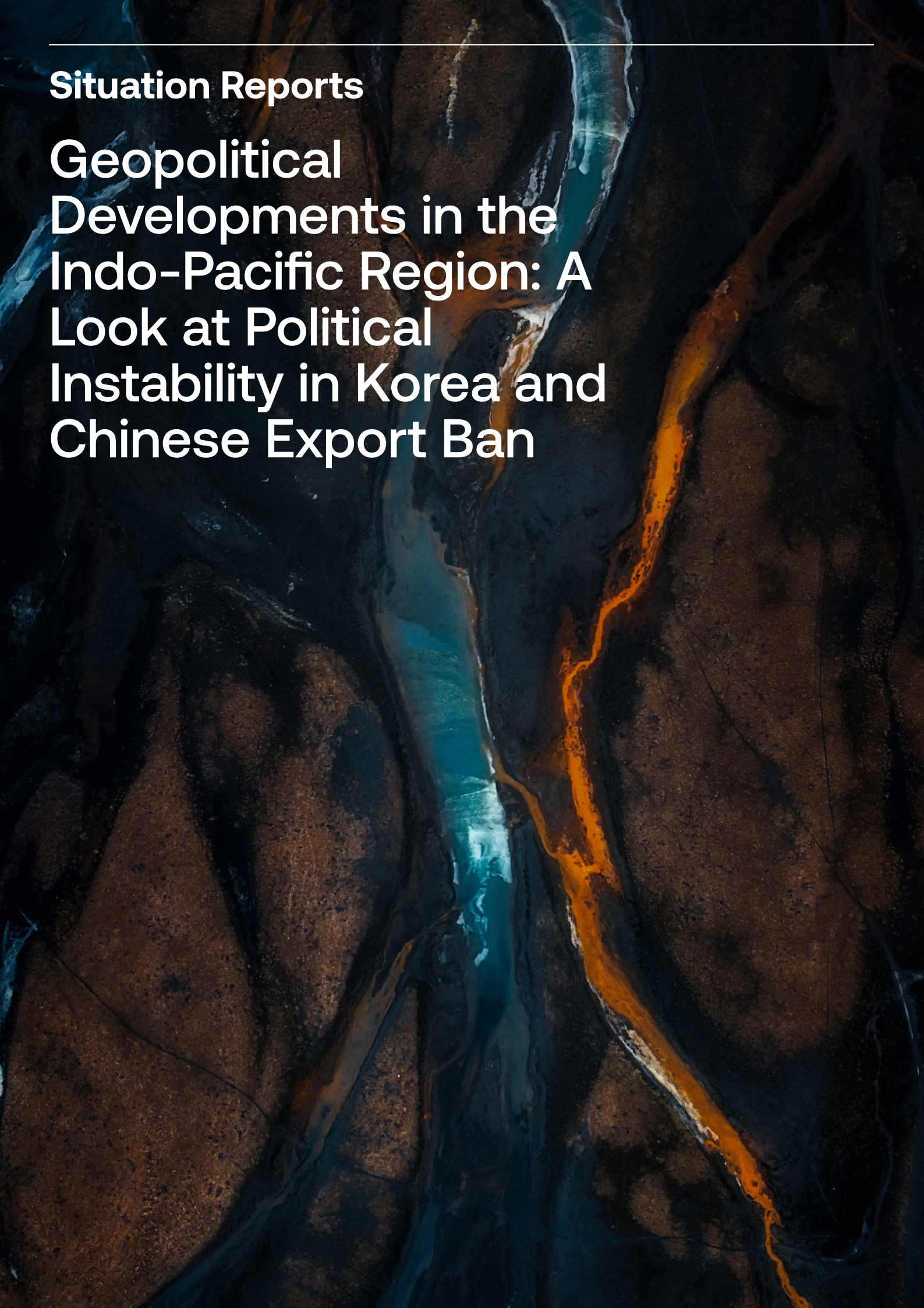
Situation Reports

Geopolitical Developments in the Indo-Pacific Region: A Look at Political Instability in Korea and Chinese Export Ban



