

Geopolitical Considerations for the Global Supply Chain

American Coatings Association

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Webinar



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Deep Industry Knowledge – Extensive Industry Relationships – Decades of Industry Experience

Agenda

- **Introduction to ChemQuest**
- **The Coming Supply Chain Crisis: The Effects of Geopolitics**
- **Geopolitics and Economic Outcomes: Yesterday, Today, and Tomorrow**
 - Supply Chain Changes
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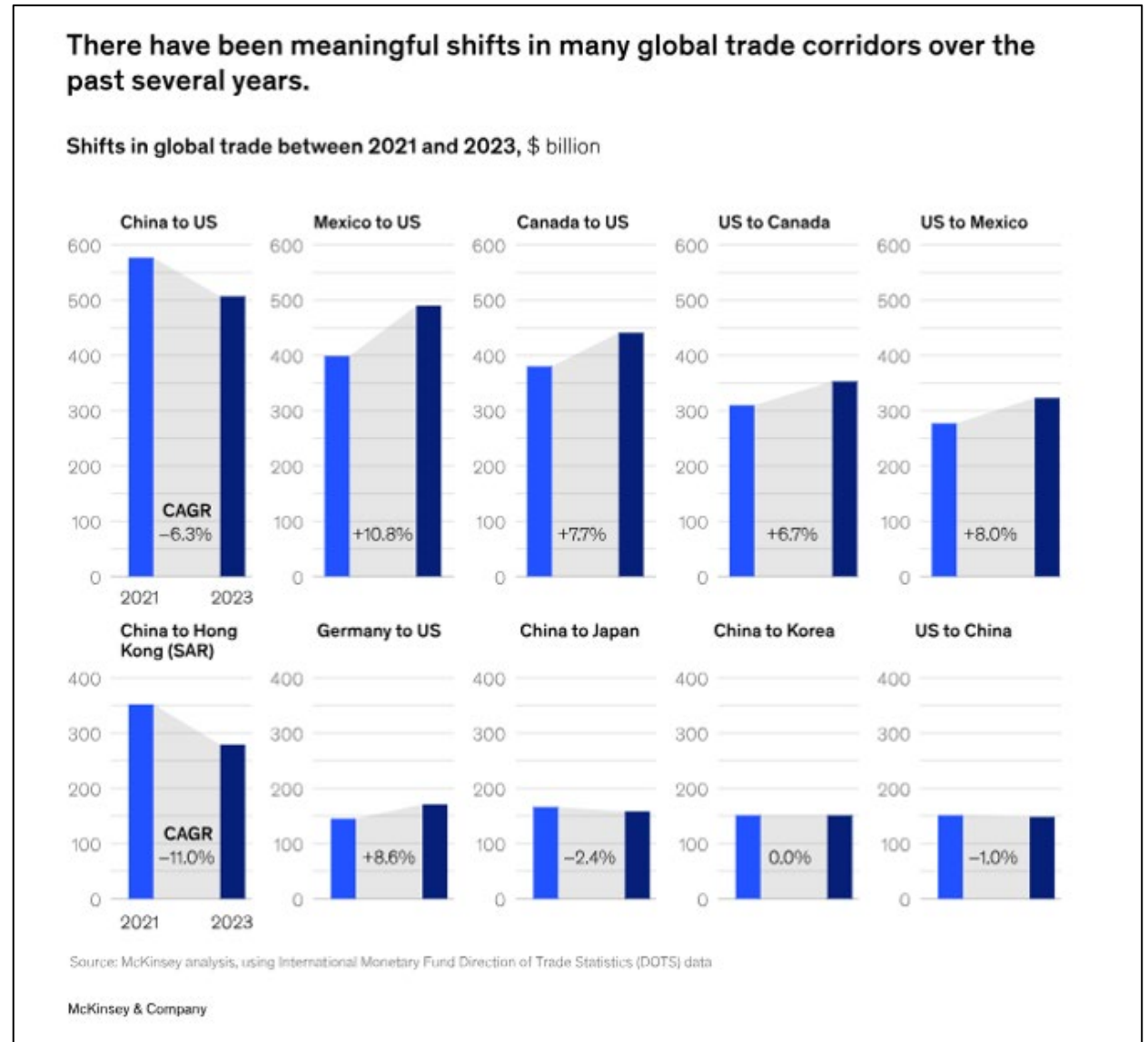
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- **Unlock new and hidden insights**, empowering an organization's smart risk-taking, catalyzing innovation excellence and value creation.
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The Coming Supply Chain Crisis: The Effects of Geopolitics



Recent Changes in Trade (2021 to 2023), Selected Countries

- U.S. trade to Mexico and Canada increases, as do Mexico and Canada imports into the U.S.
- Trade from China to the U.S. decreases significantly, although U.S. trade to China stays about the same (albeit low).
- Trade from China to Hong Kong also decreases sharply.



Construction Segment Experiencing Global Growth

- Construction has been a global driver, especially Civil Engineering and Non-Residential.
- Europe has lagged behind other regions but is poised for moderate growth—and North American will see moderate growth in residential, as well.
- China, however, has several more years of slow construction growth, due to severe overbuilding.

Global output per subsector	2022	2023	2024*	2025*
Construction total	0.6	3.7	2.0	1.8
Residential	0.8	0.5	0.0	2.4
Non-residential	1.0	5.5	2.8	1.4
Civil Engineering	0.4	6.8	4.4	1.5

Year-on-year, % change /*forecast – Source: Oxford Economics

Output per region	2022	2023	2024*	2025*
North America	-5.1	1.8	3.5	2.9
Asia-Pacific	2.1	6.3	1.7	0.6
Europe	2.1	1.7	1.0	2.5
Middle East / Africa	4.4	2.5	2.7	3.3

Year-on-year, % change /*forecast – Source: Oxford Economics

Light Vehicles Represent Another Global Growth Segment

- Asia-Pacific is a powerhouse in global Automotive output growth.
- Electric Vehicles/Battery Electric Vehicles (EVs/BEVs) are set to drive future gains.

