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Consider This:

The weaponisation of supply chains

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"After enduring a prolonged and unprecedented series of shocks, the global economy appeared to have stabilised, with steady yet underwhelming growth rates. However, the landscape has changed as governments around the world reorder policy priorities and uncertainties have climbed to new highs. Forecasts for global growth have been revised markedly down compared with the January 2025 World Economic Outlook (WEO) Update, reflecting effective tariff rates at levels not seen in a century and a highly unpredictable environment."

IMF, World Economic Outlook, 14 April 2025

For decades, global supply chains have driven efficiency and resilience in global trade, benefiting consumers by providing a variety of products at affordable prices. Companies leveraged logistics, capital mobility and trade liberalisation to reduce costs and build economies of scale. However, recent crises like COVID-19, geopolitical conflicts and trade weaponisation have revealed vulnerabilities and dependencies in key sectors.

Policymakers now focus on safeguarding critical supply chains, reducing high-risk dependencies and boosting resilience against external shocks. This shift aims to ensure long-term economic stability and competitiveness in an uncertain global environment.

The physical architecture of supply chains must change, not just to lock in future supplies of raw materials, but also to safeguard the physical and digital integrity of every step of the supply chain, in the name of national security. It seems obvious that foreign direct investment (FDI) will suffer, weakening global capital expenditure.

All these considerations are driving debates in boardrooms and investment companies around the world, with the recognition that prevailing country risk premiums will have to change, along with the mechanisms to determine them, because they do not adequately reflect the outlook.

Franklin Templeton Institute offers five topic papers covering five global supply chains, applying fundamental research with an eye to identifying sources of risk and opportunity in each:

1. Artificial intelligence
2. Critical minerals
3. Industry
4. Shipping
5. Finance

Investors must develop a deep understanding of industry-specific supply chains to be able to pick the winners and avoid the losers in the next decade. It is not just about the country of origin. In a world where everything can be weaponised, the traditional measures of valuation and risk no longer apply.

Chapter 1

Weaponising artificial intelligence (AI) supply chains

Global supply chains face structural challenges

Global supply chains are being recalibrated to erode efficiency and profitability in the name of compliance with geoeconomic policy imperatives. In a world where everything has the potential to be weaponised, companies need to have customs and policy information in real time to inform business decisions around the deployment of capital, and investment returns are highly dependent on these decisions.

The AI supply chain is not secure

AI requires access to highly skilled engineers, significant capital and, of course, enormous volumes of data. But even AI requires nuts and bolts. The software is run in data centres, which consist of tens of thousands of component parts that represent a highly complex spider's web of supply chains that range across many countries around the globe, all of them subject to tariffs or obstacles to trade in the new world.

Chips are just the most visible vulnerability

Naturally, the key parts are the advanced semiconductors, which do the heavy processing. These are already intricately snarled in the geoeconomic webs that drive direct and indirect barriers to trade. Selling the machines that make the chips, as well as the materials used to make them, is subject to licence and sanction. Antimony, gallium, germanium and indium are some of the primary critical minerals used to create compound semiconductors. Some of the main challenges in their production are the cost of raw materials and the complexity of the fabrication process, but the main issue is the uncertain access to critical minerals, as we explore further in that chapter.

Data centres need energy

Moving more and more transactions, records and business to the cloud demands an increase in electricity to power this transition. Data centres and AI applications are also held up as drivers of additional electricity demand growth. Their tendency to concentrate geographically puts a significant strain on local resources,[1] and so far, the rate of technical efficiency improvements has been relatively slow. In large economies like the United States and Europe, data centres account for 2%–4% of total electricity consumption.

Going forward, data centres are widely expected to account for 10%[2] of global electricity demand growth in the next five years. Their relevance, however, is likely to be pronounced only in certain geographies with high concentrations and consequent pressures on the local grid. Northern Virginia is the largest data centre market in the world (13% of global capacity and 25% of capacity in the Americas). It has 352 data centres consuming four gigawatts (GW), likely to rise to 11 GW by 2030, equivalent to 40% of the state's power generation capacity. The European Union (EU) has 1,830[3] data centres, around 15% of the world's total, and a third of these are in Germany. Please see our previous paper on this topic: Consider This: Could Europe build a structural advantage via cheap electricity?

The importance of US geography (and protectionism)

On an overall basis, the United States has enough baseload (continuous) power generation to cope with this growing demand. However, it is not available in the right places. The biggest surplus of power generation is in Texas and North Dakota. However, the data centres are concentrated in California and in northern Virginia, where they can be close to the landing sites of the undersea cables that carry data around the world. The Jones Act also gets in the way. This federal law, passed in 1920, limits how cargo can be transported by sea. It stipulates that any cargo shipped between US ports must be carried by US-built, US-owned and US-operated ships, with American crews. It was originally intended to support the strategically important shipping industry, but it has had unintended negative consequences. Natural gas fuels 55%[4] of Virginia's electricity generation, yet the state utility cannot simply buy liquified natural gas (LNG) from Texas, because the United States has no LNG tankers and cannot contract a South Korean or Japanese vessel to ship it to Virginia because of the Jones Act, making the cost prohibitively expensive. We explore this further in our chapter on weaponising shipping.

Data centre design is important

Data centres are particularly vulnerable due to the extensive range of subcomponents sourced from numerous countries. This makes them susceptible to supply shortages, especially considering the ongoing weaponisation of trade. The risk of a domino effect causing successive bottlenecks across the entire supply chain is inherently high. And the complexity of tangled commercial relationships makes the challenge of an urgent recalibration to accommodate geoeconomic pressures virtually impossible.

The highly sophisticated, high-density chips required for AI workloads function 24 hours per day and generate significant heat. This means they need sophisticated heat, ventilation and air conditioning (HVAC) systems, which also provide air quality and humidity control. The heating and ventilation systems are separate from the air conditioning, but they must operate in tandem to optimise performance. Conclusion? It is prohibitively expensive and technically challenging to retrofit existing data centres. They tend to be new builds designed for purpose.

Undersea cables: Old fashioned, efficient but vulnerable

Undersea cables, although largely out of sight and until recently, out of mind, serve as the primary conduit for global data flow. These cables are particularly susceptible to geopolitical tensions. Spanning 1.3 million kilometres with 1,636 cable landing stations,[5] they facilitate the transmission of US$10 trillion[6] in daily financial transactions, private and commercial communications, and critical national security information. These cables, which can be as thin as human hair and reach depths of up to 8,000 metres, are integral to our digital infrastructure and the AI value chain. Ownership of these cables predominantly lies with private sector companies, including telecommunications and technology firms. Notably, northern Virginia hosts a high concentration of data centres due to its proximity to the landing points of numerous transatlantic undersea cables.

Despite significant technological advancements over the decades, undersea cables have remained largely unchanged since their inception in 1850.[7] The primary reason for this is speed. While satellite data transmission records around 200 gigabits per second, undersea cables are at least five times faster, exceeding 200 terabits per second. However, these cables are prone to breaks, with approximately 150 incidents occurring annually due to aging, accidents or geopolitical conflicts. Recent incidents include cable breaks caused by Chinese and Russian vessels in the Baltic Sea and the Taiwan Straits.[8] Repairing these cables is both costly and complicated, especially in disputed waters. Currently, both the United States and China have complete value chains for undersea cables. The world relies on a fleet of only 46 cable repair ships,[9] 30 of which belong to NATO members. In a world where everything is potentially weaponised, the US State Department[10] has advised communications providers of their suspicions that certain cable repair ships could pose security risks. State Department officials have noted that a state-controlled Chinese company, S.B. Submarine Systems, which assists in repairing international cables, appears to be concealing its vessels' locations from radio and satellite tracking services, raising concerns.

Conclusion

While investors debate the implications for valuations of AI-related firms, the real-world risks of physical disruption loom. While semiconductors are a significant component of the AI supply chain, the broader implications of tariffs on related goods, such as electronics and data centre components that incorporate semiconductors, are also relevant. The inescapable conclusion is that tariffs can have indirect effects that lead to supply chain shortages for AI.

The vulnerability of the AI-supply chain to physical disruption is particularly concerning around undersea cables, where old technology maintains its central importance yet is unable to address its security weakness. In a world of weaponisation of supply chains, we believe this weakness is not prioritised as it should be.

Investors should be clear that the physical supply chain of AI cannot be taken for granted and should be considered a major risk factor, with knock-on effects on a wide variety of industrial supply chains.

Undersea cables, although largely out of sight and until recently, out of mind, serve as the primary conduit for global data flow. These cables are particularly susceptible to geopolitical tensions. Spanning 1.3 million kilometres with 1,636 cable landing stations, they facilitate the transmission of US$10 trillion in daily financial transactions, private and commercial communications, and critical national security information.

