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# Global Supply Chain Reconfiguration: The Evolution of Asymmetric Dependence between China and the United States and the Third-Party Effects

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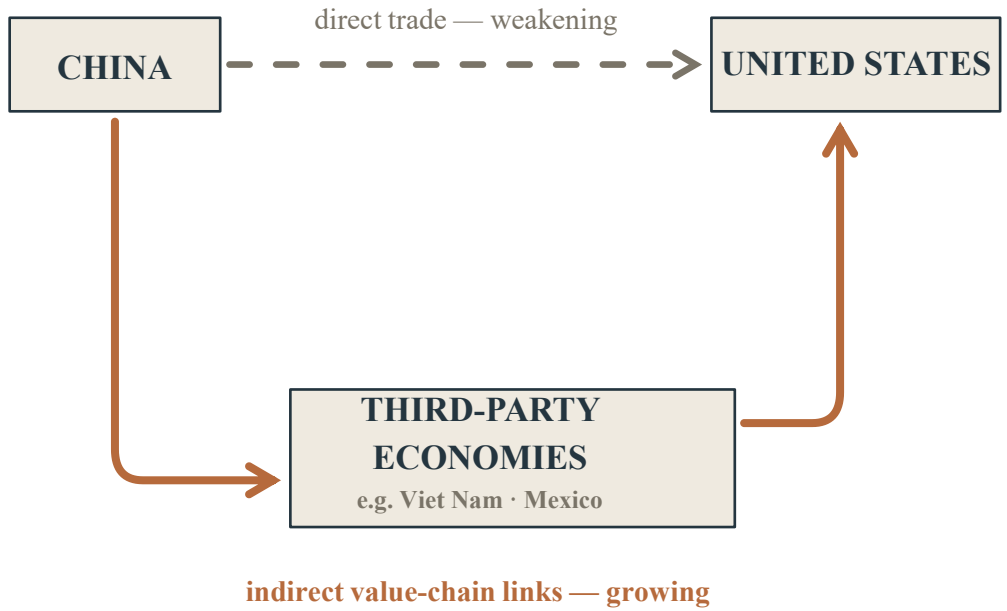
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# Do bilateral trade statistics still measure supply-chain dependence?

**Policy runs on measured dependence.** Tariffs, export controls and industrial policy are calibrated to bilateral trade statistics.

**But production is routed.** When goods move through third countries and multinational networks, bilateral flows can overstate or understate true dependence.

**Direct decline ≠ decoupling.** Falling direct trade can coexist with unchanged underlying dependence via intermediaries.




**A decline in visible bilateral trade may overstate the decline in actual supply-chain dependence.**

Source: Author's conceptual illustration based on the paper's accounting framework.

# Four Questions, One Measurement Claim

**Q1** How has asymmetric China–U.S. dependence evolved over 2000–2023?

**Q2** Through which channels — direct or third-party, trade or FDI?

**Q3** Which third economies matter, and how does this differ by industry?

**Q4** How are trade and FDI channels intertwined?

**Aggregate China–U.S. supply-chain dependence has not collapsed — but the channels through which it is realized have been reconfigured.**

Declining direct dependence + rising indirect dependence can reasonably be read as **partial decoupling**. Our task is to measure both margins.

# One accounting framework: direct links vs the third-party effect

**Two Paths:**

Total bilateral supply-chain dependence

= Direct bilateral links

+ Third-party effect (via third economies)

**Three channels:** GSCT (trade) · GSCI (FDI) · GSCTI (trade × FDI composite)

**Three dimensions:** upstream supply · downstream demand · final consumption

| Data source | Coverage | Role in this paper | Window |
|---|---|---|---|
| OECD AMNE-ICIO | 80 economies(+ROW) · 41 sectors · domestic vs foreign firms | Macro & sectoral decomposition of direct vs third-country channels | 2000–2023 |
| HS 8-digit customs data (China & U.S.) | - | Product-level direct import dependence | 2017–2025 |
| OECD trade by industry & end-use | Final vs intermediate goods | Long-run stylized facts | 1992–2024 |

# From Gross Output to Bilateral Dependence

The accounting framework answers three questions: which channel carries the dependence, who owns the production, and whether the link is direct or mediated through a third economy.

**1. Decompose gross output by ownership and channel.**
Domestic and foreign firms are separated, and international supply-chain activity is decomposed into trade-related (GSCT), FDI-related (GSCI), and composite trade–FDI (GSCTI) channels.

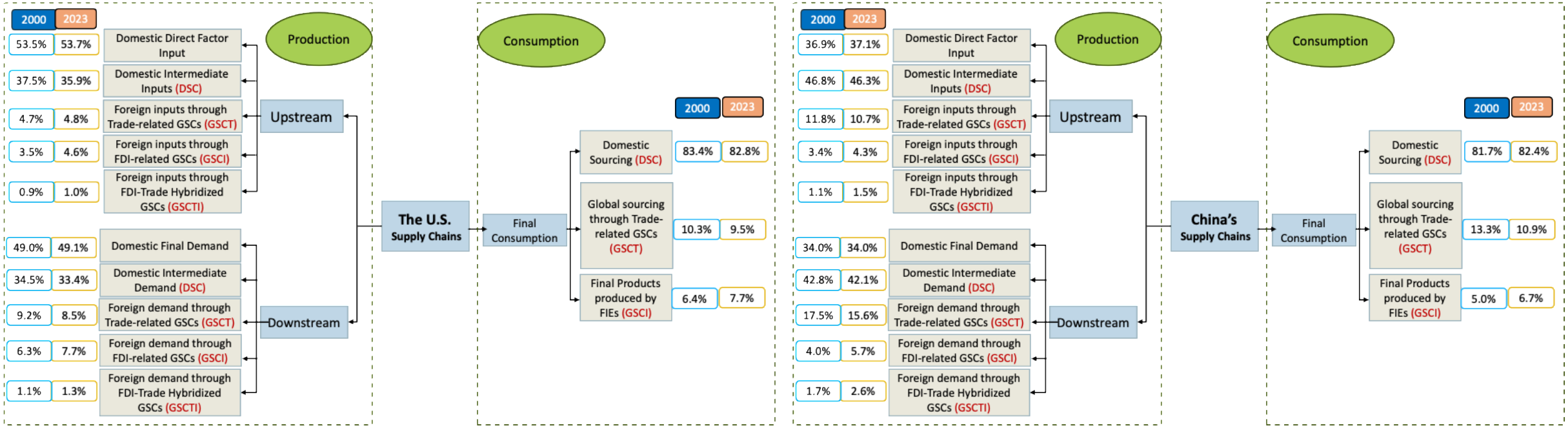
**2. Attribute multinational production to its country of ownership.**
The foreign-firm output-share matrix $W^{sr}$ allocates production by foreign affiliates in host country r to owner country s, converting a multilateral decomposition into bilateral dependence measures.