Motor vehicles and parts output	2022	2023	2024*	2025*
Global	4.8	11.1	0.8	1.4
Americas	7.0	6.8	1.3	1.3
Asia-Pacific	4.2	13.1	0.3	1.7
Europe	3.4	12.6	1.5	1.0

Year-on-year, % change /*forecast – Source: Oxford Economics

Global registration of new light vehicles	2022	2023	2024*	2025*
All types	-0.9	10.8	2.6	3.5
Combustion engine vehicles	-9.1	2.2	-6.4	-5.7
Electric vehicles	61.8	38.6	26.5	25.0
Hybrid vehicles	18.3	37.2	20.4	12.8

Year-on-year, % change /*forecast – Source: Oxford Economics

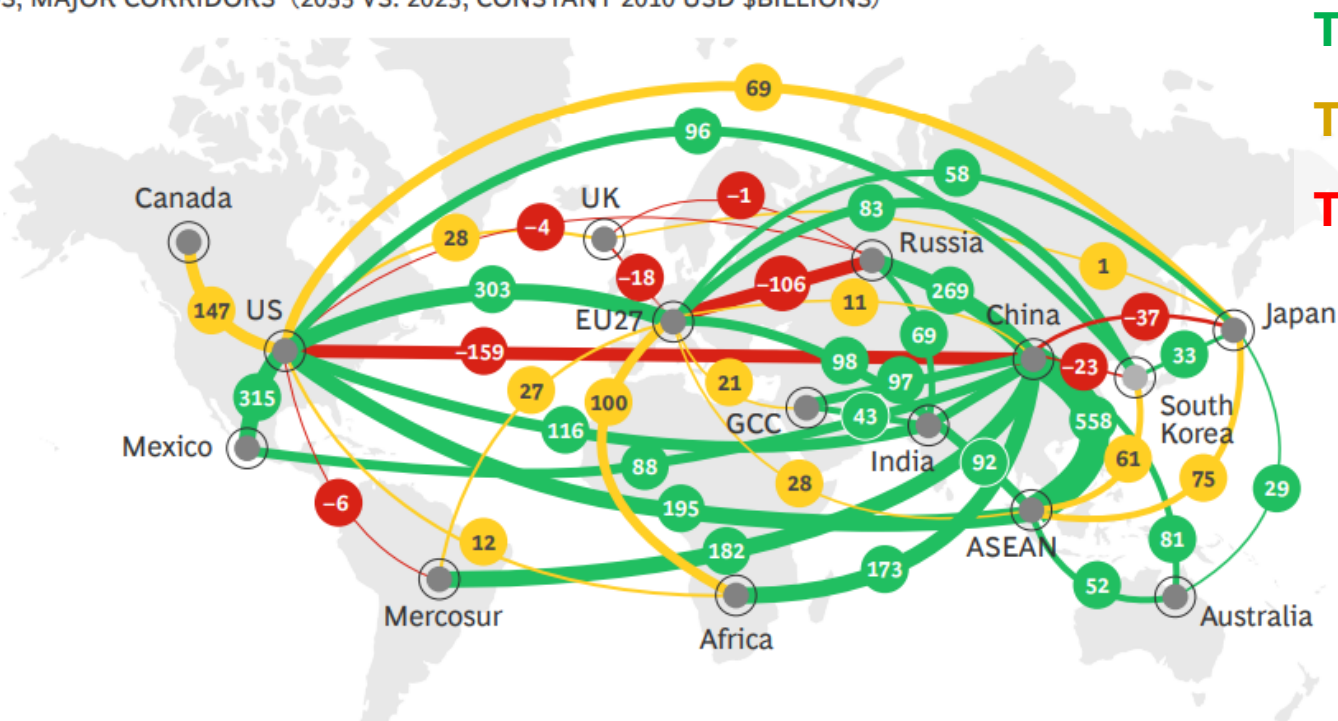
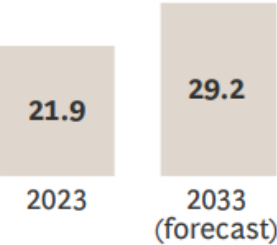
International Trade to Grow 30% by 2033 (2.9% CAGR)

How Trade Flows Between Nations and Regions Will Change by 2033

CHANGE IN TRADE OF GOODS, MAJOR CORRIDORS¹ (2033 VS. 2023, CONSTANT 2010 USD \$BILLIONS)

EXPORTS OF GOODS, GLOBAL (CONSTANT 2010 USD \$TRILLIONS)