Chapter 2

Weaponising critical minerals supply chains

Geopolitics + economics = geoeconomics

Geopolitical pressures might appear to be very slow-moving, with little immediate impact on capital markets. That view seemed justified up until around a decade ago. Great power rivalries resulting in escalating geopolitical pressures have now become immediate, direct and global in reach, but uneven in their intensity. Geopolitical considerations influence policy and hence investment returns, both directly and indirectly, via their impact on the affected countries and on industrial and commodity supply chains.

Investment takeaway

A new economic and geopolitical order is shaping up, in which three centres of economic gravity stand out: The United States, China and the European Union (EU). Each one has structural strengths and weaknesses and a different governance system, which ultimately determines policy direction. This new order prioritises **geoeconomic logic** over traditional economic logic.

"Twin trends of electrification and digitalisation are increasing societal dependence on critical minerals. Meanwhile, there is no energy transition or decarbonisation without significant ramps in many of these minerals—most notably lithium, nickel, copper and aluminium. Non-China-based suppliers of these materials are likely to be subject to increasing geopolitical pressure and will have a key role to play over the next decade in securing supply for both the United States and Europe."

Craig Cameron, Portfolio Manager, Templeton Global Equity Group

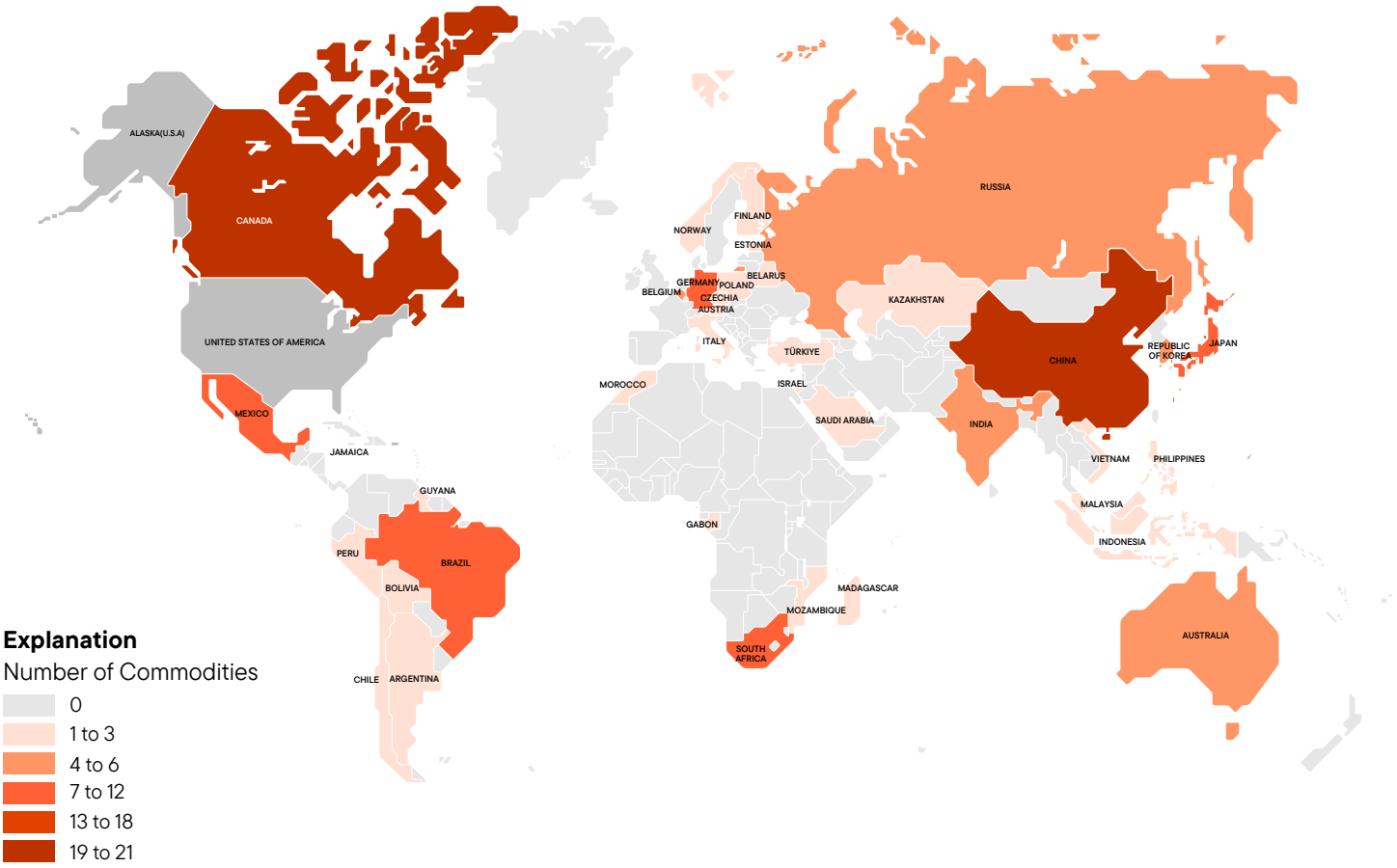
Critical minerals really are critical

These essential materials are integral to a variety of emerging technologies, from electric vehicles and specialist industrial machinery to defence applications and turbines. "Geoeconomic logic" forces countries to address their import dependency.

The exact definition of a critical mineral varies slightly because it depends on a specific country's "most critical" requirements. But there is commonality, as can be seen in Appendix I. The US Department of Energy identifies 50 such minerals,[11] the EU 34[12] and Japan 35.[13] The demand for critical minerals like copper, cobalt, lithium and nickel is subject to both technological and policy uncertainties, but the difference lies in the magnitude—in any scenario, demand should double, treble or quadruple by 2040. According to the International Energy Agency (IEA),[14] cobalt demand could be six to 30 times higher than today's levels, depending on assumptions around battery chemistry and climate policies. But the low estimate is still six times higher, revealing a significant opportunity for recycling to enable reuse. The same principle applies to rare earths, where the IEA estimates demand may be three to seven times higher in 2040.[15]

According to the Department of Energy,[16] the United States is 100% dependent on imports of 12 minerals and more than 50% dependent on a further 26. In addition, China is the biggest supplier of 26 of the 50 minerals on the critical list.

Exhibit 1: Leading Import Sources* (2020–2023) of Non-Fuel Commodities for which the United States Was Greater than 50% Import Reliant



Source: Mineral Commodity Summaries 2025. USGS, US Department of the Interior. The asterisk (*) denotes countries listed in Appendix 2.

Rare earth minerals are common; what is rare is the processing technology

Critical minerals[17] are necessary to produce microchips, electronics and electric motors. Rare earths form an incredibly powerful magnet, and that magnet is part of the motor that goes into an electric signal. Like most minerals, rare earths are unevenly distributed around the globe in economically viable quantities. The issue is that in the pre-2016 world of "economic logic," each country's specialisation[18] led to higher global efficiency and lower costs for all, but in today's world of geoeconomic logic, self-sufficiency is prioritised over financial efficiency. So, China's dominance in the processing of these minerals is now a problem.