**3. Separate direct from third-party components.**
Each bilateral measure is divided into direct bilateral links and links realized through third economies. The third-party effect is the third-country component divided by total bilateral dependence.

$$X_{GSC}^{cu} = X_{GSCT}^{cu} + X_{GSCI}^{cu} + X_{GSCTI}^{cu} \qquad T_{third-party}^{cu} = X_{GSC,Other}^{cu} / X_{GSC}^{cu}$$

Source: Paper Section 3, equations (1)–(10); extended from Wang et al. (2025).

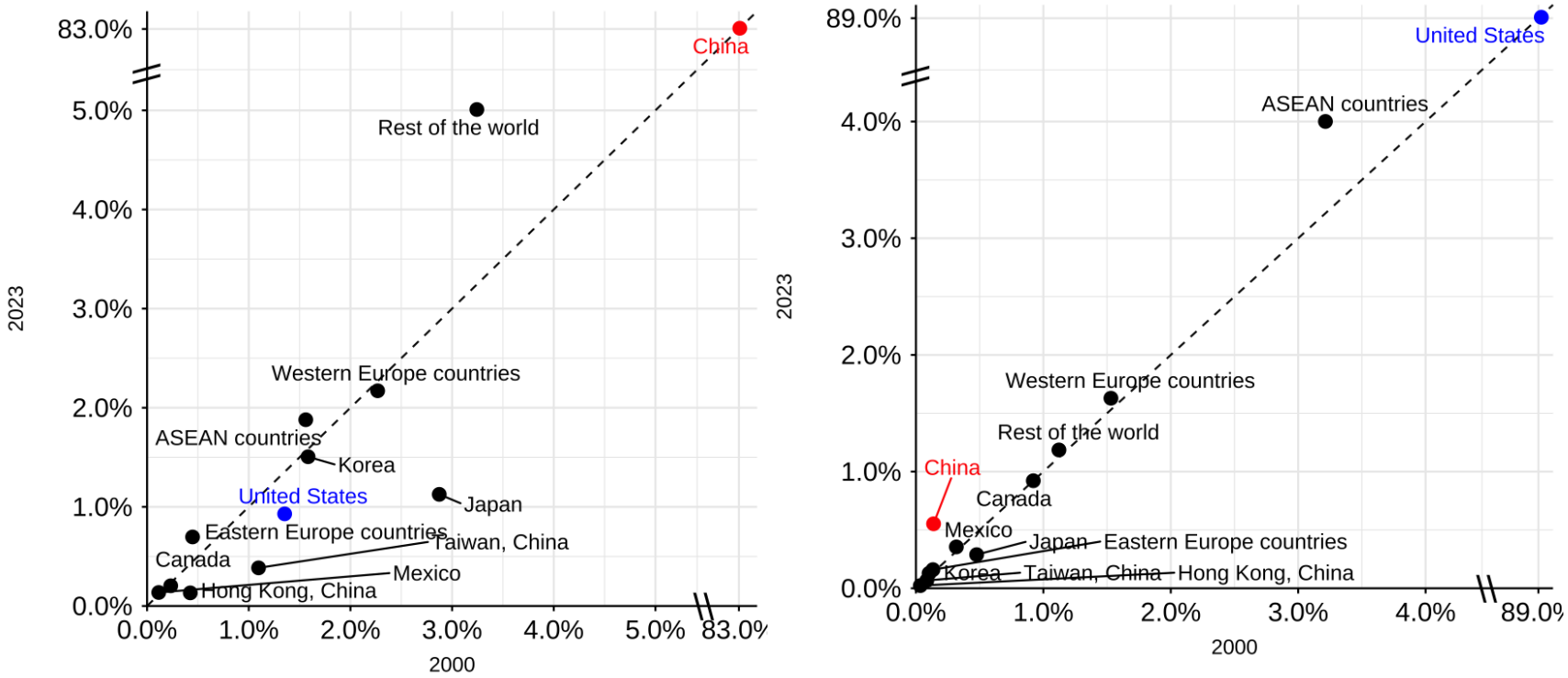
# Macro Structures: From Trade-Led toward FDI-Led Integration




- Both economies increased localization, but through different structures: China retains denser domestic intermediate linkages, while the United States relies more on multinational investment channels.
- Trade-related dependence declined in both countries, whereas FDI-related linkages rose.
- Supply-chain reconfiguration is increasingly organized through MNE production and investment networks, not only through arm's-length trade.