CAGR 2.9%



Trade flow grows
Trade flow steady
Trade flow shrinks

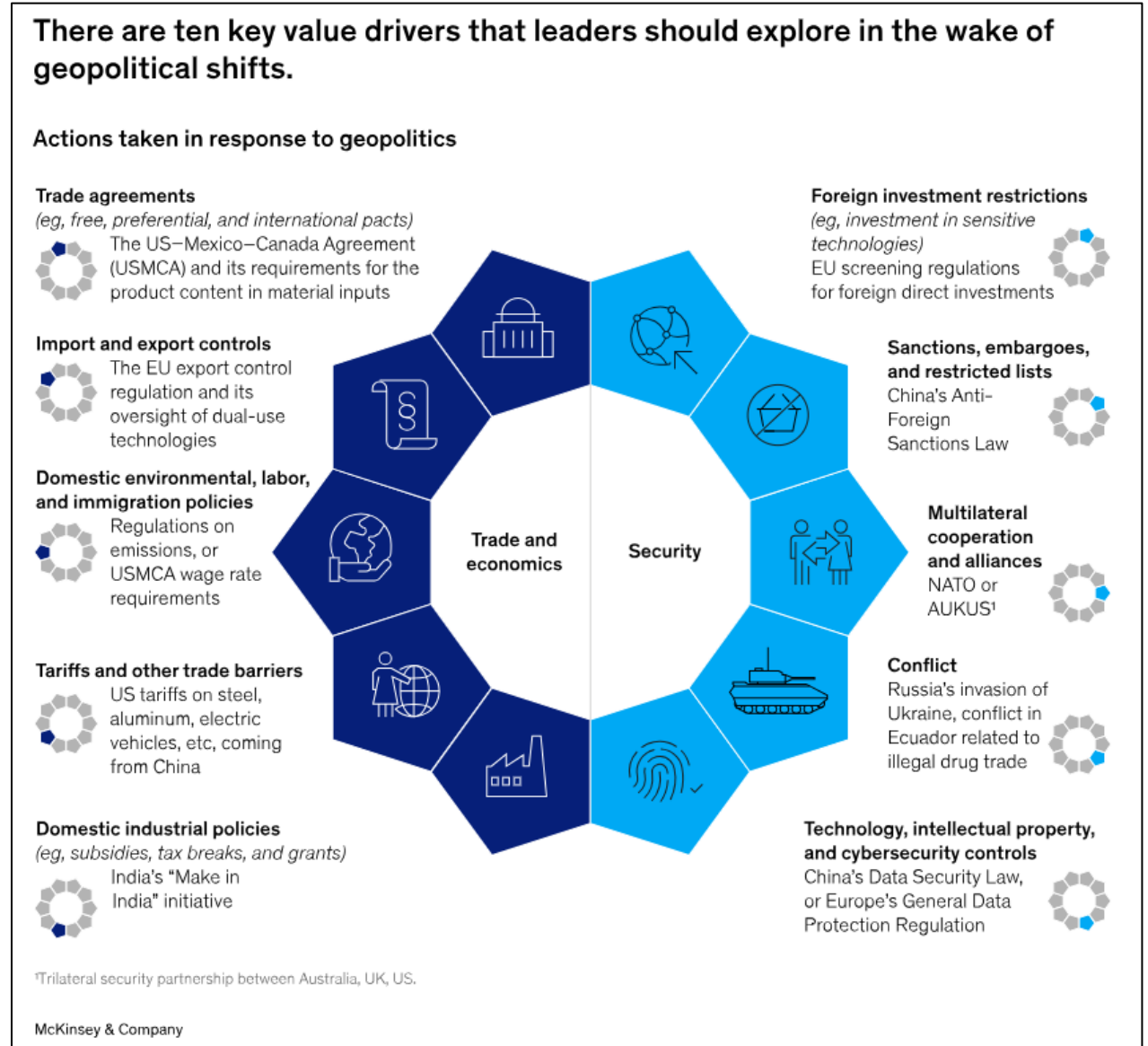
Line colors represent total global trade 2023–2033 CAGR: — <0% — 0%–2.9% — >2.9%
Line thickness represents total change in trade flows 2033 vs 2023: — — —

Sources: BCG Global Trade Model 2024; UN Comtrade; Oxford Economics; IHS Markit; World Trade Organization; BCG analysis.
Note: Floating foreign-exchange rates are used for the entire period; residual EU–Russia trade is for 2023 due to staggered sanction schedules.
¹Corridors in the map above represent ~45% of global trade.