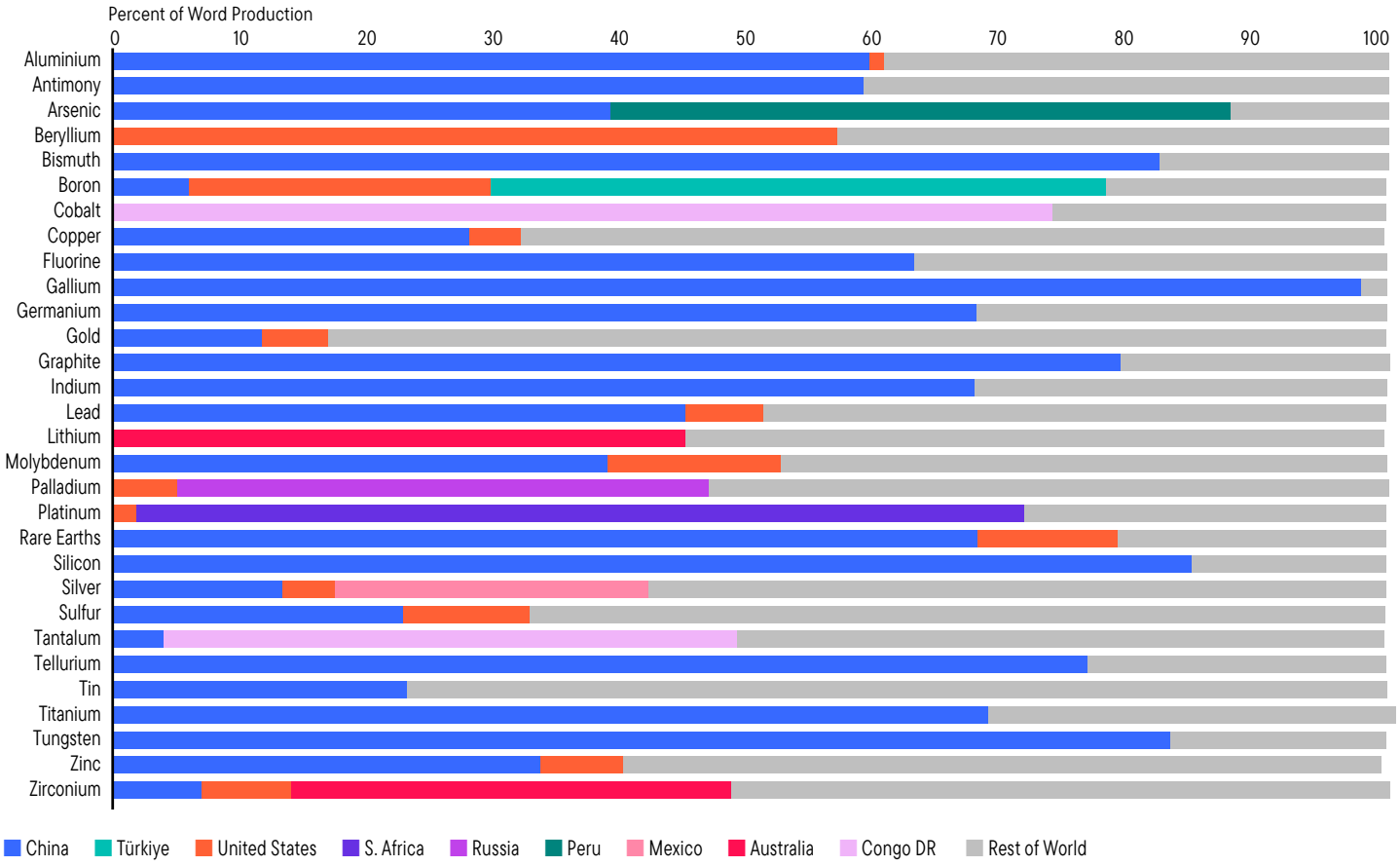
Recent data from the United Nations Conference on Trade and Development (UNCTAD) quantifies that dominance[19] in stark terms: China accounts for two-thirds of global processing and refining capacity for critical minerals.

Although extraction occurs worldwide, Beijing controls over half of the world's processing for aluminium, lithium and cobalt, as well as around 90% for rare earth metals and manganese, and has a 100% monopoly for natural graphite. Moreover, more than one-third of global copper and nickel processing takes place in China.

Since 2020, other countries have been building their own production, including the United States, Australia, Myanmar and Thailand, but they mostly stockpile for now, as they lack processing capabilities. One reason is the uncertainty over permitting and capital returns on these long-term projects, and another is the simple lack of technical knowledge. Beijing banned[20] the export of rare earth processing technology in December 2023. This implies tortuously slow progress for everyone else.

According to the IEA,[21] in 2023 China refined 70 kilotonnes (kt) of rare earths and Malaysia four kt. By 2030, the United States and Australia are forecast to refine four kt each, by which time China's capacity will be 81 kt and Malaysia's 13 kt. As the UK government's policy paper[22] on critical minerals in 2023 puts it: *"State-subsidised companies can operate globally with greater agility, at lower margins and with longer investment timeframes, creating a disadvantage for those not subsidised."*

Exhibit 2: China Leads Critical Minerals Production



Source: USGS. Analysis by Franklin Templeton Institute. As of 2025, based on 2023 data or 2023 estimates. An exception is Germanium, where 2021 estimates are shown due to data availability constraints. Boron data for the United States has not been disclosed after 2005, hence the 2005 figure was used as an approximation. US data for germanium, lithium, tellurium and titanium is not disclosed, hence US share of the total production is included in the "rest of world" category. Figures may not total 100% due to rounding error.

Meanwhile, China has initiated a series of export restrictions on rare earths, requiring special export licences for seven rare earths used in the energy, automotive and defence industries. This is in response to the tariffs imposed by President Trump and creates leverage for Beijing in negotiations with any country.

"These materials are used in technologies ranging from defence systems like the F-35 to batteries and semiconductors. Loss of access could cause defence production to grind to a halt and choke off manufacturing of other advanced technologies."

Select Committee on the Strategic Competition between the United States and the Chinese Communist Party, the Critical Minerals Policy Working Group

Heightened security considerations drive urgency

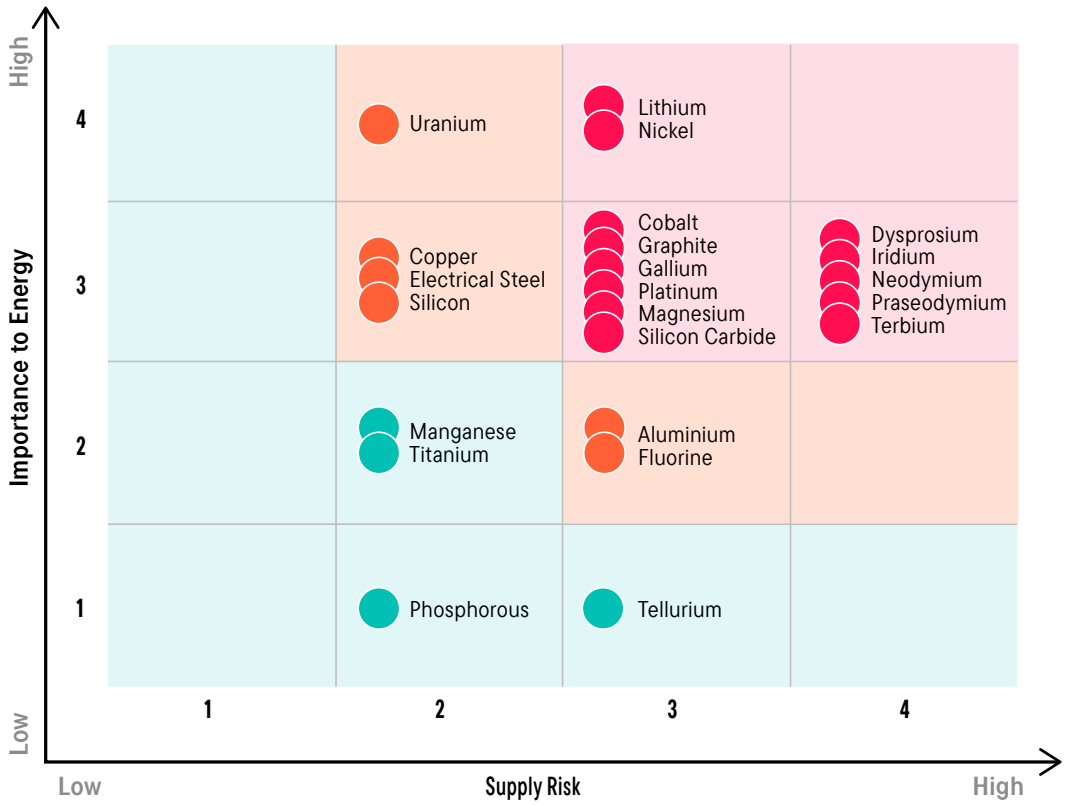
The new Hobbesian[23] world raises the stakes and makes national security a priority. These rare earths are in every form of defence technology, from warships and fighter jets to missiles, satellites and radar systems. The F-35 fighter contains 408 kilograms (kg), equivalent to 900 lbs. of rare earth elements. An Arleigh-Burke class DDG-51 guided missile destroyer uses 2,360 kg (5,200 lbs.), while a Virginia class submarine uses over 4,700 kg (9,200 lbs.).[24] Since 2020, the US Defence Production Act has invested in relevant projects, with US$700 million in 2024 alone.[25]

Alongside these considerations, Washington is aware that China is outpacing the United States in terms of acquiring high-end weapons systems and munitions five or six times faster,[26] has built the largest fleet in the world and has mobilised its economy to build up its defence industrial capacity.

The US Department of Energy has built a "criticality matrix" which points to 13 minerals in the top right quadrant (High Importance/ High Supply Risk) and six more are in the Near Critical category.

Exhibit 3: The Criticality Matrix[27]

Medium Term
2025–2035



Source: "What Are Critical Materials and Critical Minerals?" US Department of Energy. 2023.

What is the roadmap?

The world is slowly diversifying its production of rare earths but is struggling to develop alternative processing capacity. Brazil, Thailand and Vietnam each have 18% of the world's rare earths deposits (in economically viable volumes). All are at varying stages of investment in production capacity, but the key concern remains the lack of refining capacity outside China, which is structural.

The United States

The United States has been very direct and relatively hostile in its foreign policy positions this year, upending the status quo with territorial demands and an apparent attempt to break up the global trading system. For investors, this has created an unwelcome atmosphere of chaos. But one of the common threads seems to be resource-based policy. Canada, Greenland, Ukraine and the Democratic Republic of Congo (DRC) all have significant deposits of critical minerals. The United States has signed a contract with Ukraine to jointly develop that country's mineral resources and is reported to be in negotiations with the DRC for access to these resources. Separately, the United States has raised 25% tariffs on steel and aluminium imports and initiated Section 232 investigations[28] into potential tariffs on critical minerals.