# Upstream Supply: The Asymmetry Has Reversed

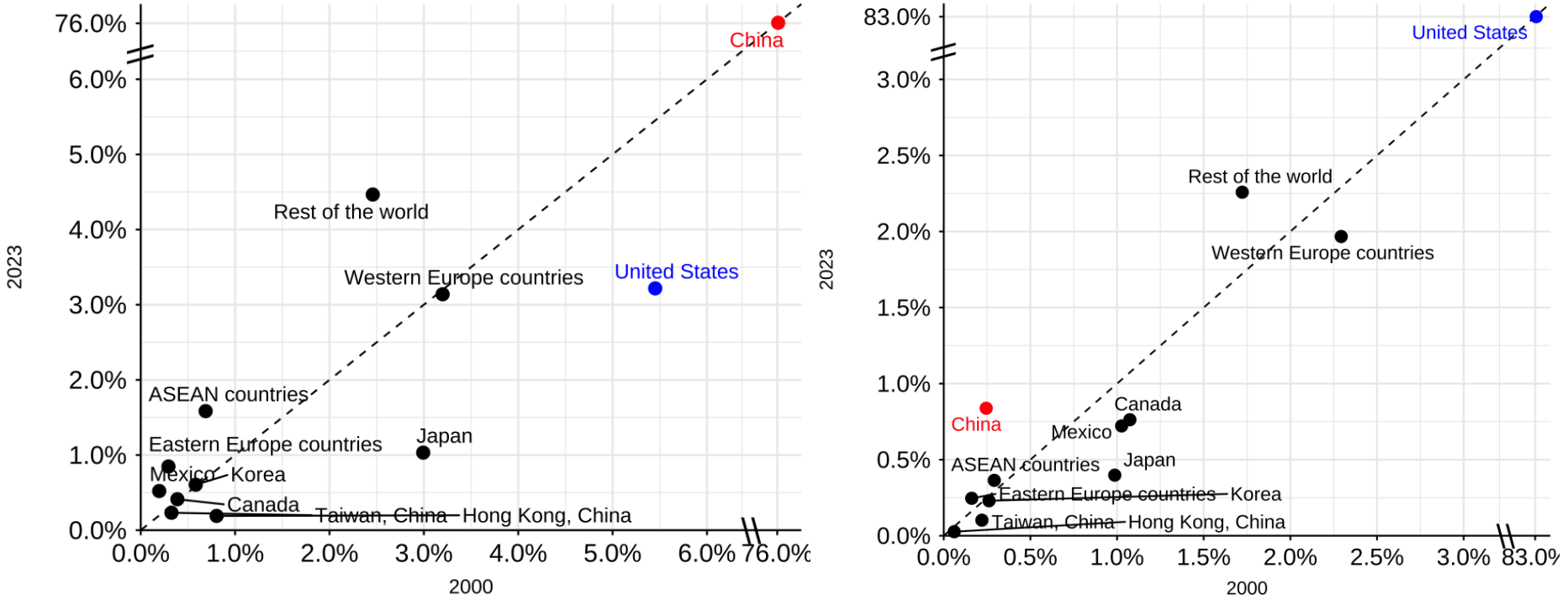
China (left) and the U.S. (right) 's upstream supply chain dependence on major economies, 2000 and 2023




- In 2000, China's upstream dependence on U.S. was higher (1.4%) than U.S. dependence on China (less than 0.1%).
- By 2023, China's dependence on U.S. inputs had declined (0.9%), while U.S. upstream dependence on had increased (0.6%).

# Downstream Demand: China Diversifies, the U.S. Depends More on China

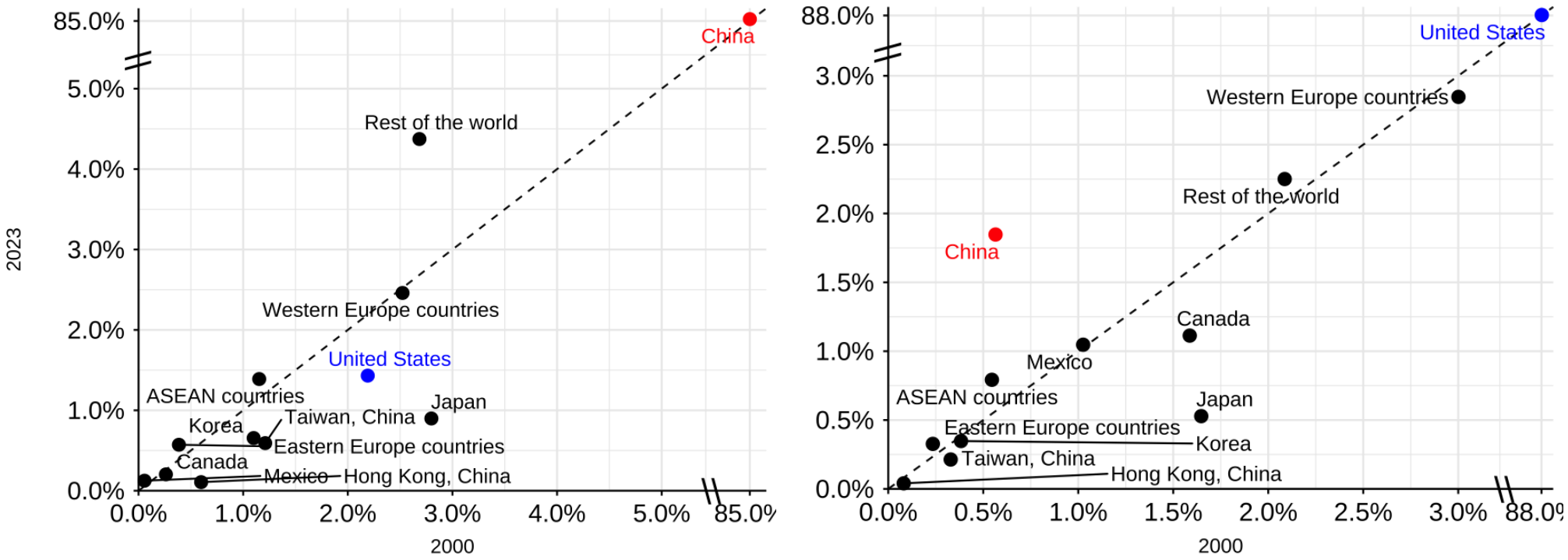
China (left) and the U.S. (right) 's downstream market dependence on major economies, 2000 and 2023




- In 2000, the United States was China's largest foreign market, absorbing 5.4% of China's gross output; U.S. dependence on Chinese demand was only 0.2%.
- By 2023, China's dependence on the U.S. market had fallen to 3.2% (and on Japan from 2.9% to 1.0%), while dependence on ASEAN rose to 1.6% — export markets diversified.
- In contrast, U.S. dependence on Chinese market demand rose to 0.8%, making China an important destination for U.S. output.

