Trends in Global Manufacturing and Supply Chains

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My research is covered by 400+ media in 20+ countries globally.

- **Barron’s**, “The dirty secret behind companies’ carbon-emissions disclosures”, July 17, 2023
- **WSJ**, “Amazon is proof of a major weakness in ESG ratings”, Nov 11, 2021
- **Chicago Booth Review**, “Global supply chains can hurt a company’s credit”, August 11, 2021
- **South China Morning Post**, “How to spot and avoid greenwashing in supply chains”, June 12, 2021
- **Economist**, “A wave of supply-chain reshoring around the corner”, Dec, 2020
- **Reuters**, “Decoupling from China does not help companies mitigate risks.”, Oct 29, 2020
- **Forbes**, “Financial Supply Chain in the COVID-19 Pandemic: Fuel or Wildfire?”, Apr 30, 2020
20 Years of Manufacturing Globalization
Rise of China

- China joined WTO in 2003. The open of product and service markets promoted China’s strong growth and modernization.
- Global supply chain is transnational arbitrage of production factors. China has comparative advantages in industrial scale and demographic dividend.
- As China accumulates capital, China’s innovation potential threatens the United States’ position in technology and advanced manufacturing.

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Network structure of global value chains in 2000 and 2017

4 Waves of China Manufacturing Relocation

- **First round: 2008-2015**
  - Production cost squeeze: exchange rate, labor, capital cost, land price

- **Second round: 2016-2018**
  - Supply-side reform and overcapacity reduction

- **Third round: 2018-2021H1**
  - China-U.S. trade war, re-shoring, comprehensive decoupling
    - Some supply chains are relatively easy to break (e.g. commodity flows) but finding new suppliers takes time.
    - Some supply chains are simple (e.g. apparel).
    - Some supply chains are complex and can break with prohibitive bans (e.g. tech)
    - There are other forms of interdependence • FDI, VC, R&D – all large and cooperative/competitive.

- **Fourth round: 2021H2 to present**
  - China-U.S. conflict escalation, friend-shoring, targeted decoupling
Trade War: US Sourcing Restructuring

Figure 2. (Color online) U.S. Supplier Growth Rate Distribution Pre-/Post-Trump Election in 2016

Note. The colors of different regions represent the growth rates of suppliers of American companies in that region; green represents an increase, whereas red represents a decrease.

Charoenwong, Han, and Wu: Trade and Foreign Economic Uncertainty in Supply Chains
Manufacturing & Service Operations Management, Articles in Advance, pp. 1–22, © 2022 INFORMS
COVID-19: PPE Shortage and Global Export Ban

- The COVID-19 in 2020 has exposed the vulnerability of the global supply chain: governments prioritize domestic needs first so the location of the production base matters.

COVID-19 Temporary Export Measures
Affected products include personal protection equipment (e.g., masks, gloves), pharma products, hand sanitizer, food and certain other products.
**IPEF (Indo-Pacific Economic Framework)**

- US: Return to the Asia-Pacific to restore influence in the Indo-Pacific region
- US: Talking about money is not enough. We need to talk about rules, standards, and regulation
- Japan and South Korea: Look forward to US’ return
- India: Benefit from the process of reducing dependence on China by Europe, America, and Japan
- Asean countries: Hope to improve the regional economic and trade rules, not target China (mostly neutral)

**Criticism:** talking shopping, a hamburger without the beef
- China’s plan is about the economy (to provide beef).
- It requires its economic growth (40% of the world’s growth) to spillover.
Traditional Tradeoff: Cost Efficiency vs. Concentration Risk

- Multinational companies follow mercantilism (blurry country boundary).\(^1\)
  - During trade tension, federal contractors (especially in swing states) increase their imports from China at reduced prices. Similar results on imports from Russia are found during the Ukraine crisis.
  - They are more likely on the tariff list according to Section 301(B) of the Trade Act by United States Trade Representative (USTR).
  - One department is exceptional: DoD.
  - Hedging story: additional cost minimum wage, federal acquisition regulation, business ethics and conduct, disclosure costs, monitoring subcontractors...

- U.S. firms are hurt in the Trade War.\(^2\)
  - China exporters bear 26% tariff increase, while US importers bear 74%.
  - Chinese firms that are large, export high-quality product, and have relatively high profit margin, choose to stay in the U.S. market.

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\(^1\)Cen Ling, Jing Wu, & Fan Zhang, “Federal Supply Chains”, 2022

\(^2\)Haichao Fan, Caiyun Wu, & Jing Wu, “The Impact of the Trade War on Export Prices”, 2022
New Trends: 4 Pillars of IPEF

- **Resilient Economy**
  - Improve *supply chain resilience*: Supply chain early warning system to find out the distribution of key supply chains.

- **Connected Economy**
  - Higher *digital trade standards* for trade facilitation.

- **Clean Economy**
  - To address *climate change*, strengthen cooperation in areas such as renewable energy and carbon emissions.

- **Fair Economy**
  - Tax and anti-corruption cooperation, labor condition, corporate responsibility.

**Forces Driven Global Supply Restructuring**

- Economic factors: digital economy, green economy, industrial policy
  - China has certain advantages in the competition of economic factors
- Non-economic factors: values, friendship/nearshore outsourcing
  - The main pressure on China comes from non-economic factors
Resilient Economy: China Manufacturing is Resilient

- China supply chain is resilient against COVID-19 shock.\(^3\)
  - We find considerable effects on credit risk propagation during the COVID-19 pandemic by focusing on US-China supply chains link.
  - CDS spreads go down when the economic activity resumed in March 2020.