December 5, 2024

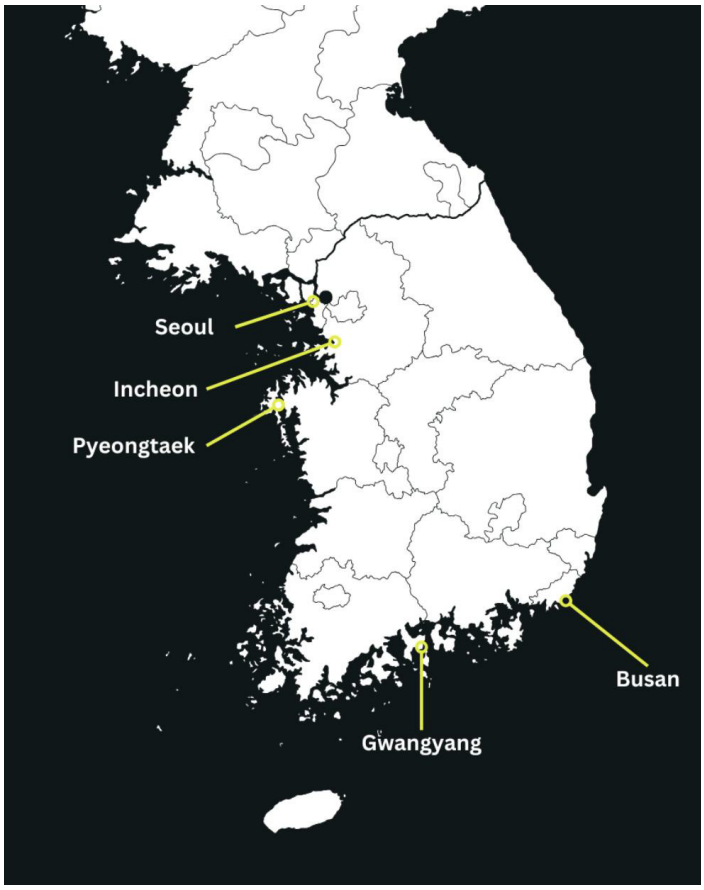
Economic and Supply Chain Implications of Recent Events in South Korea

Summary

South Korea is facing political instability following the brief declaration of martial law by President Yoon Suk Yeol and widespread labor unrest, most notably the indefinite strike by KORAIL workers (railway).

These events have caused significant economic repercussions, potentially affecting supply chains & logistics.

Rail disruptions are impacting the movement of goods, and key industries may face delays. This report provides a detailed assessment of the implications for transportation, ports, and industries reliant on South Korea's export economy.



Key Takeaways

- **KORAIL strike** could cause delays in port operations, especially at **Busan Port** which handles over **75% of South Korea's container traffic.**
- **Key industries** like semiconductors, automotive, and petrochemicals are facing cascading effects due to disrupted logistics and **delayed just-in-time (JIT) deliveries**.
- The Korean government has announced a **$28 billion stabilization** fund to support affected industries and help manage **financial market volatility.**

1. Economic Overview

Market Reactions:

- **KOSPI Index:** Fell for two consecutive days to **2,441.85** as investor confidence waned.
- **Korean Won:** Weakened to **1,415 KRW/USD**, reflecting currency volatility driven by uncertainty.

GDP Forecasts:

- **2024 Growth:** Revised down from **2.5% to 2.2%.**
- **2025 Growth:** Reduced to **1.9%,** largely due to disruptions in key sectors and declining investor confidence.

1. Economic Overview

Government Actions:

The administration has announced a **$28 billion stabilization fund** to **support affected industries** and mitigate **financial market volatility**.

2. Supply Chain Disruptions

Hinterland Transportation Network:

KORAIL's announced a strike starting on December 5th. It's **extensive rail network forms** the backbone of South Korea's **freight** and **passenger** movement:

- **Primary Freight Lines Affected:**
  - Busan-Seoul Corridor: Handles high-density freight, particularly semiconductors, consumer electronics, and automotive components.
  - Gwangyang-Daegu-Seoul Line: Vital for steel and petrochemical exports.

Pyeongtaek-Seoul Line: Essential for moving finished vehicles to **Pyeongtaek port**.

- **Impact of Disruption:**
- Freight could to **trucks** is causing **congestion** on highways such as the Gyeongbu Expressway, increasing transit times and costs.

Key inland hubs like **Uiwang ICD** and **Gunpo ICD** face container backlogs, affecting the smooth flow of goods to ports.

Port Operations:

South Korea's four major ports, crucial for international trade, may face delays due to disrupted inland transportation:

- **Busan Port:**
  - Accounts for over 75% of South Korea's container traffic and is the world's sixth-largest container port.
  - Rail-dependent container depots like Uiwang Inland Container Depot (ICD) are critical for feeding Busan's export volume. Rail disruption creates bottlenecks, forcing reliance on slower and costlier road transport.
  - Current Congestion Time: **3 days.**

- **Gwangyang Port:**
  - Key hub for steel and petrochemical exports, with significant hinterland connections via KORAIL. Delays in raw material transport to the port could impact steelmakers and chemical industries.
  - Current Congestion Time: **0 days.**