# Final Consumption: U.S. Household Dependence on China Has Risen

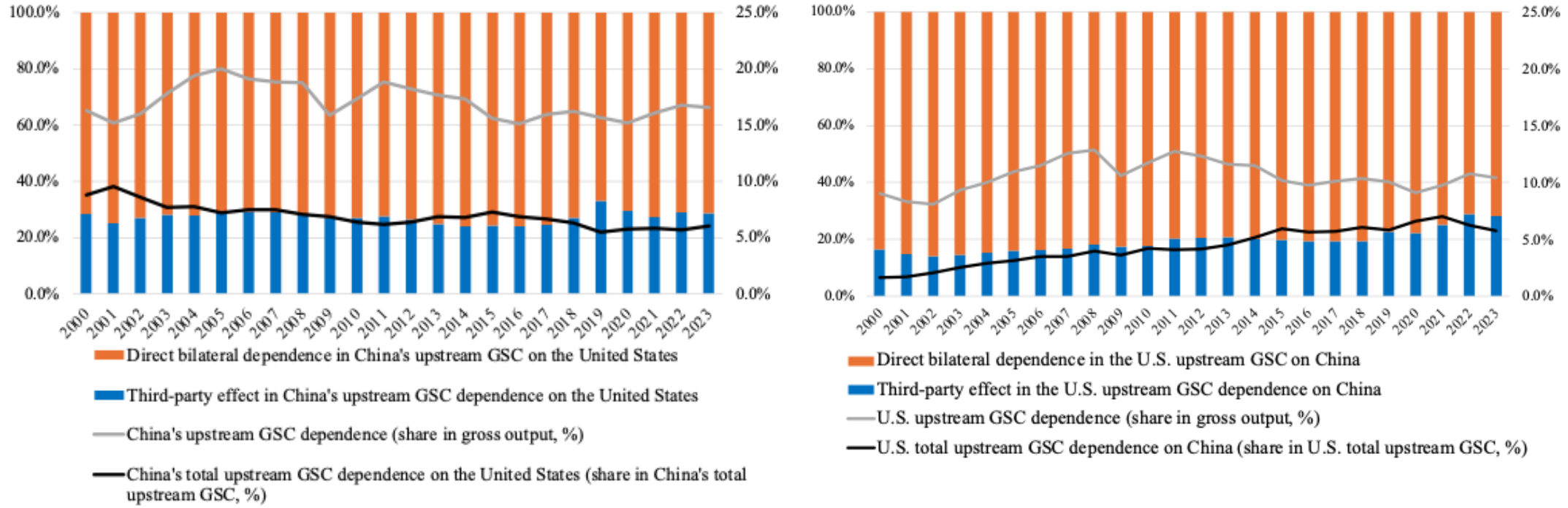
China (left) and the U.S. (right) 's final consumption dependence on major economies, 2000 and 2023




- In 2000, China's final consumption depended relatively heavily on the U.S. (2.2%), Japan (2.8%), and Western Europe (2.5%); U.S. households obtained only 0.6% of consumption from China.
- By 2023, China's final consumption had become more localized — dependence on the U.S. (1.4%), Japan(0.9%), and Taiwan (China) (0.6%) all fell noticeably, while reliance on ASEAN as well as the rest of the world (4.4%) increased.
- In contrast, U.S. households became increasingly dependent on Chinese products (1.8% ).

# Bilateral Upstream Supply

Upstream supply chain dependence: China on the U.S. (left) and the U.S. on China (right)

