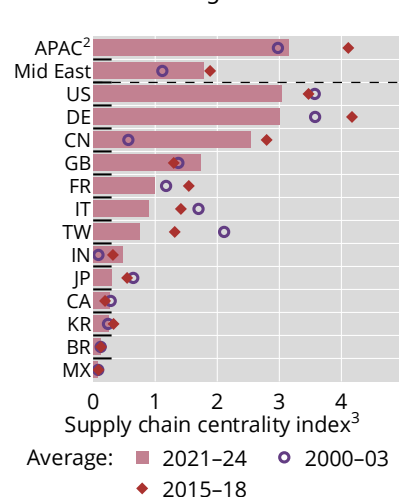
Rising supply chain disruptions bring chokepoints into focus

Graph 1

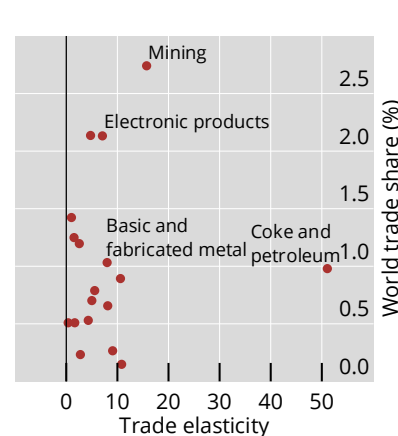
A. Geopolitical factors increasingly driving supply chain disruptions¹



B. Critical supply chain nodes concentrated in large economies



C. Trade elasticity and world trade shares⁴

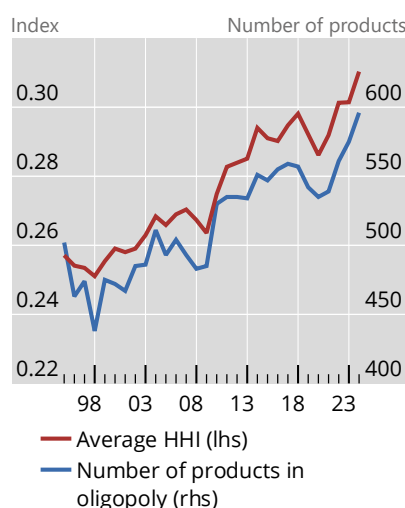
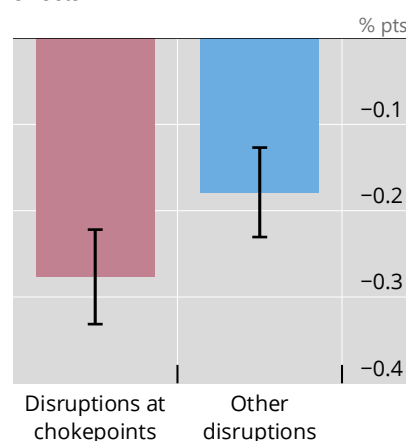
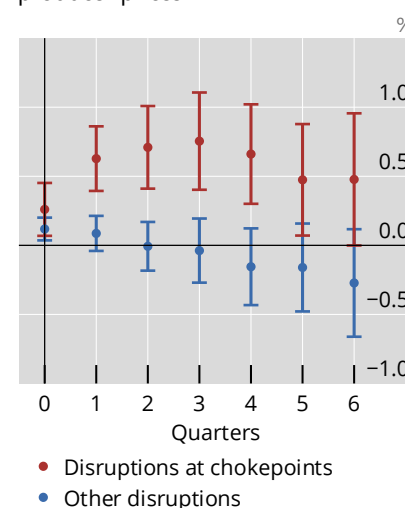


¹ Based on analysis of earnings calls using a large language model. Geopolitical = conflicts, trade barriers and other geopolitical causes; logistics = transportation difficulties. ² Asia-Pacific. ³ Supply chain centrality measured by betweenness centrality (rescaled) capturing the importance of a supply chain node by how often it lies on the shortest paths between other nodes. Average of betweenness centrality of nodes (country-sectors) in a jurisdiction, excluding domestic links. ⁴ Trade elasticities measure how strongly trade flows respond when prices change. The world trade share is based on input-output tables and captures world expenditure spent on internationally traded goods from a given sector.