Successive US administrations have historically pursued a comprehensive strategy to eliminate these vulnerabilities, including access to financing, incentives to build supply chains onshore and enhancing end-of-life recycling. Unfortunately, these are extremely complex value chains and companies and investors require long-term policy stability to commit capital because these projects are inevitably expensive, technically challenging and the investment returns are back-end-loaded.

There are rare earth separation facilities being built in Texas and California, and the United States has been using the Development Finance Corporation (DFC) to channel equity investment and loans in relevant areas to build up production capacity that can be refined onshore in future. One historic example is a US$50 million equity investment in a South African gypsum retreatment facility to produce rare earths, another is a US$30 million investment in a Brazilian nickel and cobalt mine, and loans to a large copper mine in Peru, majority owned by Freeport McMoRan. Perhaps more surprising, the US Department of Defense (DOD) has a stake in a lithium mine: a US$90 million agreement to support Albemarle's planned re-opening of their Kings Mountain, NC, lithium mine to increase domestic production of lithium for the US battery supply chain.[29] Albemarle estimates that Kings Mountain will be operational between 2025 and 2030.

But mining is a long-term business with back-end-loaded financial returns. Mining companies are not interested in putting capital to work if they cannot quantify rates of return to their shareholders in the absence of stable policy and clarity of taxation or tariffs. A great example is Germanium, which goes into semiconductors. The biggest supplier to the United States is Teck, a Canadian company. With the tariff situation, CEO Jonathan Pryce announced a move to reserve warehouse and port capacity to redirect sales to Asia.[30]

The EU

The EU is a less obvious potential beneficiary of the prevailing geoeconomic winds. In 2023, the European Commission approved 47 strategic projects to boost production and refining capacity of strategic minerals. They are located across 13 EU member states and cover lithium, cobalt, copper and 13 other critical raw materials. Citing security concerns, the European Parliament has passed a law to prohibit imports from outside the Union above a certain threshold in extraction, processing and recycling. The ambition is to develop capacity for 40% of its demand, with 25% coming from recycling. This means that Greece could potentially account for 10% of the EU's aluminium. It could also meet the totality of the EU's demand for gallium. Gallium is a sought-after mineral used to make gallium arsenide, which is a compound used in electronics, photovoltaics, lasers and thermometers.

There is significant scope for tensions between the EU and the United States, since they are essentially competing for a limited pie and are subject to the same dependence on China.

In the case of Ukraine, there is a memorandum of understanding signed by Kiev and Brussels dating from before the Russian invasion in 2022, and furthermore, the country is an officially recognised candidate for membership of the EU. As a result, any deal signed with the United States on future access to critical minerals could prejudice Kiev's accession to the EU.

The surreal situation regarding US designs on annexing Greenland is another sticking point. Brussels has reportedly been asked by the Danish government to avoid open confrontation with the Trump administration over rhetoric on the seizure of territory belonging to a sovereign EU member state. But the matter is clearly not closed and could abruptly rise again.

Conclusion

Beijing is taking this opportunity to present itself as a stable and reliable economic partner, aiming to strengthen ties with Asian countries in comparison to the United States. The Chinese export restrictions highlight the vulnerability of various industries, including semiconductors, automotive and defence technology, to any supply disruption. In such cases, defence might be prioritised over civilian uses, and companies may not have sufficient stockpiles.

Recycling contributes to a secondary supply of minerals, enhances security of supply and improves waste management. However, estimating the impact on demand is challenging, with projections suggesting a reduction in primary supply requirements for copper, lithium, nickel and cobalt by 10% to 30% by 2040. Technological advancements could improve these numbers, like the progress seen in solar cell technology with reduced reliance on silver and silicon over the past decade.

Without a significant technological breakthrough in processing or an agreement with China, it appears that the United States and the EU may still rely on China for critical minerals for at least another decade.

In our opinion, investors would do well to bear in mind that the flow of sufficient quality critical minerals can no longer be taken for granted and should be considered a major risk factor in a wide variety of industrial supply chains, from automobile, to technology, to defence and more.

Appendix 1: The commonality of definitions and critical materials lists

	US	EU
Definition	Any non-fuel mineral, element, substance or material that the Secretary of Energy determines: (i) has an elevated risk of supply chain disruption; and (ii) serves an essential function in one or more energy technologies, including technologies that produce, transmit, store and conserve energy.[31]	Raw materials of high economic importance for the EU, with an elevated risk of supply disruption due to their concentration of sources and lack of good, affordable substitutes.[32]
Total Number of Critical Minerals	50	34

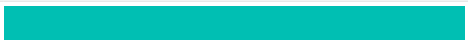
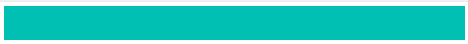
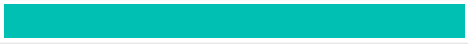
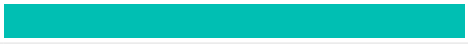
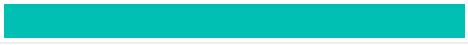
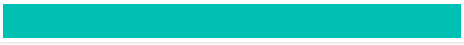
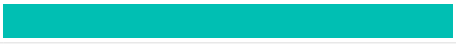
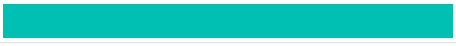
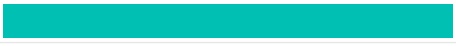
EU and United States List of Critical Materials

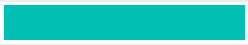
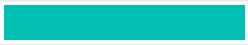
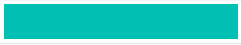
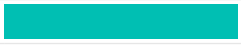
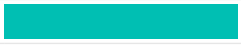
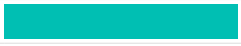
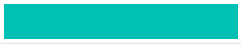
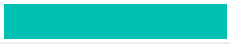
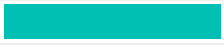
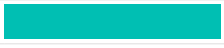
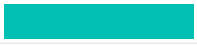
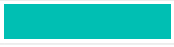
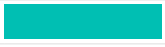
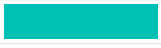
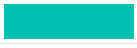
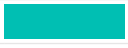
Aluminium	Copper	Helium	Palladium	Tantalum
Antimony	Dysprosium	Holmium	Phosphate Rock	Tellurium
Arsenic	Erbium	Iridium	Phosphorus	Terbium
Baryte	Europium	Lanthanum	Platinum	Thulium
Beryllium	Feldspar	Lithium	Praseodymium	Tin
Bismuth	Fluorspar	Lutetium	Rhodium	Titanium
Boron/Borate	Gadolinium	Magnesium	Rubidium	Tungsten
Cerium	Gallium	Manganese	Ruthenium	Vanadium
Cesium	Germanium	Natural Graphite	Samarium	Ytterbium
Chromium	Graphite	Neodymium	Scandium	Yttrium
Cobalt	Hafnium	Nickel	Silicon Metal	Zinc
Coking Coal	Rare Earth Elements	Niobium	Strontium	Zirconium

EU List US List EU and US List

Source: Regulation proposals COM (2023) based on the Study on the Critical Raw Materials for the EU 2023—Final Report, Annex II, European Commission, March 2023; USGS Mineral Commodity Summaries, 2023.

Appendix 2: US Net Import Reliance[1]

Commodity	Net import reliance as a percentage of apparent consumption in 2024	Leading import sources (2020–2023)[2]
ARSENIC, all forms		China,[3] Morocco, Malaysia, Belgium
ASBESTOS		Brazil, Russia
CESIUM		Germany, China
FLUORSPAR		Mexico, Vietnam, South Africa, China[3]
GALLIUM, metal		Japan, China, Germany, Canada
GRAPHITE (NATURAL)		China,[3] Canada, Mexico, Mozambique
INDIUM		Republic of Korea, Japan, Canada, Belgium
MANGANESE		Gabon, South Africa, Australia, Malaysia
MICA (NATURAL), sheet		China, Brazil, India
NIOBIUM (COLUMBIUM)		Brazil, Canada
RUBIDIUM		China, Germany, Russia
SCANDIUM		Japan, China, Philippines
STRONTIUM		Mexico, Germany
TANTALUM		China,[3] Australia, Germany, Indonesia
YTTRIUM, compounds		China,[3] Germany
GEMSTONES		India, Israel, Belgium, South Africa
ABRASIVES, fused aluminium oxide		China,[3] Canada, Brazil, Austria
NEPHELINE SYENITE		Canada
TITANIUM, sponge metal		Japan, Kazakhstan, Saudi Arabia
POTASH		Canada, Russia, Belarus, Israel
BISMUTH, metal, alloys and scrap		China,[3] Republic of Korea
IRON OXIDE PIGMENTS, natural and synthetic		China,[3] Germany, Brazil, Canada
TITANIUM MINERAL CONCENTRATES		South Africa, Madagascar, Canada, Australia
ANTIMONY, metal and oxide		China,[3] Belgium, India, Bolivia
PLATINUM		South Africa, Belgium, Germany, Italy
STONE (DIMENSION)		Brazil, China,[3] Italy, Türkiye
DIAMOND (INDUSTRIAL), stones		India, South Africa, Russia, Australia
RARE EARTHS,[4] compounds and metals		China,[3] Malaysia, Japan, Estonia
PEAT		Canada
CHROMIUM, all forms		South Africa, Kazakhstan, Canada, Finland
COBALT, metal, oxides and salts		Norway, Finland, Japan, Canada
BARITE		India, China,[3] Morocco, Mexico
BAUXITE		Jamaica, Türkiye, Guyana, Australia
MAGNESIUM METAL		Israel, Canada, Türkiye, Czechia
TIN, refined		Peru, Bolivia, Indonesia, Brazil
ZINC, refined		Canada, Mexico, Republic of Korea, Peru
ABRASIVES, silicon carbide		China,[3] Brazil, Canada
RHENIUM		Chile, Canada, Germany, Poland
SILVER		Mexico, Canada, Republic of Korea, Poland