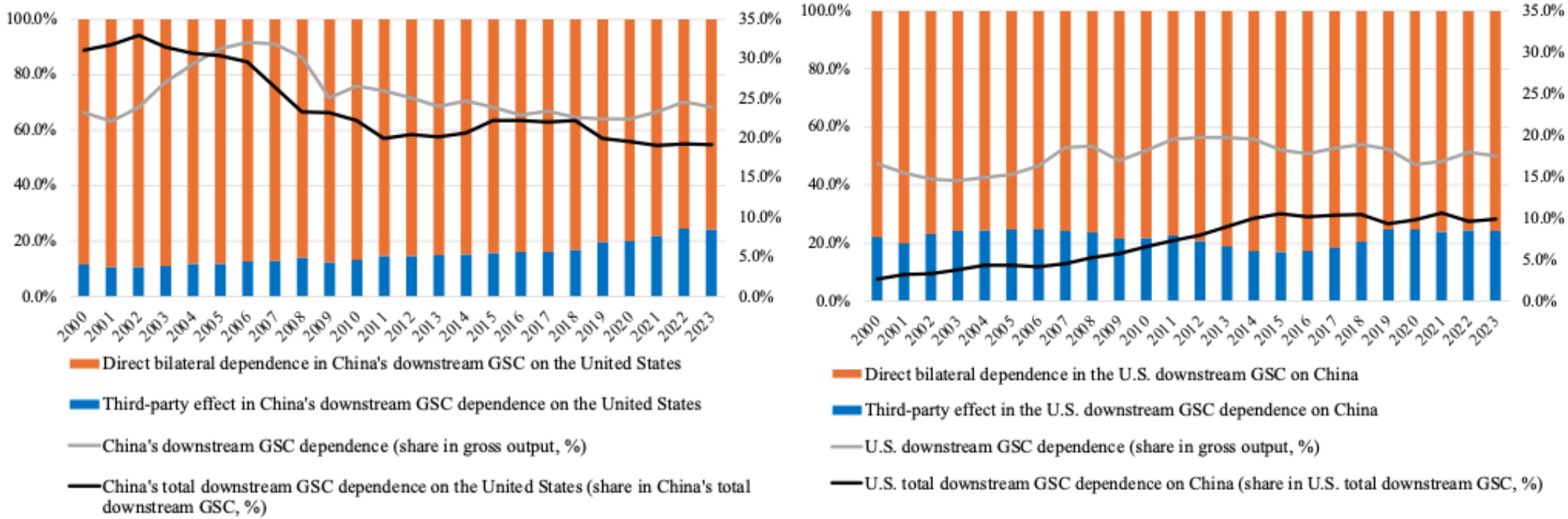



- China’s upstream dependence on the United States declined from 9.6% to 6.1%, with about 30% realized through third parties.
- U.S. upstream dependence on China rose from 1.7% to 7.0% in 2021, then declined to 5.7%. while the third parties channel increased from 16.5% to 28.1%.
- The upstream dimension shows a clear asymmetry: China’s dependence on the U.S. is declining, whereas U.S. dependence is rising and relies more on indirect channels.

Source: OECD AMNE-ICIO, 2000–2023

# Downstream Demand: China Diversifies; the U.S. Depends More on China

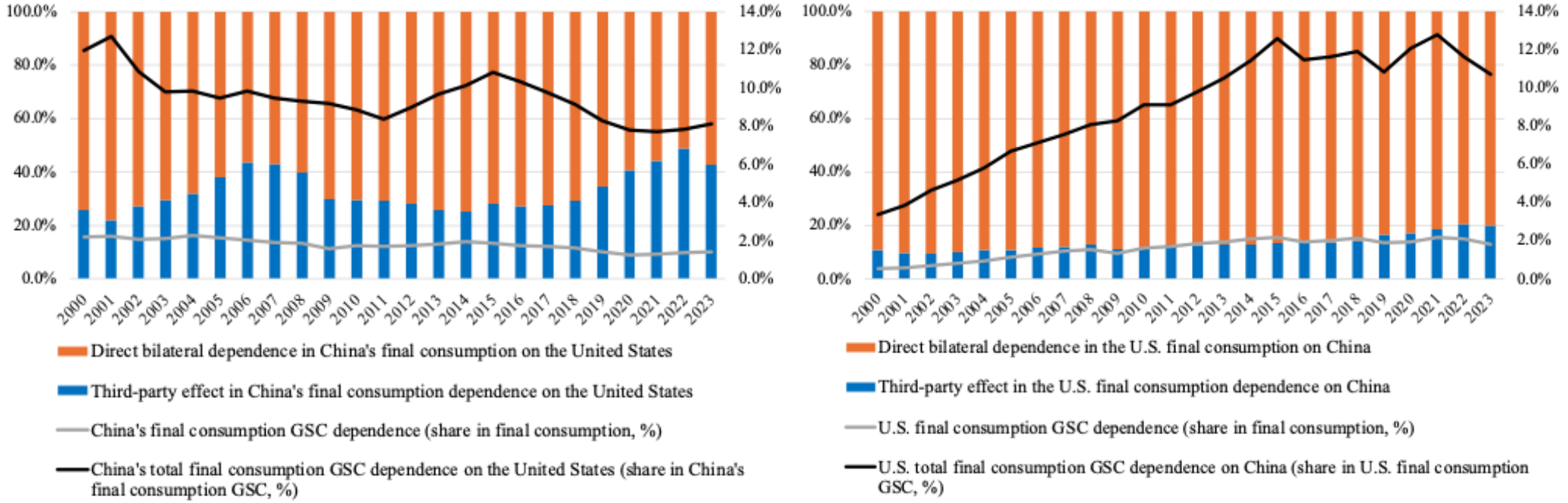
Downstream market demand dependence: China on the U.S. (left) and the U.S. on China (right)




- China’s downstream dependence on U.S. market demand fell from 31.1% in 2000 to 19.2% in 2023, indicating substantial export-market diversification.
- The third-party share of China’s U.S.-bound downstream dependence rose from 11.7% to 24.3%, but direct trade remained dominant.
- U.S. downstream dependence on Chinese demand rose from 2.7% to 9.9%; about 25% was realized through third-country production networks.

# Final Consumption: U.S. Household Dependence on China Has Risen

Final consumption dependence: China on the U.S. (left) and the U.S. on China (right)




- China’s final-consumption dependence on U.S. supply fell from 12.0% in 2000 to 8.1% in 2023, as consumption became more localized.
- U.S. final-consumption dependence on Chinese supply rose from 3.4% to 10.7%; 80% has been realized through direct bilateral trade.
- The consumption side therefore shows the clearest asymmetry: U.S. households have become more exposed to Chinese products, while Chinese households rely less directly on U.S. supply.

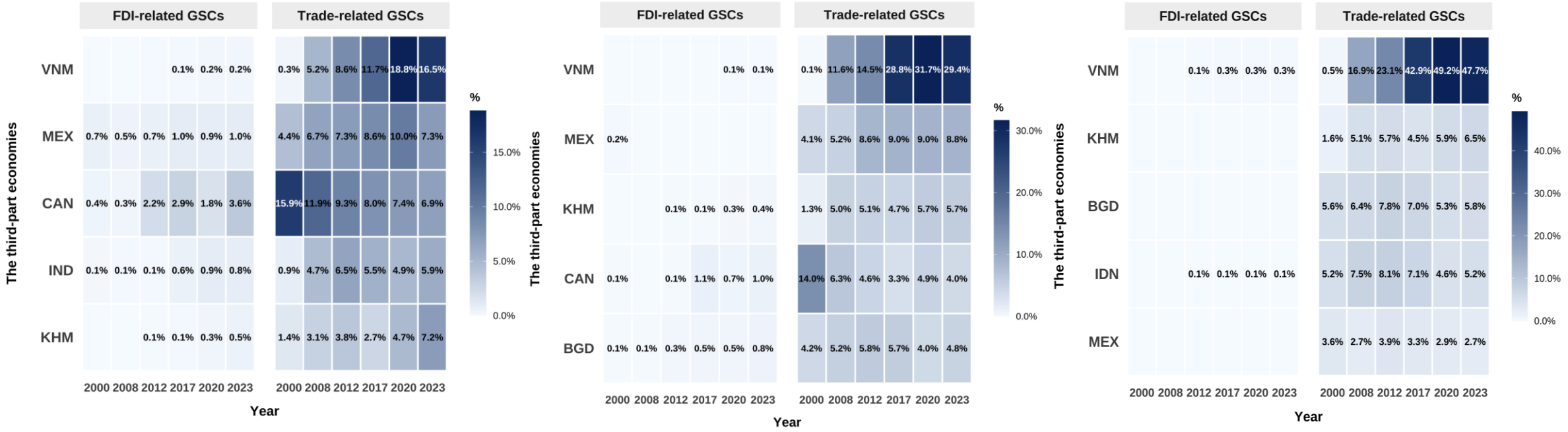
# Functional Roles of Third-Country Economies: A Typology