- **Pyeongtaek Port:**
  - Major gateway for automotive exports, particularly vehicles from Hyundai and Kia plants in the Gyeonggi Province. Rail disruptions could lead to delays in outbound shipments and increased warehousing costs.
  - Current Congestion Time: **3 days.**

- **Incheon Port:**
  - A critical hub for trade with China and nearby Asian markets. Rail disruptions are slowing the transport of electronics, machinery, and other high-value goods.
  - Current Congestion Time: **2 days.**

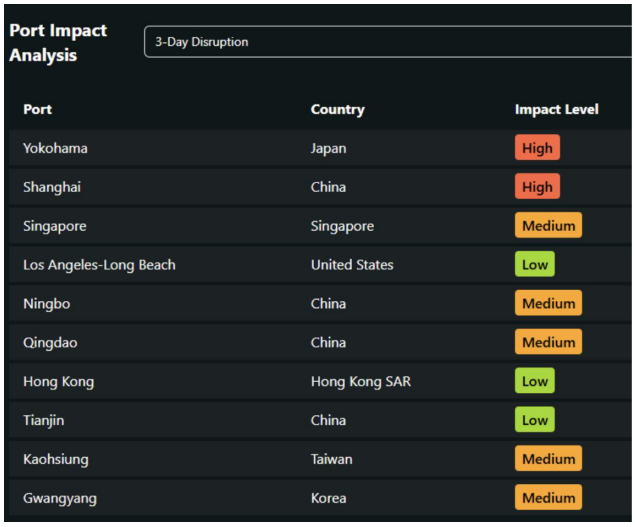
Top 5 Upstream / Downstream Ports (Busan)

- **Qingdao**
- **Yangshan (Shanghai)**
- **Tianjin Xin Gang**
- **Ningbo**
- **Shanghai**

The analysis below evaluates the **cascading effects** of a **3-day port disruption at Busan** on connected ports in the **global maritime network**.

Impact levels are assessed based on **geographical proximity**, **trade volumes**, and **port capacity**.

Results show **high impacts** on major **East Asian hubs** like **Yokohama** and **Shanghai**, with **moderate effects** extending to regional ports like **Singapore and Kaohsiung**.



More distant ports maintain **lower impact levels** due to **available rerouting options**, demonstrating the network's **regional vulnerabilities** despite overall **resilience**.

Industry-Specific Impacts

The KORAIL strike and potential transport delays could trigger cascading effects across South Korea's industrial base:

Semiconductors:

- **Products Impacted:**
  - Memory chips: Essential for global tech production, including smartphones, servers, and PCs.
  - Semiconductor manufacturing tools: A critical export for advanced chip production globally.
- **Industry Implications:**
  - South Korea accounts for **34%** of global memory chip exports. Disruptions risk delays in shipments from leading manufacturers.

Automotive Sector:

- **Products Impacted:**
  - Nitrile rubber (**50%** of global exports): Key for gaskets and seals.
  - Acrylonitrile-butadiene-styrene (ABS, **30%** of global exports): Critical for automotive trims and bumpers.
  - Finished vehicles: Significant delays in outbound shipments through Pyeongtaek Port.
- **Industry Implications:**
  - Production lines reliant on just-in-time (JIT) delivery models face immediate challenges in securing necessary raw materials.

Petrochemicals and Energy:

- **Products Impacted:**
  - p-Xylene (**30%** of global exports): Used in polyester production, affecting textiles and packaging.
  - Oil platforms and tankers: Gwangyang and Busan disruptions impact heavy industry exports.
- **Industry Implications:**
  - Supply chain bottlenecks could stall production in dependent industries **worldwide**.

Industry-Specific Impacts

Consumer Electronics and Machinery:

- **Products Impacted:**
  - Electronic integrated circuits (**34%** of global exports): Key for computing, industrial automation, and consumer electronics.
  - Drying machines (**33%** of global exports): Essential for textiles and apparel production globally.
- **Industry Implications:**
  - Retailers and manufacturers relying on South Korean electronics face **potential shortages**.

Risk Assessment:

Prolonged Strike:

- Further delay in resolving the KORAIL strike would exacerbate port congestion and increase supply chain inefficiencies.

Port Bottlenecks:

As goods accumulate at Busan, Gwangyang, and other ports, the risk of container overflow and export delays intensifies.

Conclusion

The combined political and labor crises in South Korea are testing the resilience of its economy and global supply chains. Proactive strategies by businesses and stakeholders are crucial to mitigating the immediate and long-term impacts. South Korea's recovery will depend on its ability to stabilize domestic operations and reassure global partners of its reliability as a supply chain hub.