Sources: Caliendo and Parro (2015); OECD, Inter-Country Input-Output database (2025); Exiobase 3.10.2; S&P Global Market Intelligence; BIS.

The severity of a disruption at a chokepoint depends not only on its centrality but also on how readily firms can find alternatives. The most direct form of substitution involves sourcing the same product from other suppliers. Estimated trade elasticities – which measure how strongly trade flows respond when relative prices change – shed light on this form of substitution. Comparing these elasticities with world trade shares – a proxy for economic importance – reveals significant differences across goods (Graph 1.C). Mining and energy-related products combine a large trade share with relatively high substitutability across suppliers. By contrast, electronic products, including semiconductors, are both economically critical and more difficult to source elsewhere. Basic metals, which include some rare earth elements, are also hard to substitute, although they account for a lower share of international trade.

The scope for substitution also depends on how concentrated production is. In particular, alternatives may be limited or difficult to access quickly when supply is concentrated in a few countries. From this perspective, the steady rise in the export concentration of intermediate inputs across countries over the past three decades points to declining substitutability and greater exposure to chokepoints (Graph 2.A). Part of this increasing concentration reflects the adaptation of trade and production networks around a small number of processing hubs. In electrification metals, for instance, supply chains have increasingly taken a hub-and-spoke form centred on China, thanks to a combination of sustained investment and industrial policy measures (Kirk et al (2026); Banerjee et al (2026)).

A. Country export concentration in intermediate inputs has increased¹B. Supply chain disruptions at chokepoints lead to greater output effects^{2,3}C. Only chokepoint disruptions drive price increases in downstream producer prices^{2,4}

¹ Measures of export concentration for intermediate input materials. Average HHI = mean of the Herfindahl-Hirschman Index; number of products in oligopoly = number of products for which the export share of top three exporter countries is more than 80%. ² Based on earnings call analysis using a large language model. Disruptions at chokepoints: supply chain disruptions in critical production network nodes (country-sectors with above median betweenness centrality). Other disruptions: supply chain disruptions in less important nodes (below median betweenness centrality). Error bars show 90% confidence intervals. ³ Impact of a one standard deviation increase in supply chain disruptions on the firms' propensity to change output, estimated by a panel ordered logit model. Converted into the scale of annualised global industrial production growth. ⁴ Impact of a one standard deviation supply chain disruption on the industry-level producer price index.

Sources: CEPII, BACI database; Exiobase 3.10.2; S&P Global Market Intelligence; BIS.

Macroeconomic implications

Evidence confirms that chokepoint disruptions have a quantitatively significant effect on economic activity and prices. For instance, a one standard deviation increase in disruptions at key country-sector nodes¹ of the global supply network is associated with a 50% larger decline in global industrial production growth compared with an equally large disruption at less critical nodes (Graph 2.B). Moreover, within one year disruptions at key nodes also raise downstream firms' producer prices by about 70 basis points, while those at less important nodes have minimal impact (Graph 2.C).

Additional analysis indicates how the size of these effects depends on multiple factors, including the nature of the disruption, the scope for substitution, inventory levels and margins, among others. As to the nature of the disruption, earnings call data indicate that firms are more likely to seek substitutes and reallocate production in response to trade restrictions and other geopolitical disruptions than to natural disasters or health crises, presumably because the former are expected to be more persistent (Graph 3.A). By contrast, logistical disruptions typically prompt like-for-like sourcing from alternative suppliers rather than broader adjustments.