| Functional role | Empirical signature | Main channel | Example |
|---|---|---|---|
| **Transit hub** | Rising indirect share, low FDI-related share | Trade-based routing | Vietnam in textiles |
| **Production platform** | Rising third-country share with non-negligible FDI component | Trade and FDI | Mexico in electronics and autos |
| **Upstream conduit** | Specialized intermediate-input mediation | Technical input linkages | Taiwan and Korea in electronics |
| **Strategic buffer** | Ownership-linked foreign production network with market-access implications | FDI-related network | Sweden in motor vehicles |

- Third-party economies are not simply alternative suppliers: they channel, stabilize, and sometimes obscure China–U.S. production dependence.
- Categories are interpretive, not mutually exclusive: the same economy may play different roles by sector.
- Case studies: Vietnam in textiles, Mexico in electronics/autos, Taiwan and Korea in electronics, Sweden in motor vehicles.
- The typology matters for policy because each role implies a different exposure: transit hubs are footloose and can shift quickly; platforms and buffers are anchored by sunk investment; conduits are anchored by technology.

# Transit Hubs: The Textile Sector

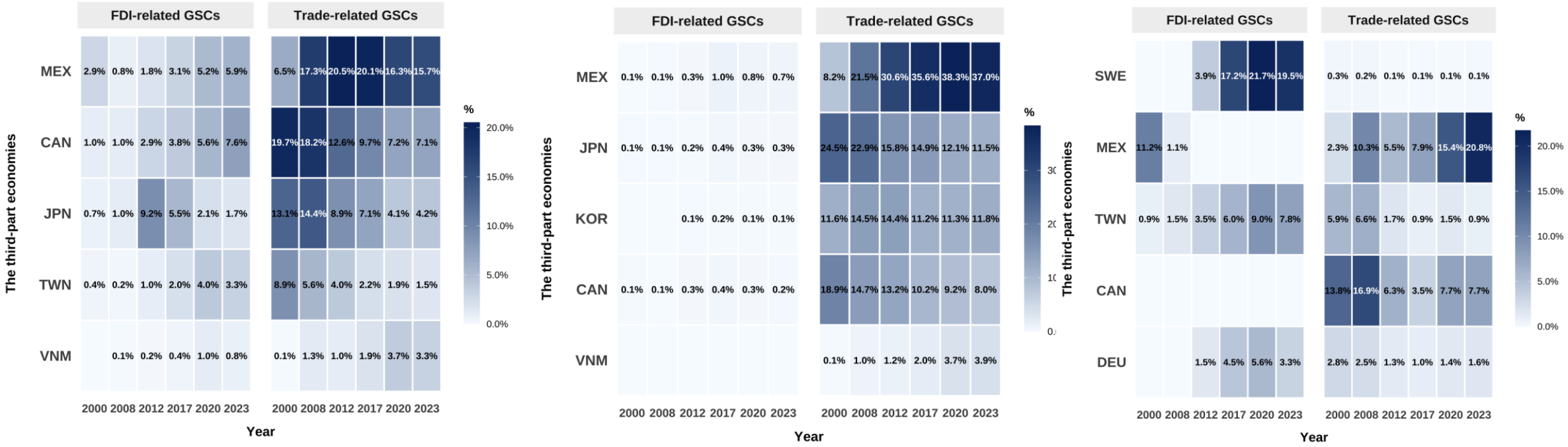
The Textile Sector Intermediation:
(a) U.S. Upstream Dependence on China; (b) U.S. Final Consumption Dependence on China; (c) China's Downstream Dependence on the U.S.




- Vietnam illustrates transit-hub mediation: high trade shares, FDI-related share below 1%.
- Vietnam, Mexico, and Cambodia are the main transshipment hubs — Vietnam became the largest indirect source for U.S. textile consumption; FDI channels remain small but are growing in Vietnam and Cambodia,indicating a gradual move from pure transshipment toward production platforms.
- Upstream textile inputs remain more stable because of contracts and technical requirements.

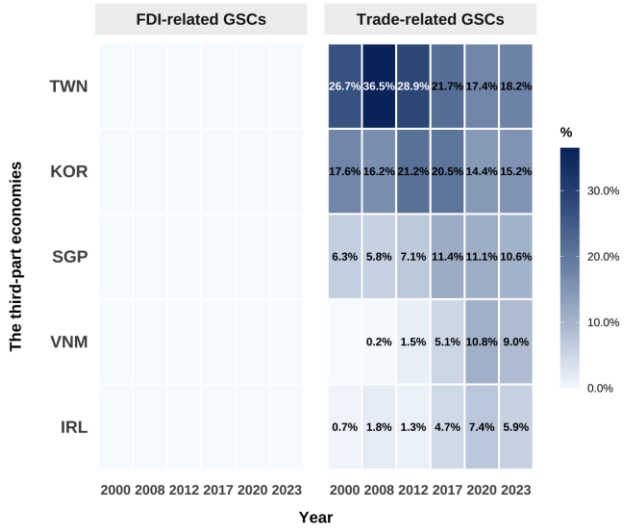
# Production Platforms and Strategic Buffers: The Motor Vehicle Sector