- Shanghai lockdown proves China’s resiliency again.\(^4\)
  - Shanghai port volume is clearly affected by 1 month before re-bouncing back.
  - Local suppliers shift to Ningbo. New suppliers near Shenzhen are quickly engaged.

- Diverse sourcing and local sourcing become popular, especially for PP&E.\(^5\)
  - COVID attacks major manufacturing hubs: Daegu, Bavaria, Milan, Detroit.
  - Tail risk becomes highly weighted. Policies also set parameters (eg. USMCA).

\(^3\) Senay Agca, John Birge, Ziang Wang, & Jing Wu, “The Impact of COVID-19 on Supply Chain Credit Risk”

\(^4\) Yimeng Niu, Vinod Singhal, & Jing Wu, “Supply Chain Resilience to COVID-19 Lockdowns”

\(^5\) Senay Agca, John Birge, & Jing Wu, “The Impact of the COVID-19 Pandemic on Global Sourcing of Medical Supplies”
Digital Economy: A Tale between Two Countries

- U.S. and China rank top in digital economy.
- The global expansion of digital firms is challenged by digital authoritarianism and other concerns (shared value, political trust, data security).

![Geography of the digital economy is highly concentrated in two countries](https://www.netzoekonom.de/vortraege/#tab-id-1).
Green Economy: Who is Producer?

- China has the most manufacturing capacity.\(^6\)
- PV modules - China suppliers more than 75% of the world’s shipments.
- EV cars - China has 53% of the global market share.

**Today’s Green Energy is Red**
China dominates key links of the green energy supply chain

Non-economic Factors

- Unilateral containment: the trend of “Small yard, high fence” (imposition of stronger lockdowns on specific technology and research areas)
  - Tariffs (likely to be eased)
  - Export controls (likely increase)
  - Rules of origin “USMCA” (likely increase)
  - Delisting of Chinese stocks (in progress)

- Increase investment: active competition
  - R&D investment
  - Industrial policy, distortions through compensation

- Strengthening the alliance: emphasizing values
  - Technology and product standards
  - Economic and trade rules
  - Nearshore and friend-shore
  - Human right and democracy

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Ling Cen, Yanru Han, & Jing Wu, “Equal Employment Opportunity in Supply Chains”
Case Study: Why US Targets Huawei?

- US core competitive advantage: innovation and technology.

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<td>26 Basic Material Chemistry</td>
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<tr>
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<td>27 Machine Tools</td>
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<td>17 Information Technology Management</td>
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<td>34 Micro and Nano Technologies</td>
<td>23</td>
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Jing Wu (CUHK)
My Predictions on China and Globalization 2.0
1. China Capacity Shift to Domestic and B&R Needs.

- FIE serves mostly domestic demand in China. More Chinese companies will go abroad and become MNCs.
- Due to reshoring and near-shoring, global supply chains will be shortened.
2. China Maintain its Strength in Quality Labor.

- China has the tradition in raising high skills and uniform labor.8
- Chinese families support their children’s education at no cost.
- Intellectual returnees contribute greatly to Chinese industrial upgrading.

8Ling Cen, Michael Hertzel, Ziang Wang, & Jing Wu, “Labor Coordination and Division: Human Capital Investment in Supply Chains”
3. China Maintains its High Production Network Centrality.

- China is in a central position among RCEP (ASEAN, China, Japan, S.Korea, India, Australia, NZ) and B&R countries.
- China and ASEAN are complementary and co-opetive.
4. While Trade May Decrease, Globalization 2.0 Picks up.

- The global manufacturing restructuring may be localized and regionalized. There is a trend of diversification (China+N).\(^9\)
- Global trade is at its peak, but cross-border financing, technology and knowledge transfer are accelerating.\(^{10}\)

\(^9\)Miaozhe Han, Ben Charoenwong, & Jing Wu, “Trade and Foreign Economic Policy Uncertainty in Supply Chain Networks: Who Comes Home?”

\(^{10}\)Michael Hertzel, Jie Peng, Jing Wu, & Yu Zhang, “Global Supply Chains & Cross-border Financing”
5. Geoeconomic Buffer Zone (GBZ) Faces Opportunity.

- Great powers compete for control and influence over geoeconomic buffer zones to gain economic and geopolitical benefits.
  - Examples: “B&R” (China), USMCA (US).

- Geoeconomic buffer zones can also serve as bridges and platforms to carry out economic cooperation, promote cross-border trade and investment, and strengthen the regional economic integration.

- China companies are important players in such GBZ due to their experience dealing with emerging economies and “weak” institutions.
Summary

- China’s rise in globalization has relied on its comparative advantage in labor and industrial scale. However, its push in the high-end manufacturing sector and technology innovation challenges the United States.

- The impact of Natural disasters and geopolitical risks has led to frequent disruptions in global supply chain, leading to a trend towards re-shoring, near-shoring, friend-shoring.

- The geoeconomic buffer zones between regions will become the focus of competition among major powers, ushering in new growth opportunities.

- India, Mexico, Southeast Asia, Africa etc. have the opportunity to become the new “world factory” in next decades.

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