The scope for substitution, in turn, influences the relative magnitude of the quantity and price effects. Substituting across suppliers generally limits the impact on quantities but often implies paying higher input prices. For instance, following export restrictions, lower imports from countries imposing the restrictions tend to be largely offset by higher imports of the same product from elsewhere (Graph 3.B). A

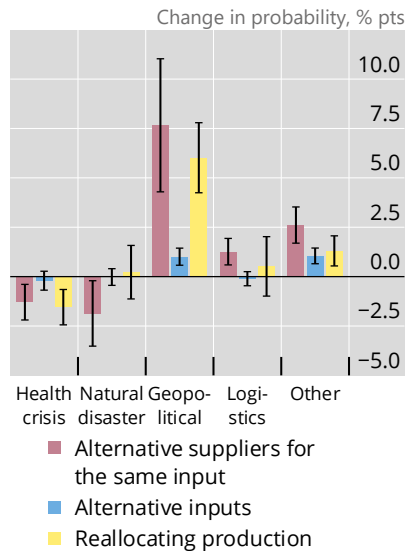
¹ Key country-sector nodes are defined as those with high supply chain (betweenness) centrality, which captures how often a node lies on the shortest paths between other nodes.

case in point is Japan's response to China's restrictions on rare earth exports: between 2012 and 2014, Japan reduced the share of its rare earth imports from China from around 80% to about 45%, yet purchases from other countries were much more expensive (Graph 3.C).

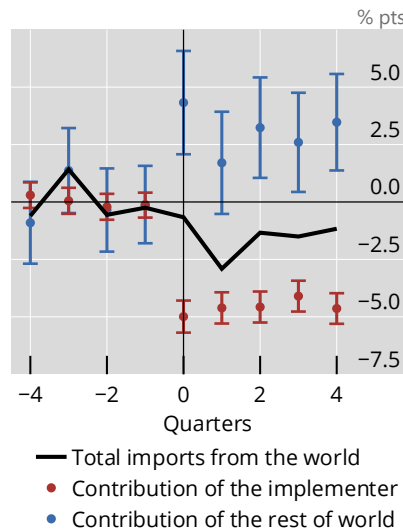
Substitution is significant after geopolitical disruptions, but input prices rise

Graph 3

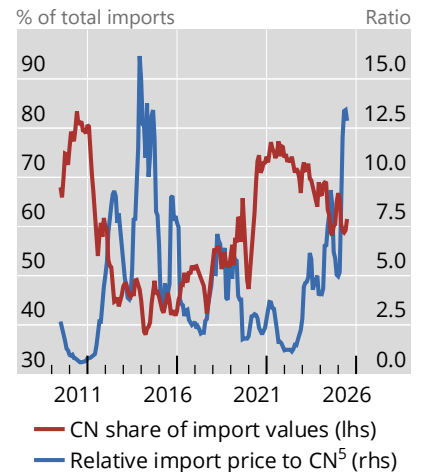
A. Propensity to seek substitutes depends on the source of disruption^{1,2}



B. Export ban shortfalls largely covered by imports from other economies^{1,3}



C. Japan substituted rare earth imports but paid higher prices⁴



¹ Error bars show 90% confidence intervals. ² Change in the probability of firms stating they are seeking alternative suppliers for the same input, alternative inputs or reallocating production conditional on reporting a supply chain disruption driven by the listed causes. Based on processing earnings call transcripts with large language models. ³ Impact of export bans on the import of restricted products for affected countries, percentage change relative to pre-export restriction period. Based on an event study regression model: $\log X_{n,i,j,t} = \text{ImplementerContribution} + \text{OtherCountryContribution} + \text{FixedEffects} + \varepsilon_{n,i,j,t}$, where $X_{n,i,j,t}$ denotes the imported quantity of a Harmonised System (HS) six-digit product n from country i to j in period t . Scaled to match the case in which the pre-restriction share of the implementer is 10%. ⁴ Based on HS 2846; six-month moving averages. ⁵ Ratio of the median import unit price of all countries to that of China.

Sources: UN Comtrade; Japanese Ministry of Finance; Global Trade Alert; S&P Global Market Intelligence; BIS.