Geopolitics and Economic Outcomes: Yesterday, Today, and Tomorrow

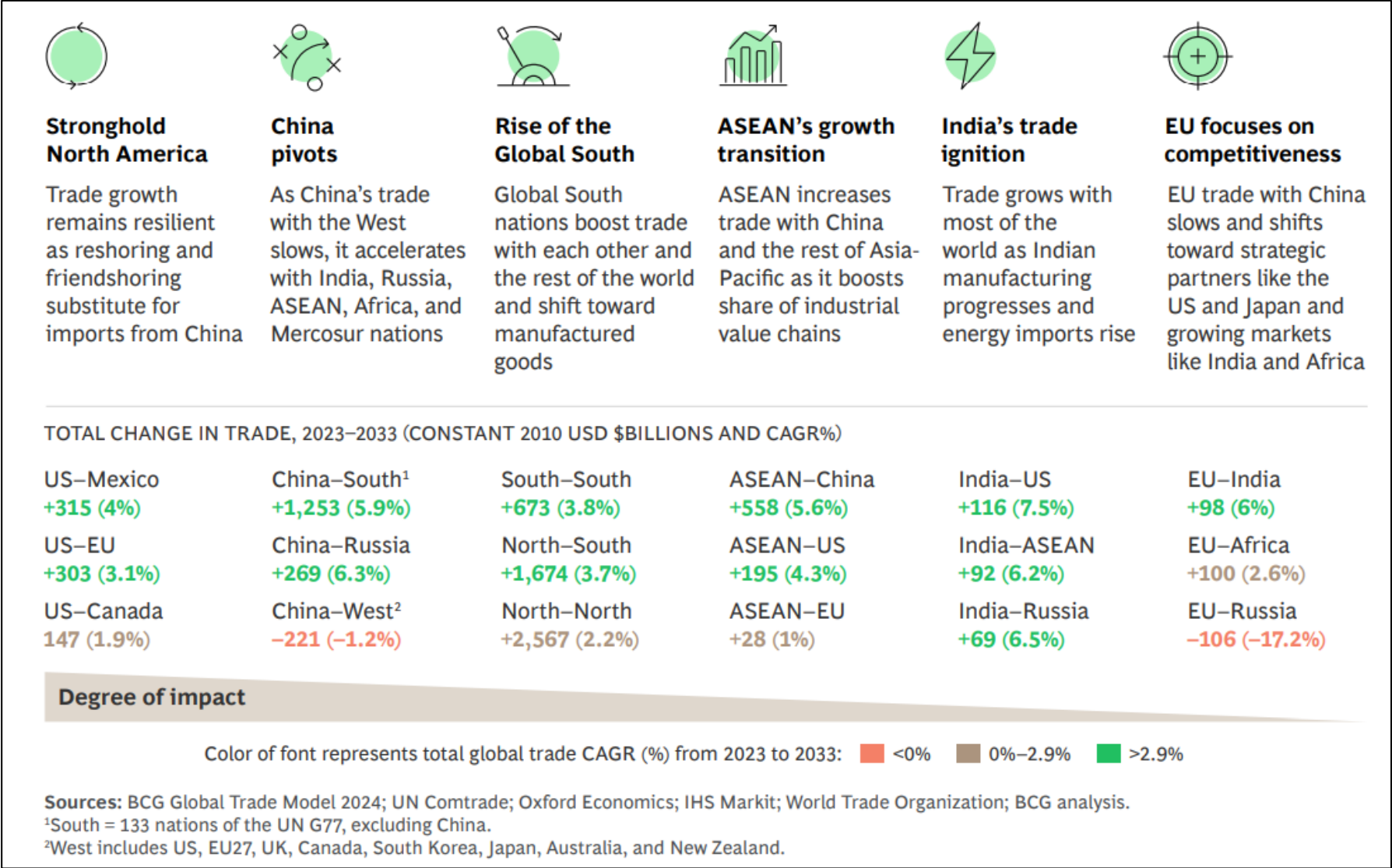
Global Drivers Affecting Trade

- Trade agreements
- Import and export controls
- Domestic environmental, labor, and immigration policies
- Tariffs and other trade barriers (e.g., steel, aluminum)
- Domestic industrial policies (e.g., subsidies, tax breaks)
- Foreign investment restrictions
- Sanctions, embargoes, and restricted lists
- Multilateral cooperations and alliances
- Conflict (e.g., Ukraine, Red Sea, Taiwan, Ecuador, Gaza, *et al.*)
- Technology, intellectual property, and cybersecurity controls



Major Geopolitical Drivers Redrawing the Map of World Trade

- North America
 - Reshoring/friendshoring
- China
 - Increases trade with Russia, India, ASEAN
- Global South
 - Increases trade everywhere
- India
 - Increases trade everywhere
- EU
 - Shift trade from China to US, Japan, India



Looming Challenges for Traditional Approaches to Stable Supply Chains

Looming Challenges for Traditional Approaches to Stable Supply Chains



SUPPLY CHAIN CHANGES

- Just-in-time inventory—dying
- Reshoring/nearshoring for critical products, and reduction of shipping costs
- Geopolitical considerations:
 - Resolution of the Russo-Ukrainian War
 - Suez Canal disruptions
 - Tariffs/potential tariffs/threat of tariffs, and other geopolitical trade issues
 - Potential invasion of Taiwan by China
 - The “Greenland Question”
 - The U.S. is not alone in coveting its potential military importance and strategic mineral supply.
 - Changes in the balance of power in the Middle East—
 - Syria breaking away from Iran and seeking backing by Saudia Arabia
 - Gaza Strip: major differences in viewpoint among Arab nations and U.S.
 - Possible U.S. designs on Gaza Strip

Looming Challenges for Traditional Approaches to Stable Supply Chains

MATERIALS SUBSTITUTION

- Replacement of materials requiring paints and coatings by non-paint-reliant materials
- Decorative Architectural: Fewer paintable surfaces
- Industrial & Specialty: Clear and color wrap films, larger windows in vehicles



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Market Consolidation and Labor Shortages



➤ MARKET CONSOLIDATION

- Consolidation of paints and coatings formulators and raw material providers
- Paints and coatings formulators continuing to consolidate globally, with major players such as Sherwin-Williams, PPG, AkzoNobel, and Nippon driving M&A activity


➤ LABOR SHORTAGES

- Labor shortage leading to higher automation and increased use of robotics and. . . .
- Faster turnaround, faster return-to-service coating application technologies



Trade Outlook

Trade Outlook



North America will continue to reduce its dependence on Asia, especially China.

As the West reduces its dependence on China, it will align with other trade partners for the rest of its commerce.

The European Union's trade growth with China will largely stagnate.

The region is becoming more reliant both on long-standing trade partners such as the U.S. and Japan and emerging markets such as India, Turkey, and Africa.

The Global South—especially India and Southeast Asia—will become an important region regarding world trade.

- Global South nations are a group of 133 developing nations, representing around 18% of global GDP, but 62% of the world's population. It also accounts for around 30% of global trade.
- Global South nations are forming new trade alliances and partnerships that sidestep the U.S. and the EU.

Companies must consider the risks and opportunities created by geopolitical shifts that will alter their supply chains and business strategies and develop game plans for adapting to disruption.

China and India



- China's trade within BRICS+ (Brazil, Russia, India, China, South Africa, Egypt, Ethiopia, Indonesia, Iran, and the United Arab Emirates) is projected to account for 44% of China's total forecast trade growth over the next decade.
- China's trade relationship with Russia is projected to increase significantly. Bilateral trade will grow by \$269 billion by 2033 (6.3% CAGR).
- China's total trade growth will be limited to 2.7% annually over the next decade, well below the current average real annual GDP growth estimate of 3.8%.
- India is emerging as the other big Global South trade story as it pursues favorable relations with most of the world's major economies. Boston Consulting Group predicts growth of 6.4% CAGR in India's total trade through 2033, to \$1.8 trillion
- India's annual trade with the US is expected to more than double over the next decade, to \$116 billion in 2033.

Antebellum Trade Outlook ... but a trade war is on the horizon: North America

- The effects of geopolitics are escalating—we're already witnessing seismic shifts in global trade.
- Annual trade between the U.S. and Mexico will increase by \$315 billion by 2033—representing a CAGR of 4%.
- U.S.-Canada trade will grow by \$147 billion as companies serving North American markets shift more of their supply chains.
- The trade agreement between the U.S., Mexico, and Canada—USMCA—is up for renegotiation in 2026.
 - Washington is concerned that Chinese firms aim to circumvent high U.S. protectionist barriers against low-cost Chinese EVs and other goods by assembling and exporting them from Mexico, taking advantage of its duty-free access under the USMCA.
 - One issue to watch is whether the U.S. will leverage the USMCA renegotiation to seek to have Mexico screen Chinese foreign direct investment in its North American manufacturing value chain.
- *Friendshoring* is a new term redefining North American trade relationships, where trade relations are bolstered with U.S. allies. U.S. trade with the EU, for instance, is projected to grow by \$303 billion, a CAGR of 3.1%, by 2033.



As trade lanes evolve, consider shifting your supply chains to make them more robust, cost effective, and resilient.