Commodity	Net import reliance as a percentage of apparent consumption in 2024	Leading import sources (2020–2023)[2]
ALUMINA		Brazil, Jamaica, Australia, Canada
MAGNESIUM COMPOUNDS		China,[3] Israel, Brazil, Canada
GERMANIUM		Belgium, Canada, China, Germany
IODINE		Chile, Japan
LITHIUM		Chile, Argentina
SELENIUM, metal		Philippines, Mexico, Canada, Poland
TUNGSTEN		China,[3] Germany, Bolivia, Vietnam
SILICON, metal and ferrosilicon		Brazil, Russia, Canada, Malaysia
GARNET (INDUSTRIAL)		South Africa, Australia, India, China[3]
NICKEL		Canada, Norway, Australia, Brazil
ALUMINIUM		Canada, United Arab Emirates, Bahrain, China[3]
DIAMOND (INDUSTRIAL), bort, grit, and dust and powder		China,[3] Republic of Korea, Ireland, Russia
COPPER, refined		Chile, Canada, Mexico, Peru
MICA (NATURAL), scrap and flake		China, Canada, India, Finland
VANADIUM		Canada, Brazil, Austria, South Africa
PALLADIUM		Russia, South Africa, Belgium, Italy
VERMICULITE		South Africa, Brazil, Zimbabwe
FELDSPAR		Türkiye, Mexico
LEAD, refined		Canada, Republic of Korea, Mexico, Australia
PERLITE		Greece, China
BROMINE		Israel, Jordan, China[3]
TELLURIUM		Canada, Philippines, Japan, Germany
ZIRCONIUM, ores and concentrates		South Africa, Australia, Senegal
SALT		Canada, Chile, Mexico, Egypt
CEMENT		Türkiye, Canada, Vietnam, Greece

1. Not all mineral commodities covered in this publication are listed here. Those not shown include mineral commodities for which the United States was a net exporter (abrasives, metallic; beryllium; boron; cadmium; clays; diatomite; gold; helium; iron and steel scrap; iron ore; kyanite; molybdenum; rare earths, mineral concentrates; sand and gravel, industrial; soda ash; titanium dioxide pigment; wollastonite; zeolites; and zinc, ores and concentrates) or less than 20% net import reliant (gypsum; iron and steel; iron and steel slag; lime; nitrogen, fixed—ammonia; phosphate rock; pumice and pumicite; sand and gravel, construction; stone, crushed; sulfur; and talc and pyrophyllite). For some mineral commodities (hafnium; mercury; quartz, high-purity and industrial cultured crystal; thallium; and thorium), available information was inadequate to calculate the exact percentage of import reliance.

2. Listed in descending order of import share. Only the top four countries are listed. Excludes countries that provided less than 3% import share.

3. Includes Hong Kong.

4. Includes lanthanides cerium, dysprosium, erbium, europium, gadolinium, holmium, lanthanum, lutetium, neodymium, praseodymium, samarium, terbium, thulium, and ytterbium.

Source: Mineral Commodity Summaries 2025. USGS, US Department of the Interior. Version 1.2, March 2025.

Chapter 3

Weaponising industrial supply chains

The new formula for supply chains: A real, immediate and permanent impact

Since the 1980s, as communication costs decreased and new software and digital platforms emerged, companies could choose from a much wider universe of suppliers, coordinate effectively and track shipments anywhere in the world in real time. The internet enabled the restructuring of global production lines, with countries and companies specialising in specific parts of different industry supply chains. This resulted in the optimisation for quality, price, reliability and of course, working capital efficiency.

Instead of the historical practice of arbitrage of unit labour costs and tax incentives, the architecture of logistics chains focuses on differentiation of service, speed of delivery and knowledge intensity. The added component is **geoeconomics**, which creates intense pressures on supply chains, resulting in globalisation falling to regionalisation at every level of the complex, multi-country network. This process will most probably lead to further polarisation between countries and companies across the developed and emerging asset classes. It is intrinsically harder for smaller companies to adapt, as they operate on relatively thin margins, more expensive financing, and have limited management bandwidth.

Investment takeaway

This injection of geoeconomic pressures has negative impacts on costs, margins, reliability, business confidence and, ultimately, investment returns. But perhaps equally importantly, it upsets the relative clarity of expectations regarding the likely winners and losers going forward.

The automotive sector: Digitalisation, technology, circularity and vertical integration

Significant global disruptions, including COVID-19, geopolitical tensions and unpredictable tariffs, have repeatedly forced recalibration on automotive sector supply chains. Increases in inventory, funded by working capital, have been used by both original equipment manufacturers (OEMs) and suppliers to make their supply chains more resilient. Higher stock levels avoid disruption and stoppages in manufacturing when components do not arrive on time. But this is a short-term strategy, and most of the implied cost falls on Tier 1 and Tier 2 suppliers, who usually pay higher rates of interest than OEMs do, making it unsustainable in the long run.

Firefighting these logistical crises has absorbed automakers' time, working capital and management bandwidth. The casualties have been sustainability initiatives, particularly for suppliers.[33] Separately, the proportion of supply obtained from offshore locations had fallen by 22% compared with 2021. According to the same report, one in three automotive companies still lacks a comprehensive sustainability strategy, with many existing initiatives put on hold.

To build robust supply chains for the future, automotive sector companies are including circularity in their business models. Recycling spent materials is increasing in importance, as the real limitations of access to new resources materialise, but there is a shortage of suppliers who can help. This has led Volkswagen to invest heavily to enhance its global supply chain, sourcing new suppliers for nickel and batteries, while increasing its near-shoring.[34] Vertical integration could well become commonplace in the sector, via joint ventures between automakers and technology companies, for example.

Investment takeaway

The main developments for this supply chain are increased digitisation and deployment of logistics software to gather and parse real time data to better model potential risks and their possible solutions. This gathering of huge quantities of data across multiple domains, and the need to process all of it in "real time" to quickly interpret risks and potential solutions, is exactly what the next industry is fast approaching: defence.

Defence supply chain: Demand certainty, digitalisation, innovation, critical minerals

The defence industrial supply chain has similar complexity to the automotive equivalent, but with a more constrained geographical spread, because of its national security considerations. As an industry, it has suffered benign neglect over the last 36 years, as swords became ploughshares and, particularly for a prosperous West, the prospect of sustained large-scale warfare appeared minimal.

The Russia-Ukraine war changed all that and immediately forced a rethink around the prioritisation of a big, efficient military industrial base. The main lesson from history has been that the winner is usually the one with the greatest staying power, meaning the side that can keep delivering new replacements of well-trained, well-equipped and motivated troops. Unlike autos, the defence industry requires unity of purpose and complete alignment of policy, investment and execution. On paper, autarchies are better prepared to make strategic decisions fast, and marshalling the economy for a single objective is easy.

Recent analysis[35] by Dr Jack Watling and Oleksandr V Danylyuk of the Royal United Services Institute (RUSI) suggests that Russia's soviet heritage meant Moscow already had a military-industrial mobilisation and has been effective at generating production of arms and equipment at scale. Ukraine was successful, but not as systematic as Russia, and Kyiv has relied on a large informal and unregulated small business ecosystem to keep production going. This informality has contributed to its innovation in drone production. In Europe, there was no preparation, plentiful legislation, and no levers to marshal economic forces, and it has taken a year or two to develop the alignment required for a Europe-wide initiative. Nevertheless, what companies need most in Western capitalist democracies is demand certainty.

There appears to be a new determination in European capitals and a willingness to act, which bodes well for a (belated) rebuild of a continental military deterrence.