The potential for substitution increases with time – and the size of the macroeconomic effects diminishes – as technological and organisational constraints ease. Trade substitution elasticities – measuring the ease with which firms can replace imported goods with alternatives – are typically much lower in the short than in the long run. Simulations of models incorporating international input-output linkages illustrate how these differences translate into output effects (Graph 4.A). For instance, in a scenario where trade costs in high-tech electronics sectors rise by 150% globally, the short-run GDP losses are estimated to be around 1% in most countries and as high as 4% for economies heavily reliant on these sectors. In the long run, losses are considerably smaller, averaging about 0.3% and at most 1% even in the most exposed economies.

The third factor, inventory buffers, can mitigate the near-term impact of chokepoint disruptions while giving firms time to find substitutes. The oil market offers a clear illustration: the large drawdown of oil reserves during the current disruption of the Strait of Hormuz has contributed to limiting the impact on oil prices. This aligns with the stabilising role abundant commercial inventories have played in smoothing past logistical disruptions to shipping through the Strait of Hormuz (Graph 4.B). However, with inventories currently low and transit through the Strait of Hormuz limited, the risk of sharper price increases has risen. Beyond oil, the rise in firms' inventory-to-sales ratios over the past two decades suggests efforts to bolster resilience, especially after major supply disruptions (Graph 4.C). This build-up was also facilitated by low

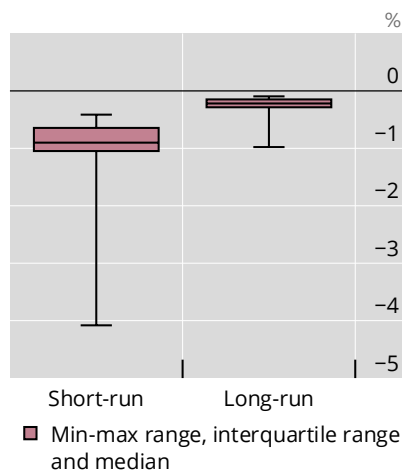
interest rates for much of that period. However, with interest rates now higher, building resilience through higher inventories has become more costly.

Finally, margins can help to absorb higher costs, temporarily dampening the pass-through to prices. Analysis of earnings calls indicates firms with higher margins – often producers of less substitutable intermediate goods – are initially less likely to raise prices following supply chain disruptions, but this effect wanes after four quarters.

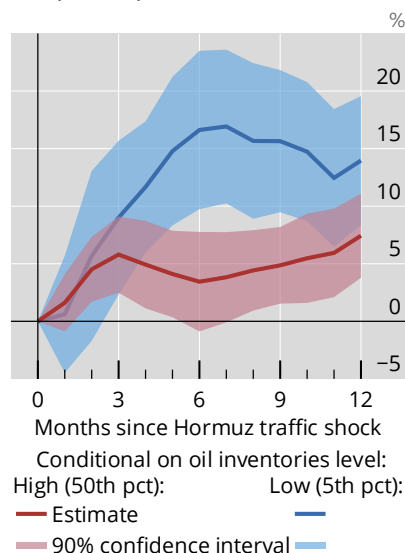
Substitution and inventories mitigate the effects of chokepoint shocks

Graph 4

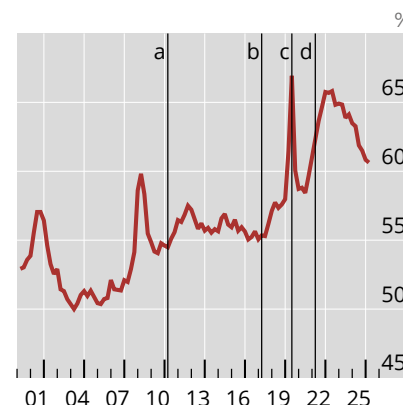
A. Short-run effects on GDP larger due to lower substitution¹



B. Commercial oil inventories help to dampen oil price increases²



C. Inventories relative to sales have seen a secular rise³



^a 2011 Tohoku earthquake. ^b 2018 US tariffs. ^c 2020 Covid-19 lockdowns. ^d 2022 start of Russia-Ukraine war.