Antebellum Trade Outlook ... but a trade war is on the horizon: China





- As China's trade with the U.S. and EU slows, it's growing strongly with much of the rest of world.
 - We project that annual two-way trade with the West will contract by \$221 billion by 2033—representing an average annual decline of 1.2%
 - The cost of imported Chinese goods would increase by more than \$200 billion if no alternative sources are available and if import volumes remain constant.
- We project that China's trade with the Global South, by contrast, will surge by \$1.25 trillion by 2033, representing a CAGR of 5.9%.

This shift will support China's geopolitical agenda of reducing its economic reliance on the West while deepening ties with major emerging markets.

Tariffs: A Genuinely Complex Issue

Tariffs: A Genuinely Complex Issue

- 
- May provide short-term relief
 - Often give the public a psychological “high”

- 
- Typically act as painkillers
 - Like painkillers, they just give temporary relief

Tariffs: A Genuinely Complex Issue

- The Great Depression was fueled, in the view of Franklin Delano Roosevelt, by sky-high tariffs that had placed the U.S. on “the road to ruin” by inviting retaliation and discouraging investment.
- Tariffs reduce the demand for foreign goods, which has historically led to the strengthening of the dollar, resulting in less global demand for American goods.
- A group of supply chain and operations management experts from Georgia State University, Colorado State University, Arizona State University, and Kuwait University found that the tariffs enacted in 2018 had a ripple effect of unintended consequences that negatively affected the supply chains.
- The 2018 U.S. tariffs increased costs by \$51 billion/year—a burden shouldered principally by U.S. companies and consumers.
- The group concluded that these tariffs had “an overall negative impact” on firm value that led to a decrease in the value of domestic producers within the protected industries.
- The 2002 tariff increases on selected steel products backfired—U.S. Senator Lamar Alexander (R-Tennessee) observed that since “there were 10 times as many people in steel-using industries as there were in steel-producing industries. . . [steel using industries] lost more jobs than exist in the steel industry.”
- Tariffs of the permanent, rather than strategic, type tend to run afoul of the “Law of Unintended Consequences.”

Multiple studies of the long-term effects of tariffs in the 20th and into the 21st Centuries indicate that, with only a few exceptions, tariffs do more harm than good.

Trade Wars and Tariffs

- Supply managers have been warned for years that it's difficult to manage supply chain risk when buying products from (1) manufacturers a long distance away and (2) potential adversaries, says Timothy R. Fiore, CPSM, C.P.M., Chair of the Institute for Supply Management® (ISM®) Manufacturing Business Survey Committee.
"Supply managers should be prepared for this," he says. "In actuality, we likely are not."
- According to [The Economist](#), China claims its exports to America rose by US\$30 billion between 2020 and 2023, whereas the U.S. claims Chinese imports fell by \$100 billion. *Sometimes, words simply fail. . . .*
- According to the Committee for a Responsible Federal Budget, [President Trump's campaign pledges](#) would add an estimated US\$7.75 trillion to the projected debt through FY 2035, part of which is expected to be offset by revenue estimated at \$2.7 trillion to \$4.5 trillion generated by [increased custom duties](#).
- Tariffs could cost U.S. consumers as much as \$78 billion a year in annual spending power, according to the National Retail Federation.



Possible Effect of a Trade War

Economic Impacts of 60.0% Tariffs on China and 10.0% Tariffs on all Other Nations (% change in prices and economic activity due to tariffs)

International Trade (Imports + Exports)	Factory Output	Logistics Jobs
-23.0	-7.2	-3.2
Core Consumer Price Inflation	Steel Prices	Auto & Parts Prices
1.3	4.2	6.5

Source: US Census Bureau, US Bureau of Labor Statistics, Tax Foundation, the Hartford's Global Insights Center

These figures quantify the impact of tariffs on various prices and sectors. They isolate impact of tariffs from other macroeconomic and industry trends. The figures are based on econometric modeling by the Hartford's Global Insight Center and findings from outside researchers.

The Role of Politics, both Domestic and Global, on Global Trade and Supply Chains

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Politics—Domestic

- Deport children of illegal immigrants born on U.S. soil (“Dreamers”)
 - Deplete U.S. workforce of ~300,000 future U.S. workers
 - Current *Industrial Unemployment* is ~3.6% so removing 300K workers=disaster
 - Where, exactly, will the workers come from to fill the void?
- Deporting 7MM? 9MM? 11MM? (pick a number) of illegal immigrants will affect the following areas in what ways and to what degree?
 - Seasonal harvesting—the U.S. is currently experiencing a significant shortage of career and seasonal farm workers
 - Seasonal farmworkers aging out—resulting in higher prices to consumers and putting some farms out of business
 - MIGRANT WORKERS ≠ illegal immigrants ≠ deadbeats
 - Illegal immigrants ≠ illegal immigrants with criminal records
- Tariffs as political tools vs. tariffs as revenue generators
 - Tariffs only enrich the U.S. Federal Government General Fund—U.S. consumers are not given a portion of the tariff to help offset higher prices
 - . . . And prices *will be* higher
 - Hit China with a 10% tariff on Tupperware®, and the U.S. Government will collect 10% of all Chinese Tupperware® sold to U.S. consumers.
 - Before you can say “consumer savings,” however, the Chinese/Russians/Slovenians/French/(pick a country) retailers will raise the price of Tupperware® by 10%, so it is *the consumer* who actually pays the cost of the tariff
 - Increasing consumer prices automatically → inflation that cannot easily be checked by FED fund controls



Politics—Domestic



- Roles played by
 - Corporate greed
 - Lessons learned from 2021-2023
 - Lessons NOT learned from 2021-2023
- Contract negotiations between R/M suppliers and paint/other specialty chemical customers
 - What have we learned since 2021-2023?
 - To what extent have we learned our lessons?
 - To what extent has this learning been effective?
- Raw material suppliers' customer rating lists—same or different from 2019?
 - **"A" Suppliers**—Partnerships; purchases made on overall value, not lowest price; loyalty; fair payment terms; on-time delivery; overall quality; quality of technical service; quality of sales service—are they merging these days?; significant history of working together, and clear establishment of trust; etc.
 - **"B" Suppliers**—Mixtures of "A" and "C" characteristics. . . What does it take to turn a B customer into an A customer? How about turning a B customers into a C customer? When are these changes most likely to happen?
 - **"C" Suppliers**—Customers chase every penny down the rabbit hole; consolidate purchases with minimum number of products to obtain pricing; indulge in hoarding behavior; treat R/M suppliers as if they were bankers; poor forecasting; many "RUSH" orders; refusal to pay small-batch upcharges; etc.