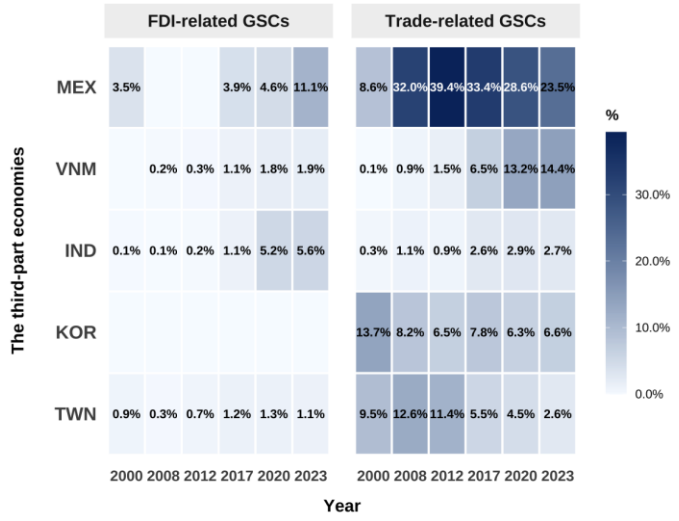
Motor Vehicle Sector Intermediation.
(a). U.S. Upstream Dependence on China ; (b) U.S. Final Consumption Dependence on China; (c). China's Downstream Dependence on the U.S (right).

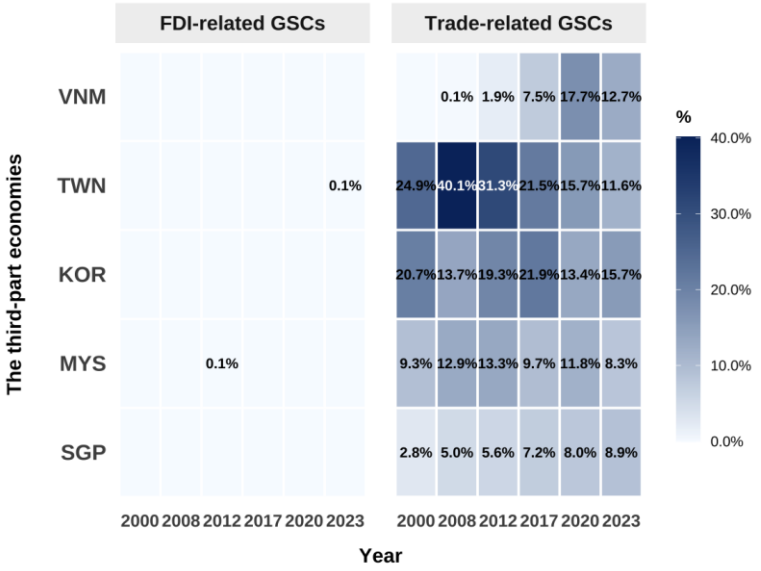


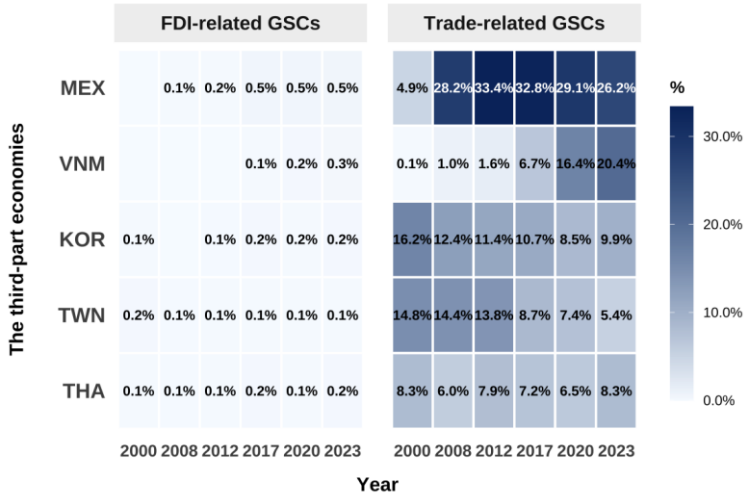

- Mexico dominates as a USMCA nearshoring platform: its trade-channel share of U.S. automotive final consumption reached 37.0% in 2023;
- FDI matters more than in textiles: Sweden's FDI-related share reached 21.0% after 2017, which illustrates an ownership-linked strategic-buffer role rather than simple trade rerouting, consistent with Chinese automakers using European production capacity to reach the U.S. market.
- Mediation depends on firm ownership structure.