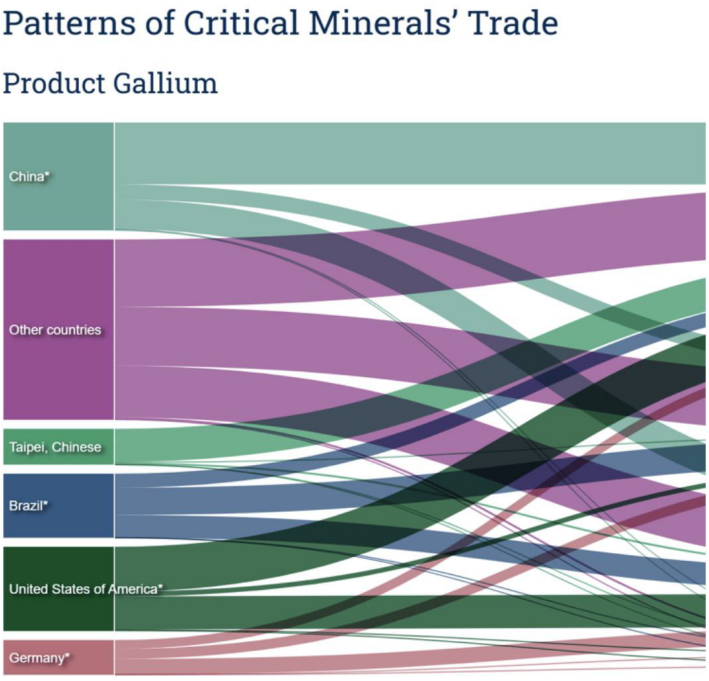
December 9, 2024

Situation Report- Chinese Export Bans on Critical Minerals Targeting the U.S.

Summary

In a strategic move that highlights escalating trade tensions, China has announced an immediate ban on the export of gallium, germanium, and antimony to the United States.

These materials are indispensable for high-tech industries, including semiconductors, renewable energy, and defense systems. The ramifications of this decision will be far-reaching, touching not only the U.S. economy but also global supply chains and geopolitical dynamics.



Source: tradebriefs.intracen.org

Historical Development & Context

In 2019, the U.S.-China trade war intensified, marking a significant escalation in economic and geopolitical tensions. The U.S. increased tariffs from 10% to 25% on a wide range of Chinese goods, targeting over $200 billion worth of imports. This move was followed by several critical developments:

Huawei Blacklisting (2019): The U.S. added Huawei to its Entity List, citing national security concerns. This action restricted Huawei's access to critical U.S.-sourced components and technologies, significantly impacting China's telecommunications sector.

Rare Earth Export Threats (2019): China hinted at curbing rare earth exports to the U.S., emphasizing its dominance in global supply chains. While no formal restrictions were implemented at the time, the threat underscored China's leverage in critical materials.

COVID-19 and Increased Scrutiny (2020-2021): The pandemic intensified tensions, with the U.S. adopting measures like the Uyghur Forced Labor Prevention Act (2021), aimed at addressing alleged human rights violations in China's Xinjiang region. These measures restricted imports linked to forced labor, indirectly affecting Chinese supply chains.

Advanced Chip Restrictions (2022): The U.S. introduced sweeping controls on the export of advanced computing chips and related equipment to China. These restrictions targeted technologies critical for military applications, effectively cutting China off from high-performance semiconductors and the tools required to manufacture them.

Historical Development & Context

Gallium and Germanium Export Controls (2023): In a retaliatory move, China imposed export controls requiring licenses for gallium and germanium, materials crucial for semiconductors, renewable energy technologies, and defense systems. These measures applied globally, not just to the United States, and underscored China's dominance in these critical supply chains. These bans highlighted China's willingness to leverage its dominance in critical materials as a geopolitical tool.

This period marked a shift from economic competition to strategic resource leverage, with critical materials becoming a focal point in the U.S.-China trade war.

Dependencies Across Supply Chains

Critical Stages of Dependency

1. **Mining and Extraction:** China dominates global production, particularly in gallium (over 90%) and germanium (70%). Chinese mines have unparalleled capacity to extract these resources at competitive costs.
2. **Processing and Refining:** China leads in refining technologies, enabling high-purity forms of these materials essential for industrial and military applications. This stage represents a significant bottleneck, as few other nations possess comparable refining infrastructure.
3. **Production and Manufacturing:** Beyond mining and refining, China's integration into manufacturing ecosystems ensures it is indispensable in creating finished goods like semiconductors, photovoltaics, and fiber-optic cables.