Politics—Selected Geopolitical Concerns

- Changes in supply—
 - China used to produce copper phthalocyanine pigments for finishing in India
 - China is now able to manage the entire Cu/phthalo supply chain internally, from basic reactions to drying and finishing
- Concern about trade route security/stability
 - Houthis in Red Sea
 - American interference in Panama
 - Importance of GIUK Gap? Real? Perceived? Military only? Maritime only? Both military and maritime?
- Russia/Ukraine War? Implications of
 - Negotiated settlement
 - Enforced settlement
 - Continued warfare—including the role of North Korean military personnel and Chinese munitions?
- Effects of the massive U.S. debt
- PFAS ISSUES—Differences in regulation by global regions/individual countries

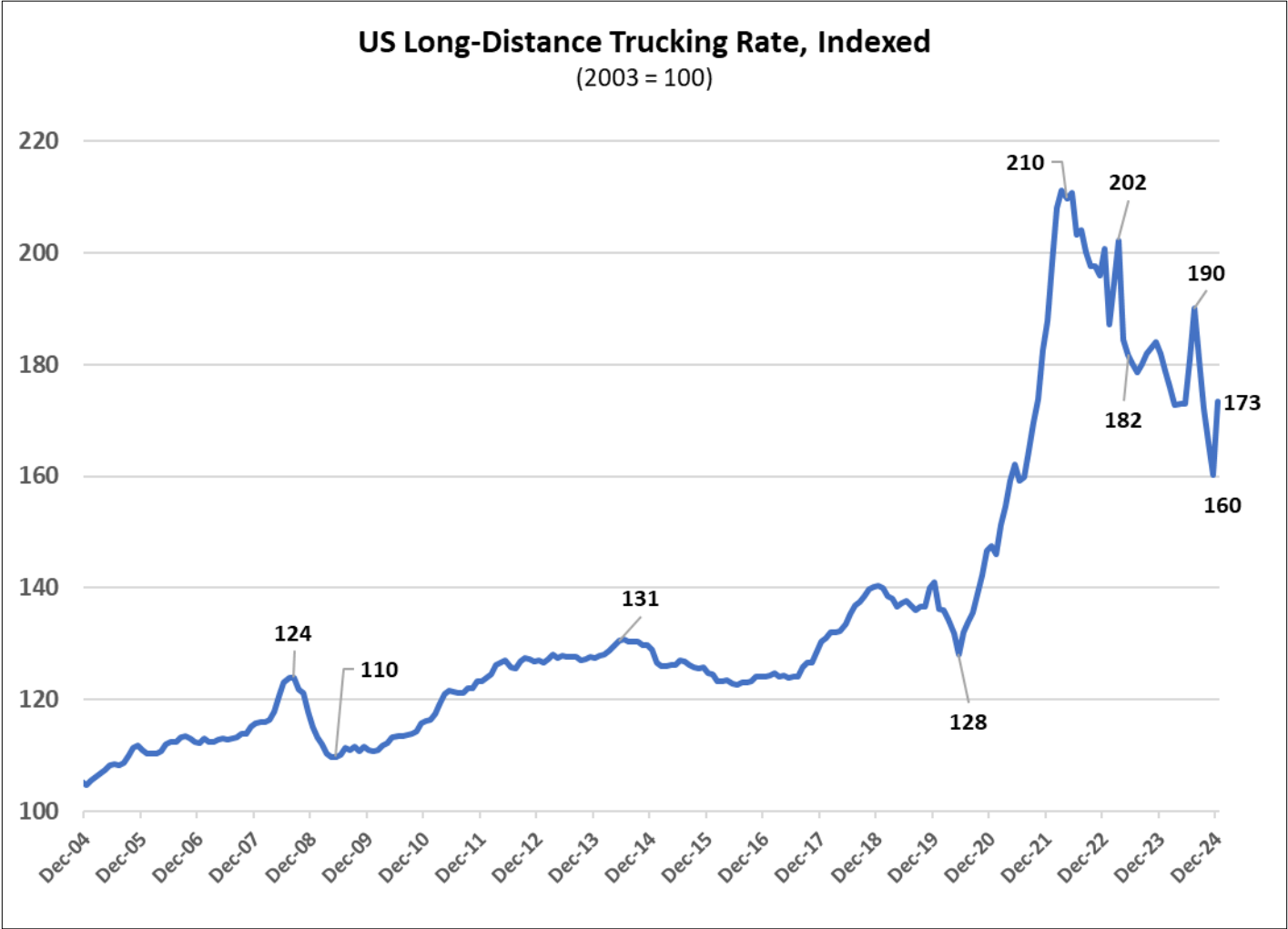


Politics—Selected Geopolitical Concerns

- Increasing dissatisfaction with China by both the U.S. and EU
 - Tariff issues
 - Concerns over Taiwan
 - Support, albeit minimal, for the Russians in the War Against Ukraine
 - Belt and Road Initiative (BRI)
 - Silk Road Economic Belt
 - 21st Century Maritime Silk Road
 - Polar Silk Road
 - Other components of BRI
 - Degenerating diplomatic relationships—we are in a “Geopolitical Recession,” which is characterized by Borge Brende, President of The World Economic Forum, by global fragmentation and polarization, leading to less cooperation and more competition than in the past.
 - Supply concerns—China produces:
 - 42% of all epoxy resin
 - 44% of all chemicals
 - 50% of the world’s steel
 - 70% of all rare earth ore
 - 90% of all refined rare earth metals
- COSTS of transportation, whether transoceanic, regional, intermodal, or multimodal