However, there is an added complication: the shortage of critical minerals. In our chapter on this topic, we explore the challenges of ensuring a supply of these resources. In defence, the importance of materials varies across military domains. Materials crucial for aircraft, helicopters and missiles may differ from those needed for corvettes, aircraft carriers and submarines. For instance, graphite is high-risk for air use, and gold is low-risk, but for sea use, they are high-risk and medium-risk, respectively. It is vital to address specific vulnerabilities for each domain when handling critical raw materials supply security risks in the defence sector. Additionally, the categorisation differs significantly from the EU green and digital transitions framework.

To build robust supply chains for the future, automotive sector companies are including circularity in their business models. Recycling spent materials is increasing in importance, as the real limitations of access to new resources materialise, but there is a shortage of suppliers who can help. This has led Volkswagen to invest heavily to enhance its global supply chain, sourcing new suppliers for nickel and batteries, while increasing its nearshoring.

Exhibit 4: Supply Risk for Critical Raw Materials in Military Applications[36]

Fighter Aircraft	Aluminium, Graphite	Beryllium, Chromium, Cobalt, Copper, Dysprosium, Germanium, Iron/Steel, Lanthanum, Nickel, Neodymium, Platinum, Praesodymium, Samarium, Tantalum, Tellurium, Terbium, Titanium, Tungsten, Vanadium, Yttrium	Barium, Borates, Cadmium, Gallium, Indium, Lead, Lithium, Manganese, Molybdenum, Niobium, Silver, Tin, Thorium, Zinc, Zirconium	Gold, Hafnium, Selenium
Main Battle Tank	Aluminium, Graphite	Beryllium, Chromium, Copper, Germanium, Iron/Steel, Neodymium, Nickel, Tantalum, Tellurium, Titanium, Tungsten, Vanadium, Yttrium,	Borates, Cadmium, Gallium, Indium, Manganese, Molybdenum, Selenium, Thorium, Zinc	Hafnium
Submarine	Aluminium, Graphite	Chromium, Cobalt, Iron/Steel, Platinum, Samarium, Titanium, Tungsten, Vanadium	Barium, Lead, Lithium, Manganese, Niobium, Silver	Hafnium
Corvette	Aluminium, Graphite	Cobalt, Chromium, Copper, Iron/Steel, Nickel, Samarium, Titanium, Tungsten	Barium, Lead, Lithium, Molybdenum, Manganese	Gold
Artillery	Aluminium, Graphite	Beryllium, Chromium, Copper, Germanium, Iron/Steel, Neodymium, Nickel, Tantalum, Tellurium, Vanadium, Yttrium	Cadmium, Indium, Molybdenum, Manganese	
Missiles	Aluminium	Chromium, Cobalt, Copper, Dysprosium, Iron/Steel, Neodymium, Nickel, Praesodymium, Samarium, Silicon Metal, Tantalum, Titanium, Tungsten	Borates, Lead, Lithium, Niobium, Molybdenum, Zirconium	
Ammunition	Aluminium, Graphite	Beryllium, Copper, Germanium, Neodymium, Tantalum, Tellurium, Titanium, Yttrium	Cadmium, Indium	
Torpedo	Aluminium	Chromium	Lead, Lithium, Manganese, Silver, Zirconium	
Assault Rifle	Iron/Steel, Vanadium			

Very High Risk High Risk Medium Risk Low Risk

Source: Girardi, Benedetta, Patrahu, Irina, Cisco, Giovanni, and Rademaker, Michel. "Strategic raw materials for defence. Mapping European industry needs." Hague Centre for Strategic Studies. January 2023.
See the Glossary at the end of chapter for an explanation of the military equipment.

What are the key constraints to increasing production?

Defence companies often cite a shortage of skilled labour in both the United States and Europe. In Europe, another challenge is finding available land for manufacturing. However, some defence companies are utilising spare capacity in the struggling auto sector, which is experiencing declining demand and workforce cuts. This shift corresponds with increased defence spending, particularly in Germany. Below are examples of converting industrial capacity from civilian auto and rail production to defence manufacturing.

Note: This list is not exclusive, nor should it be taken as a recommendation, but rather as a statement of fact, highlighting that it is possible to join up spare industrial capacity and newer demand in a productive manner.

Rheinmetall AG

Rheinmetall AG, Germany's largest defence company, is planning to convert two of its plants in Berlin and Neuss from producing automotive components to manufacturing ammunition and weapons. It is also considering acquiring Volkswagen's (VW) Osnabrück plant to adapt it for producing combat vehicles like the KF41 Lynx infantry fighting vehicle. Rheinmetall's CEO Armin Papperger described the Osnabrück facility as "very suitable" for military production. The company is also interested in other VW locations such as Dresden.[37]

Hensoldt AG

Hensoldt AG, a defence electronics company known for radar systems used in Ukraine, is negotiating to hire about 200 employees from major automotive suppliers such as Continental and Bosch, who face layoffs due to the automotive sector's downturn. Hensoldt has already begun outsourcing some production steps like circuit boards and is considering expanding this to wire harnesses and casings, leveraging automotive sector expertise and capacity. The company is also expanding production facilities in Baden-Württemberg, including Ulm.[38]

Krauss-Maffei Wegmann and Nexter Defence Systems (KNDS)

The Franco-German defence group KNDS has acquired a historic rail wagon factory in Görlitz, Germany, from Alstom. This factory, which has produced rolling stock for over 175 years, will be repurposed to manufacture parts for military vehicles such as the Leopard 2 tank, Puma infantry fighting vehicle and Boxer armoured vehicle starting in 2027. This is an example of converting industrial capacity from civilian rail production to defence manufacturing.[39]

Other automotive suppliers and synergies

ZF Friedrichshafen, an automotive supplier undergoing restructuring and plant closures, is in talks with undisclosed defence firms about transferring workers, highlighting potential industrial synergies between the automotive and defence sectors. Renk, a tank gearbox manufacturer, has also noted increased attention on scaling production capacities linked to the automotive sector. RENK is working with NXP, a key player in automotive, industrial and IoT digital solutions, to advance the digitalisation of RENK's drivetrain products.[40]

Conclusion

The main developments for this supply chain are increased digitisation and deployment of logistics software to gather and parse real time data to better model potential risks and their possible solutions. This gathering of huge quantities of data across multiple domains, and the need to process all of it in "real time" to quickly interpret risks and potential solutions, is exactly what the next industry is fast approaching: defence.

"The willingness of Germany and the rest of Europe to increase military spending to between 3.5% and 5% over the coming decades will lead to a rebuild of the European military industrial complex, which has been hollowed out over the past several decades. Armaments will now need to be built in Europe and therefore should boost economic growth as the industry resurges."

David Zahn, Head of European Fixed Income,
Franklin Templeton Fixed Income

Glossary for Exhibit 4

Fighter aircraft: Military aircraft designed primarily for air-to-air combat. In military conflict, the role of fighter aircraft is to establish air superiority of the battlespace.

Main battle tank (MBT): A large, armoured vehicle that provides direct fire and manoeuvrability. Often heavily armoured, the MBT has remained integral to ground force military doctrine for the last half-century.

Submarine: A warship with a closed streamlined hull that can be submerged and navigated under water, armed with torpedoes or guided missiles.

Corvette: A corvette is a small fast warship that is used to protect other ships from attack. It is equipped with Electronic Warfare System and Close in Weapons Systems. It also has a helicopter landing deck.

Artillery: Mounted projectile-firing guns or missile launchers, mobile or stationary, light or heavy, as distinguished from small arms.

Missiles: Rocket-propelled weapon designed to deliver an explosive warhead with great accuracy at high speed. Missiles vary from small tactical weapons that are effective out to only a few hundred meters (anti-tank) to much larger strategic weapons that have ranges of several thousand kilometers. Missiles can also be interceptors aimed at stopping the enemy missiles by exploding in the air.

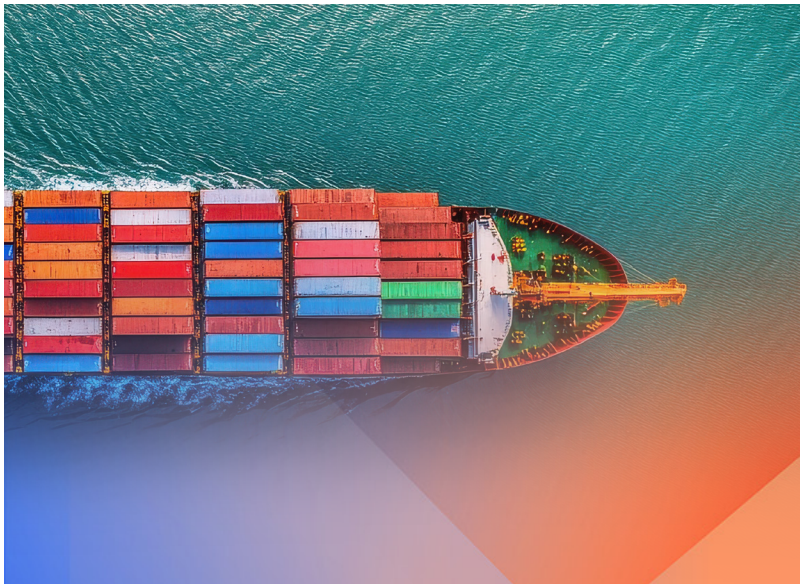
Ammunition: Also known as ammo, is the material fired, scattered, dropped, or detonated from any weapon or weapon system.