¹ GDP losses across 20 major economies in response to a 150% increase in electronic and electrical equipment sector trade costs globally, based on Baqaee and Farhi (2024) using the 2022 input-output table. Long-run trade elasticities from Caliendo and Parro (2015). Short-run trade elasticities derived by adjusting the Caliendo and Parro (2015) estimates by the ratio of long- to short-run (two-month) trade elasticities in Baqaee et al (2024). ² Impact of a one standard deviation fall in traffic through the Strait of Hormuz on Dubai crude oil price conditional on OECD commercial oil inventories. Estimation sample period: Jan 2019–Dec 2025. Hormuz traffic shocks derived as residual ($\varepsilon_{c,t}$) from the regression: $y_{c,t} = \beta \text{Tonnage}_{c,t} + \alpha_c + \alpha_t + \varepsilon_{c,t}$, where $y_{c,t}$ is the number of ships passing through maritime chokepoint, c , in month t and α_c and α_t are chokepoint and period fixed effects, respectively. High = inventories at the 50th percentile; low = inventories at the 5th percentile. ³ Mean inventories-to-sales ratio from a global panel of firms.

Sources: Baqaee et al (2024); Baqaee and Farhi (2024); Caliendo and Parro (2015); Kharroubi (2026); OECD, Inter-Country Input-Output database (2025); US Energy Information Administration (EIA); LSEG Datastream; S&P Global Market Intelligence; BIS.

Policy implications

The standard policy prescription for responding to supply shocks is to look through the first-round inflation effects, provided expectations remain anchored and the risk of second-round effects is low. This prescription remains valid in the case of disruptions at chokepoints. Yet such disruptions can have larger, more persistent and potentially non-linear effects compared with similar shocks at less central nodes. The following considerations are therefore particularly relevant for assessing the risks of second-round effects and calibrating the policy response.

First, the scale and persistence of the macroeconomic effects depend on the position and centrality of the disrupted node, as well as the availability of substitutes and operational buffers. A disruption to a central node, especially one located upstream, can have much larger effects than its direct impact. Even where substitution is strong and mitigates output losses, recourse to more expensive inputs may result in

higher prices. Sufficiently large cost increases could also trigger pricing cascades. Low inventories and limited spare capacity could magnify these effects, amplifying price pressures and making the effects increasingly non-linear. This risk is especially relevant at the current juncture. Although the rise of inflation in major economies has remained moderate despite the prolonged disruption to traffic through the Strait of Hormuz, the continued drawdown of oil reserves has increased the risk of non-linear inflationary effects. Assessing demand conditions is also critical, as strong demand can deplete buffers more rapidly and facilitate cost pass-through.

Second, whether the Phillips curve steepens following a chokepoint shock is key to policy calibration. When the chokepoint disruption occurs abroad, imported input prices are shaped mainly by global demand and supply conditions. Hence, headline inflation may only be weakly sensitive to domestic slack, and significant domestic output losses may be required to offset imported inflation. However, the curve may steepen if the shock is large enough to trigger widespread repricing in the economy. Thus, the same conditions that can make inflation more responsive to the shock can also raise its sensitivity to monetary policy-induced changes in domestic demand, thereby reducing the output cost of a given disinflation.

Finally, the policy mix can also influence the speed and effectiveness of supply repair. Maintaining production, rebuilding inventories, replacing suppliers and expanding capacity normally requires external financing. Tighter policy may therefore restrict this financing, slowing supply normalisation. Well targeted fiscal measures (eg credit guarantees) can support supply repair without boosting demand, reducing the burden on monetary policy. By contrast, subsidies which cushion price increases may be counterproductive if they dampen substitution incentives.

Besides policy calibration, clear and timely communication is crucial to preserve credibility. To this end, policymakers should be clear about what they can and cannot achieve in response to chokepoint shocks, distinguishing the unavoidable relative price adjustment from persistent and generalised inflation that policy should lean against.

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