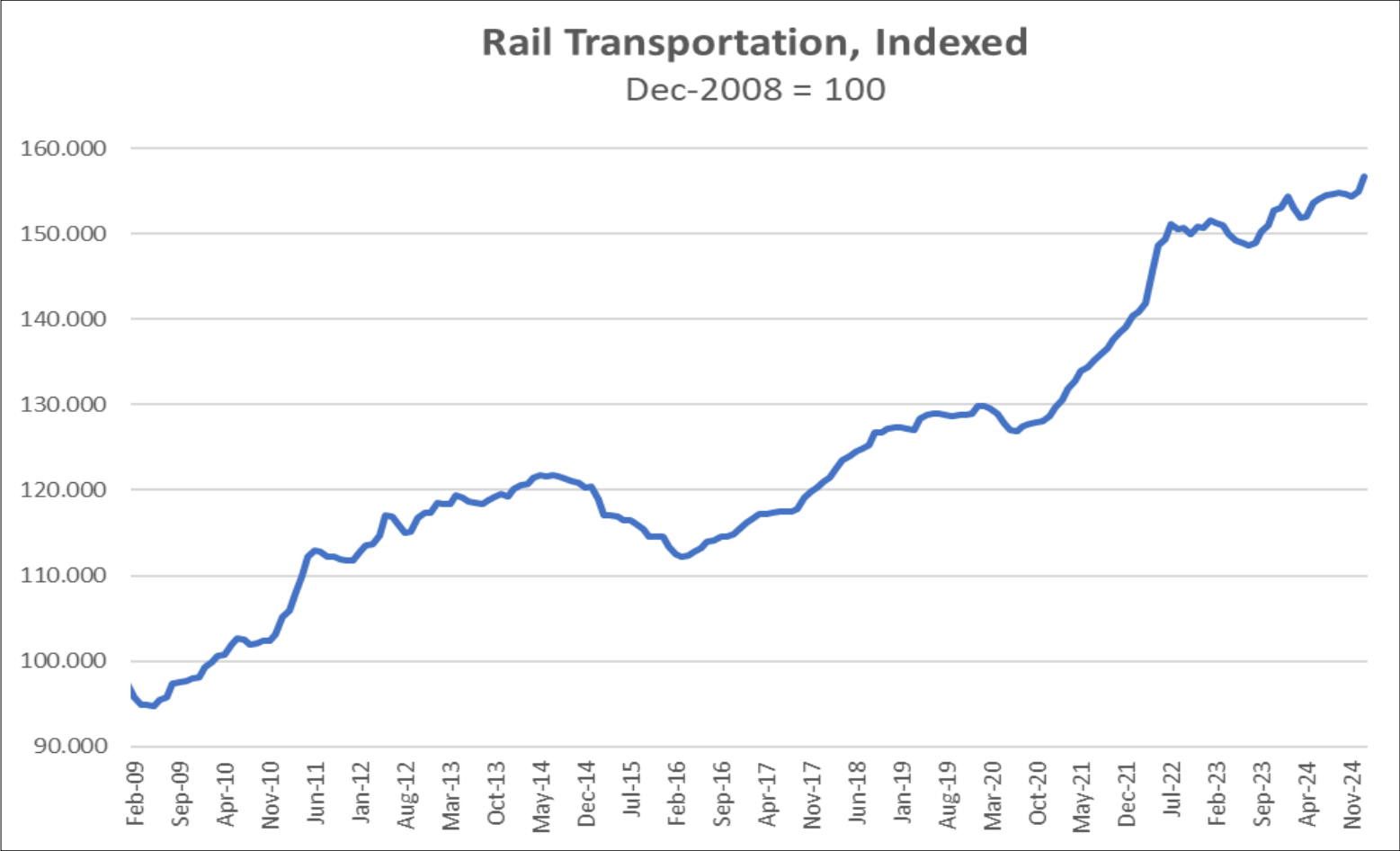


Geopolitical Effects/Potential Effects on Transportation Costs



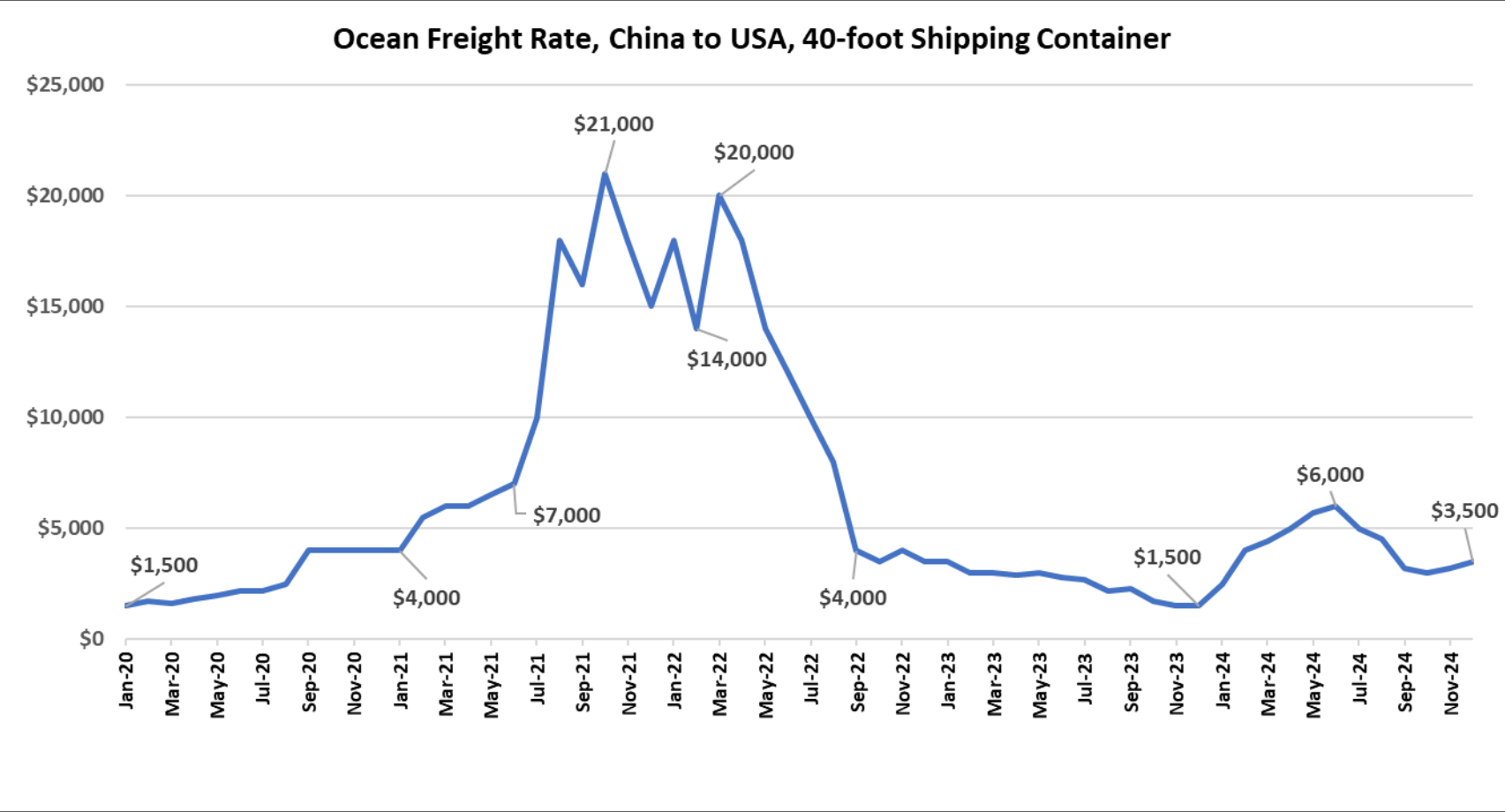
Source: Federal Reserve Bank of St. Louis, ChemQuest