Primary Export Countries

1. **Gallium and Germanium:** China accounts for more than **90%** of global gallium supply and **70%** of germanium exports. U.S. industries—from semiconductors to defense—are highly reliant on these imports.
2. **Antimony:** With over **80%** of the world's production, China's dominance leaves industries such as flame retardants and military-grade alloys exposed to supply risks.

Alternative Exporters

1. **Gallium:** Germany and Japan produce small quantities but lack the scale to meet global demand. Expansion would require years of investment and technological upgrades.
2. **Germanium:** Modest output from Canada and Belgium provides limited options. Supply chains would struggle to shift rapidly without significant cost increases.
3. **Antimony:** Russia and Tajikistan hold reserves, but geopolitical constraints and infrastructure gaps limit their viability as alternatives.

Bottlenecks in the Supply Chain

- **Gallium Arsenide (GaA) Wafer Impacts:** One notable impact of China's export controls has been on gallium arsenide (GaA) wafers, used in radars, satellites, microwaves, and LEDs. Since the July 2023 export controls, U.S. imports of GaA wafers from China have effectively fallen to zero. However, China previously accounted for only 4.8% of U.S. imports in this category. Thus, while the controls disrupted a small portion of supply, they highlight China's ability to target products with limited U.S. reliance, avoiding significant self-harm while exerting geopolitical pressure.
- **Production Concentration:** China's control over 70% or more of global reserves for these materials creates a single point of failure in supply chains. This concentration amplifies systemic risks in industries reliant on steady supply.
- **Refining Dominance:** Advanced processing capabilities—critical for transforming raw materials into usable forms—are heavily concentrated in China, with few alternatives globally.
- **Logistical and Transition Costs:** Relocating production or refining capabilities to other countries would involve substantial investment, time, and geopolitical negotiations.

Industries Affected

1. **Semiconductors:** Gallium and germanium are critical for advanced semiconductors used in 5G, defense systems, AI technologies, and consumer electronics.
2. **Renewable Energy:** Solar panels and wind turbines rely on gallium-based compounds and rare earth elements (REEs), both dominated by Chinese supply chains.
3. **Defense:** Germanium's use in infrared optics and communication systems makes it vital for military-grade equipment, including advanced surveillance and targeting technologies.
4. **Electric Vehicles:** Indirect exposure to gallium and antimony shortages threatens battery performance and safety innovations in EV manufacturing.

Outlook and Scenario Analysis

1. China's Strategic Moves:

Likely Materials for Future Bans: Rare Earth Elements (REEs), which China controls 80% of globally, are strong candidates for further export restrictions. Materials like dysprosium and neodymium, critical for electric motors and wind turbines, could be next.

Controlled Escalation: To avoid harming its own economy, China may target materials where Western dependence is high, but domestic Chinese demand is manageable. For instance, high-purity graphite for battery anodes could be restricted.

Phased Restrictions: China could implement phased export controls to maximize economic leverage while allowing its industries to adapt gradually.

2. U.S. Dependencies and Response Dynamics:

High Dependence Areas:

- **Lithium and Cobalt:** Though not yet targeted, restrictions on these materials could cripple EV and battery industries.
- **Graphite:** Essential for battery manufacturing, with over 70% of global production sourced from China.
- **Indium:** Crucial for touchscreens and photovoltaics, with China dominating refining and production.

Scenarios:

- **Economic Deterrence:** The U.S. could leverage its control over advanced semiconductor technologies to counterbalance Chinese material bans.
- **Supply Chain Fragmentation:** An ongoing trade war could lead to a bifurcated global supply chain, with allied nations decoupling from Chinese resources at significant cost and inefficiency.
- **Strategic Stockpiles:** The U.S. may rely on existing reserves and short-term imports from allies to offset immediate disruptions, but this is unsustainable long-term.

3. Broader Geopolitical Implications:

Allied Realignment: Nations like Australia, Canada, and Japan may deepen collaborations with the U.S. to create a counterweight to China's dominance. Joint extraction and refining projects in Africa and Latin America could emerge as strategic priorities.

Internal Economic Balancing: China's bans are unlikely to target materials that heavily impact its own domestic industries, such as those tied to large-scale construction or internal technology production.

Conclusion

The interplay of supply chain dependencies, geopolitical leverage, and economic impacts positions critical materials at the center of U.S.-China trade tensions. While China's dominance in gallium, germanium, and antimony underscores its strategic upper hand, its decisions are tempered by the need to avoid significant self-harm. Future restrictions are likely to target high-dependence areas such as REEs and graphite, escalating risks for U.S. industries reliant on these materials. The global economy faces a pivotal moment, as nations navigate the balance between interdependence and strategic autonomy in critical supply chains.