Torpedo: An underwater ranged weapon launched above or below the water surface, self-propelled towards a target, with an explosive warhead.

Assault rifle: Military firearm that is chambered for ammunition of reduced size or propellant charge and has the capacity to switch between semiautomatic and fully automatic fire. They are light and portable yet still able to deliver a high volume of fire with reasonable accuracy at modern combat ranges of 300–500 meters.

Chapter 4

Weaponising shipping for supply chains



Global supply chains face structural challenges

Global supply chains are being recalibrated to **erode** efficiency and profitability, in the name of compliance with geoeconomic policy imperatives. In a world where everything has the potential to be weaponised, companies need to have customs and policy information in real time to inform business decisions around the deployment of capital, and investment returns are highly dependent on these decisions.

Shipping is integral to the global supply chains

The shipping industry plays a critical role in global trade, transporting[41] approximately 11 billion tons of goods every year. Around two billion tons of crude oil, one billion tons of iron ore and 350 million tons of grain cross the seas each year. The logistics involved in these shipments far exceed the capabilities of road, rail or air transport.

These raw materials are essential for countries to develop industries, construct urban areas, accommodate and transport populations and convert resources into refined products for export. This value addition stimulates prosperity and enables developing nations to expand their economies. Furthermore, substantial quantities of chemicals, refined fuels and manufactured goods are transported by sea. Like the global industrial supply chains, the shipping sector has perfected sophisticated logistics chains that ensure timely delivery of parts and goods to manufacturers and consumers. For instance, avocados are meticulously shipped from Chile, timed to arrive in Europe precisely when they reach peak ripeness. And on a per-ton basis, shipping has the lowest environmental footprint in the transport sector.

Most importantly, up until now, it is also the cheapest transportation per ton. According to the International Chamber of Shipping, sea transport contributes US$5 to the US$100 cost of a pair of Nike trainers, or 20 pence to the £5 cost of a bottle of wine.

For the EU, shipping accounts for 80% of total exports and imports by volume, and some 50% by value.[42] For the United States, it is 70% of trade weight and 40% by value.[43]

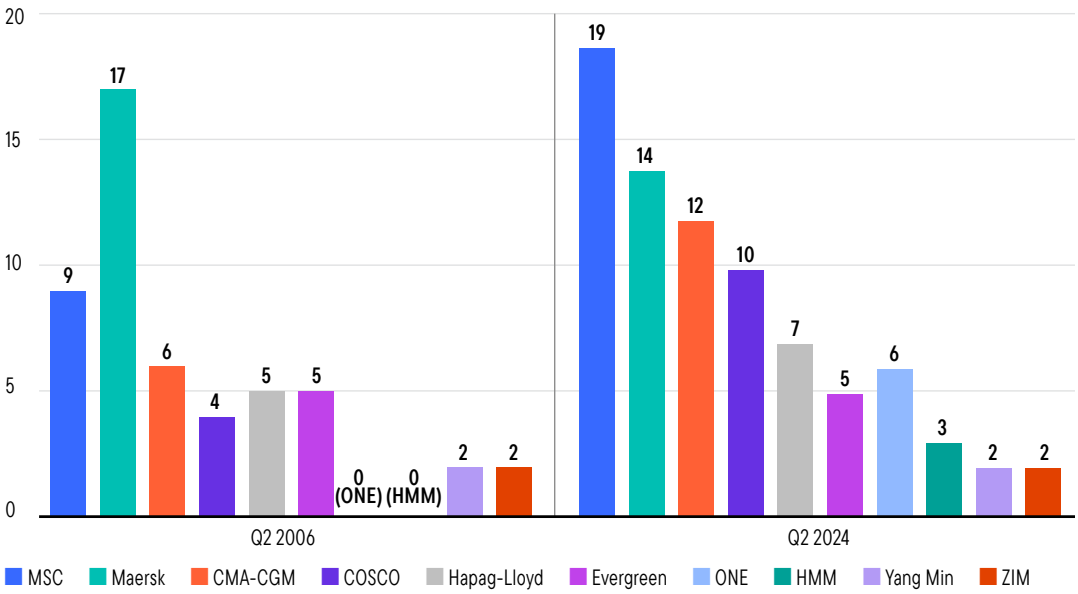
But all of that could be about to change, complicating the outlook for global supply chains.

The leaders are European, with MSC (Italy), Maersk (Denmark), CMA CGM (France) and Hapag-Lloyd (Germany) occupying four of the top five[44] positions in containers. US-built or US-registered ships do not figure in the rankings.

The United States has 122 navy cargo ships, of which only 16 are suitable for dry cargo.[45] Logically for a capitalist country, the US military has become the most reliant in the world on logistics support from the private sector. What firms does the US Navy use most intensively? Maersk (Denmark), CMA CGM (France) MSC (Switzerland) and Hapag-Lloyd (Germany)—these firms together control over 54% of global container shipping capacity. The US Merchant Marine has 185 ships[46] and the Ready Reserve Fleet, numbering 45 ships, has an average age of over 45 years.[47]

Who are the leaders in global shipping capacity?

Exhibit 5: Share of Top 10 Liner Operators in the Total Container Fleet Capacity



Source: United Nations Conference on Trade and Development (UNCTAD) calculations, based on MDS Transmodal data. Accessed May 2024.

The Jones Act retains a powerful influence

What is the main reason for this situation? Analysts cite the Merchant Marine Act of 1920. Commonly known as the Jones Act,[48] it was originally put forward as a plan to guarantee ship-building and crewing capacity for wartime or in national emergencies. It does so by restricting domestic US shipping services to ships that are US-built, US-owned and US-crewed. Today, 105 years later, it is easy to see that it has failed in its central objective.

America's decline in commercial shipbuilding has been catastrophic. In 1975, US shipyards produced 70 vessels per year, while in 2024, they produced five. Meanwhile, China produced 1,000.[49] For every 359 large container ships built by China, the United States is building one.[50]

The Jones Act effectively protects US shipyards from foreign competition, thus making both the ships and the shipping services more expensive. The higher cost of transportation by locally built ships incentivised increased use of trucks and rail for moving goods between ports, decreasing demand for new vessels.

As often happens when legislation does not deliver on its stated objectives, it persists because of lobbying by the beneficiaries. In this case, it is the domestic shipyards and labour unions[51] that brought the latest petition, helped no doubt by the generalised focus on national security. And a practical obstacle to reforming the Jones Act is that no fewer than 16 congressional committees and six federal agencies have some form of oversight authority.[52]

However, the US Navy has a pressing need to rebuild its deep-water fleet; most US shipyards would be classified as Tier 2 by global standards, with constrained capacity in the few Tier 1 facilities. The previous administration approved the sale of the loss-making Philly Shipyard in Philadelphia to South Korean shipbuilder Hanwha Ocean in September 2024. This was a precedent-setting move, injecting capital and know-how into a strategic industry. The reality is, however, that rebuilding scale and quality will likely take time as well as effort.

Meanwhile, Japanese shipyards stand to win contracts for bulk carriers and tankers, and the Pentagon is also exploring the possibility of establishing military repair facilities in Australia, the Philippines, Japan, Singapore and South Korea to try to make up lost ground.

The reasons why China has made progress in shipbuilding lie in the cyclical nature of the industry, its labour-intensive character and its reliance on skilled and experienced workers. This has meant that the Chinese policy of encouraging mixed civilian and military shipyards has been critical as it has enabled yards to maintain higher capacity-utilisation rates over time, gain economies of scale and build a skilled workforce quicker. Scale has led to higher cost efficiency, and today it is estimated that Chinese yards were responsible for half the world's production last year.

Conclusion

Investors should not underestimate the coming disruption of trade with the United States because of these measures, and although there will be increased investment in building a US commercial fleet over time, it will have to wait for US Navy orders to be completed first. Consequently, leveraging the capabilities of reliable allies such as South Korea and Japan is welcome. Just as defence manufacturers from these countries are benefiting from European rearmament, their shipyards are likely to benefit from forthcoming US orders.