Geopolitical Effects/Potential Effects on Transportation Costs



Source: Federal Reserve Bank of St. Louis, ChemQuest

Geopolitical Effects/Potential Effects on Transportation Costs



Source: ChemQuest, Freightos FBX, Statista

Learn from History or Perish

Learn from History or Perish

"What has been will be again, what has been done will be done again; there is nothing new under the sun."

— *Ecclesiastes 1:9, circa 935 B.C.*

"Study the past if you would define the future."

— *Confucius (551 – c. 479 B.C.)*

"History is the study in the present, of the past, about the future."

— *Marcus Tullius Cicero, De Oratore, 55 B.C.*

"To know your future, you must know your past."

— *George Santayana (1863-1952)*

"The distinction between the past, present and future is only a stubbornly persistent illusion."

— *Albert Einstein (1879-1955)*

The Great Supply Chain Crisis of 2021-2023

The Great Supply Chain Crisis of 2021-2023

- Major disruption in *global supply chains* initiated by the COVID-19 pandemic, and intensified by the “Big Freeze” in the Permian Basin (principally Texas) in February 2021, characterized by:
 - Major bottlenecks at ports
 - Labor shortages
 - Increased demand for certain goods, leading to:
 - Delays in deliveries
 - Product shortages
 - Price increases for consumers across various industries
 - Panic ordering by both desperate producers and customers
- This disruption was caused by a combination of factors, including:
 - Lockdowns
 - Shifts in consumer behavior
 - Disruptions to manufacturing and transportation networks worldwide



Key Points about the Great Supply Chain Crisis

- **Causes:** The pandemic triggered lockdowns, which caused sudden
 - Changes in consumer demand
 - Factory closures
 - Labor shortages at ports and production facilities
 - Major disruptions in the flow of goods
- **Impacts:** Consumers experienced
 - Longer delivery times
 - Empty shelves
 - Higher prices
 - Critically curtailed availability of common household necessities, such as paper goods, disinfectants, and many food items
 - Significant R/M reduction/destocking following the end of the crisis
- **Affected industries**
 - Electronics, automotive, and consumer goods especially impacted
 - A basket of coatings R/Ms, indexed to 2019 vs. selected coatings R/M component prices increased 40-50% from Q1 2020 → Q4 2022



Geopolitical Factors Compounded the Situation

Recent events like the Russia-Ukraine conflict further exacerbated supply chain issues, particularly in energy and commodity markets.

Timeless Lessons Learned from the Great Supply Chain Crisis

Just in Time (JIT) Delivery

- JIT (Just in Time Delivery) is dead—or if not yet dead, at least in a state of dying. No one wants to hear this, but it is difficult to deny.
- JIT can only work when one link in the chain is the focal point.
- It cannot work when multiple members of the supply chain all want JIT from their vendors.



Raw Material Supply



- Every raw material used to make paint and coatings in the U.S. should have at least one reliable vendor in the U.S. that either makes the material in the U.S. or has significant stocking capability in the U.S. to keep the regional supply chain filled with material the next time that the global supply chain is thrown off kilter.
- Having a single source of any raw material is a bad idea.
 - Whenever possible, have alternate raw materials (and alternate suppliers) approved for every raw material that is used in routine production.
 - Every producer should have multiple suppliers whenever possible (at least 2-3) so that it has a purchasing record with companies other than its primary supplier.
 - Violation of this rule should be tolerated only due to the absence of a second source.
- Certain high-profile manufacturing operations should be repatriated to the U.S., as should the ancillary suppliers to those industries.

Finally, and Most Importantly — Research & Development

- Absolutely nothing should prevent at least a minimum amount of true R&D from taking place, even during the darkest hours when all hands are on deck trying to put out fires.
- Coatings is a technology-based, global industry, and at the end of the day those with a strategy focused on the continual development of new and improved products will be the winners.



Closing Thoughts

How Can Companies Best Deal with Geopolitical Trade Issues?

- Develop resilient and transparent supply chains.
- Build a geopolitical view.
 - Become informed about your supply chain.
 - Enhance your organization's ability to sense and respond to changing geopolitical landscapes.
- Strengthen decision-making processes to remain agile. Embed geopolitical scenarios and analysis into capital allocation and strategic planning.
- Expand presence in growth markets.
- Embrace smart nearshoring and reshoring.
- Invest in regional differentiation.
 - As global trade fragments and regionalization accelerates, organizations will need to adopt differentiated structures and technology stacks.
 - A one-size-fits-all approach will no longer suffice.





Thank You!
Questions? Comments?
Please reach out:

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Deep Industry Knowledge – Extensive Industry Relationships – Decades of Industry Experience

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