# Electronics: Technology Intermediation through Trade and FDI Channels



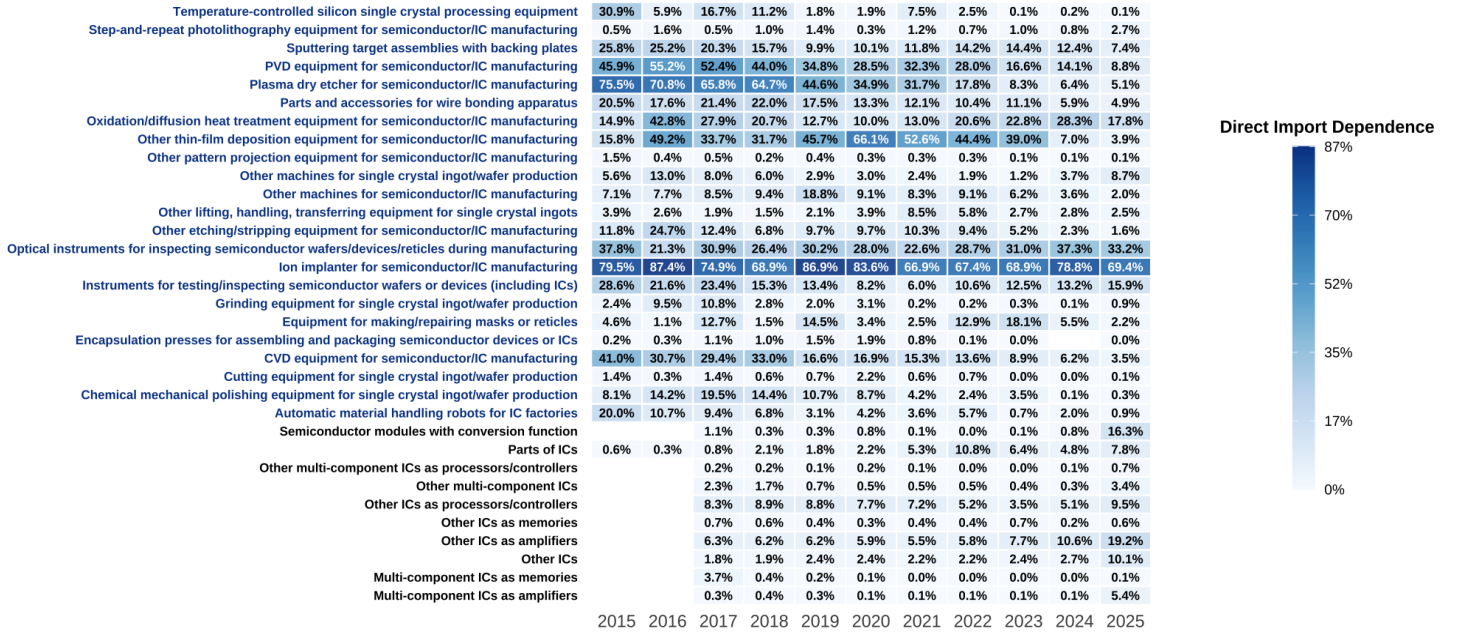




Electronics Sector Intermediation
(a). China's Upstream Dependence on the U.S. (left) and Downstream Dependence on the U.S. (right);
(b). U.S. Downstream (left) and Final Demand (right) Dependence on China

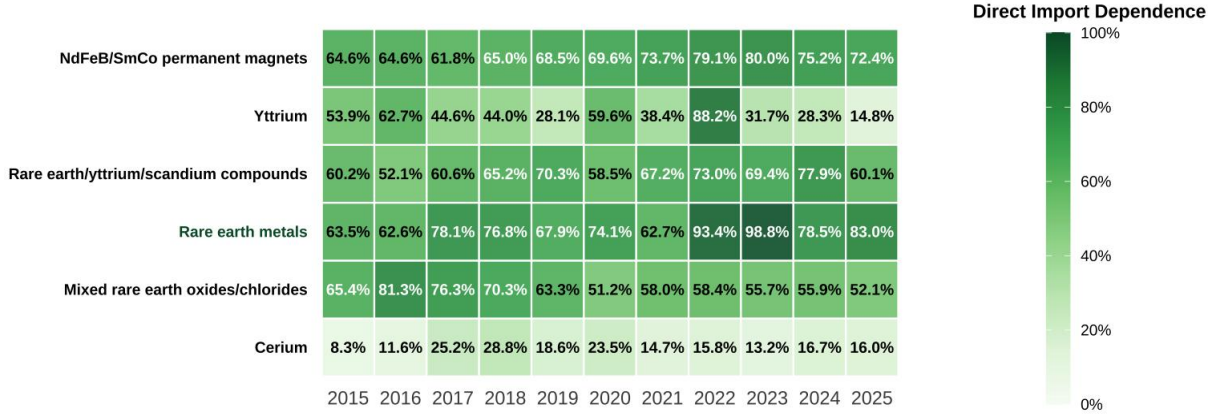
- Mexico: production platform with non-negligible FDI-related shares; and as the main transshipment point for Chinese computer products into the United States.
- Vietnam: closer to a trade/assembly hub.
- Taiwan, and Korea serve as upstream conduits shaped by technical capability — high-end chips and components.

# Strategic Products: Chips, Semiconductor Equipment and rare earths

(a) China's direct import dependence on the U.S. for semiconductors and semiconductor manufacturing equipment




(b) U.S. direct import dependence on China for rare earth raw materials and rare earth products




Use HS eight-digit level customs data to show the product-level bilateral direct import dependence

**China's dependence:** finished chips is low and declining; within chipmaking equipment, most fell significantly, which indicates partial substitution and diversification succeeds. While for ion implanters, U.S. supply shares ran at 60 to 75% for years and remain high after 2017 — China's critical chokepoint. ;

**U.S. dependence:** the bottleneck still sits in permanent magnets and rare-earth metals. U.S. import dependence on China often runs at 50-70%, with no systematic decline after 2017

# FDI Is the Quiet Reconfigurer of China–U.S. Supply Chains

FDI is not a background variable in this story. It is one of the main channels through which dependence now travels.

**Measurement**
Ownership-based accounting reveals MNE-mediated dependence that bilateral trade statistics cannot see.

**Dual role**
FDI networks stabilize production links when direct trade is disrupted, but can also transmit shocks across countries.

**Strategy**
Textiles rely on trade rerouting; automotive on FDI-led regional platforms; electronics on technology hubs and nearshoring.

**For policymakers, the key question is not whether FDI matters, but which kind of FDI builds durable resilience: footloose transshipment or platform investment that deepens regional production networks.**

# Measure Better, Target Smarter: Implications for Resilience Policy

1 **Monitor indirect as well as direct dependence.** Pair input-output measures with product-level tracking.

2 **Account for multinational production networks.** Rerouting production is not the same as reducing dependence.

3 **Treat third economies as intermediaries, not simply substitutes.** ASEAN and Mexico often channel China–U.S. links.

4 **Differentiate resilience policy by industry.** Critical products with persistent dependence require longer adjustment horizons.

**Better measurement is a precondition for better policy.**

Thank you • Kun Cai • kuncai@whu.edu.cn