Appendix 3: World fleet ownership by capacity in dead weight tons and flag of registration, as of 1 January 2024

		Number of vessels			Dead weight tons				
	Country or territory of ownership	National flag	Foreign flag	Total	National flag	Foreign flag	Total	Foreign flag as a percentage of total	Total as a percentage of world dead weight
1	Greece	580	4,406	4,992	49,985,667	344,971,148	394,977,181	87.3	16.9
2	China	6,600	2,772	9,418	130,737,555	178,336,427	309,870,897	57.6	13.3
3	Japan	959	3,142	4,104	38,689,931	203,666,970	242,366,672	84	10.4
4	Singapore	1,350	1,445	2,824	67,827,285	78,156,951	146,047,319	53.5	6.3
5	Hong Kong, China	869	1,104	2,000	76,961,461	57,939,090	135,586,887	42.7	5.8
6	Republic of Korea	826	852	1,688	19,896,324	77,045,438	97,020,891	79.4	4.2
7	Germany	172	1,918	2,091	7,492,926	66,931,088	74,427,230	89.9	3.2
8	Taiwan, Province of China	144	890	1,043	5,826,691	54,846,644	60,735,889	90.3	2.6
9	United Kingdom including Isle of Man	334	928	1,267	9,070,489	47,538,877	56,980,416	83.4	2.4
10	Norway	936	898	1,836	17,331,399	36,441,844	53,903,936	67.6	2.3
11	Bermuda	0	420	420	—	52,293,715	52,293,715	100	2.2
12	United Arab Emirates	130	1,291	1,427	596,404	50,624,996	51,247,355	98.8	2.2
13	United States including Puerto Rico	770	1,010	1,788	10,477,424	39,245,905	50,416,065	77.8	2.2
14	Türkiye	401	1,619	2,030	6,623,393	40,174,680	46,849,025	85.8	2
15	Switzerland	14	647	661	835,748	40,293,135	41,128,883	98	1.8
16	India	926	345	1,275	17,670,993	23,006,477	40,697,051	56.5	1.7
17	Denmark	399	373	772	20,313,094	18,447,451	38,760,545	47.6	1.7
18	Indonesia	2,398	132	2,540	28,277,194	3,430,913	31,980,209	10.7	1.4
19	Monaco	0	337	337	—	31,699,502	31,699,502	100	1.4
20	Cyprus	113	311	424	3,939,325	25,272,183	29,211,508	86.5	1.3
21	Belgium	81	211	292	7,038,164	17,182,252	24,220,416	70.9	1
22	Russian Federation	1,551	269	1,828	10,708,028	10,997,997	21,726,655	50.6	0.9
23	Islamic Republic of Iran	240	13	254	18,340,397	679,712	19,021,661	3.6	0.8
24	France	144	309	453	4,145,965	14,162,666	18,308,631	77.4	0.8
25	Kingdom of the Netherlands	650	536	1,186	5,437,806	12,600,744	18,038,550	69.9	0.8
26	Vietnam	938	212	1,158	12,097,561	5,446,178	17,561,034	31	0.8
27	Saudi Arabia	176	122	300	14,023,679	2,555,698	16,583,171	15.4	0.7
28	Brazil	297	86	384	4,687,509	9,423,957	14,116,966	66.8	0.6
29	Italy	420	163	583	6,789,366	6,762,515	13,551,881	49.9	0.6
30	Malaysia	442	164	618	6,435,077	3,539,337	10,016,263	35.3	0.4
31	Canada	216	158	375	2,645,448	7,351,057	9,996,989	73.5	0.4
32	Nigeria	218	72	298	5,341,412	3,371,996	9,344,789	36.1	0.4
33	Oman	3	69	72	518	7,727,130	7,727,648	100	0.3
34	Qatar	47	88	135	608,178	7,006,679	7,614,857	92	0.3
35	Bangladesh	276	6	282	5,107,202	190,469	5,297,671	3.6	0.2
	Top 35	**23,620**	**27,318**	**51,155**	**615,959,613**	**1,579,361,821**	**2,199,328,358**	**71.8**	**94.2**
	World	**26,692**	**30,135**	**58,173**	**650,553,871**	**1,650,129,315**	**2,334,036,650**	**70.7**	**100**

Source: UNCTAD calculations, based on data provided by Clarksons Research Services. Note: Propelled seagoing vessels of 1,000 gross tons and above, as of 1 January 2024. The totals include vessels for which the flag is unknown. Thus, the sum of national and foreign flags equals the total. Foreign flag as a percentage of total is calculated as share of vessels with known flag.

Chapter 5

Weaponising supply chain finance

The 78-year-old global trade architecture is being overturned

At Yalta in 1945, Roosevelt, Churchill and Stalin failed to reach an agreement on how to reconstruct Europe and maintain security on the Continent. The United States and United Kingdom wanted to ensure that democracies would flourish and that disputes would be peacefully resolved through international organisations, while the Soviet Union insisted on managing the internal affairs of the countries they controlled.

As part of the "Truman Doctrine" to contain the Soviet Union, the Western allies created the General Agreement on Tariffs and Trade (GATT), the foundations of the global trading system. Eventually, the World Trade Organisation (WTO) was set up in 1995, and enabled decades of economic growth-enhancing trade flows across the globe. Today, the United States appears to be forcing a radical breakup of the system in favour of an isolationist model, which means reducing imports into the country by way of tariffs and other barriers to trade. We are on the threshold of a new era, with profound consequences for investors.

Investment takeaway

Regardless of the rights and wrongs of this deglobalisation move, this process implies a change in the financial plumbing of the world's trading system, with potentially profound effects on investors.

Efforts to develop new financial plumbing for global trade will intensify

SWIFT (Society for Worldwide Interbank Financial Telecommunications) is the dominant payments system in the world. It was built to create standards for international bank messaging, which facilitates commercial activity and international trade. It serves 11,500 banks in more than 200 countries and processes an average of 44.8 million[53] messages per day. It is a user-owned cooperative with a focus on efficient operations. The actual funds clearance and settlement uses the Federal Reserve-owned CHIPS (Clearing House Interbank Payments System), with an average daily transaction value of US$1.8 trillion.[54]

China set up a competitor in 2014 called Cross-Border Interbank Payment System (CIPS), for the purpose of supporting renminbi (RMB) settlement and making RMB transactions more attractive. The People's Bank of China (PBOC) supervises it and it requires direct members to be under the PBOC's jurisdiction. It serves 77 direct and 1,283[55] indirect participants with an average daily transaction value of nearly US$56 billion.[56] It is estimated that as much as 80%[57] of its transactions rely on SWIFT messaging. Meanwhile, Russia developed its own System for the Transfer of Financial Messages (SPFS in Russian) after the nation was sanctioned for the annexation of Crimea in 2014. It serves domestic Russian banks and around 50 foreign banks, mainly from Central Asia, although there have been announcements of central banks in India,[58] Iran and China also connecting to facilitate payments.

Investment takeaway

The expectation is that in a scenario of an explicitly protectionist United States, the volume of trade overall will probably fall, predominantly trade with the United States. Logically, China and Russia will likely paint this as a crisis in confidence in the United States and redouble their efforts to widen the use of their alternative payment systems.

Who wants to de-dollarise?

The United States has used its strong financial sector to influence other countries. However, rising geopolitical tensions are leading to trade regionalisation. More countries are creating payment systems to reduce reliance on the US dollar (USD) by settling transactions in local currencies through bilateral currency swap lines. While these do not currently threaten USD dominance, they fragment the global payment system, raising efficiency and stability concerns, according to the International Monetary Fund (IMF).[59]

The BRICS+ group is incentivised to develop a non-USD-based financial system, with China, Russia and Iran aiming to hedge against United States and Western sanctions. China's dominance in this group is expected to enhance its global influence through the explicit strategy[60] to internationalise the RMB. The RMB's share in reserves and trade is likely to grow moderately, especially among BRICS+ members, although capital controls may limit this growth in the short to medium term. China is likely to continue to focus on increasing acceptance of its CIPS and Central Bank Digital Currencies (CBDC). It is claimed that intra-BRICS trade is now 65%[61] in their own currencies, relegating the USD to 33%, although that data is hard to verify. What is clear is that there is evidence of the wider use of RMB, as is the case of Saudi Arabia accepting RMB as payment for some oil exports, as per S&P Global.[62]

Russia is motivated to establish a rival to the G7 to bypass Western sanctions and challenge USD hegemony. Despite prioritising geopolitical ambitions over economic diversification, Russia's drive to expand BRICS+ and confront the West is evident. This effort serves both practical and propaganda purposes, demonstrating Russia's leadership in global affairs.

King USD?

Typically, trade is settled in the most liquid currency acceptable to both sides, largely because of the lower transaction costs. This means that for certain less liquid currencies, it is worthwhile to add the USD as the intermediate step. The BRICS have been explicitly incentivising the use of their own currencies as a policy, which suggests a continuous increase in the use of other currencies at the margin. This is a structural change, as the PBOC increases its credit lines for trade in RMB and the United Arab Emirates (UAE) dirham becomes more prevalent in this grouping over time.

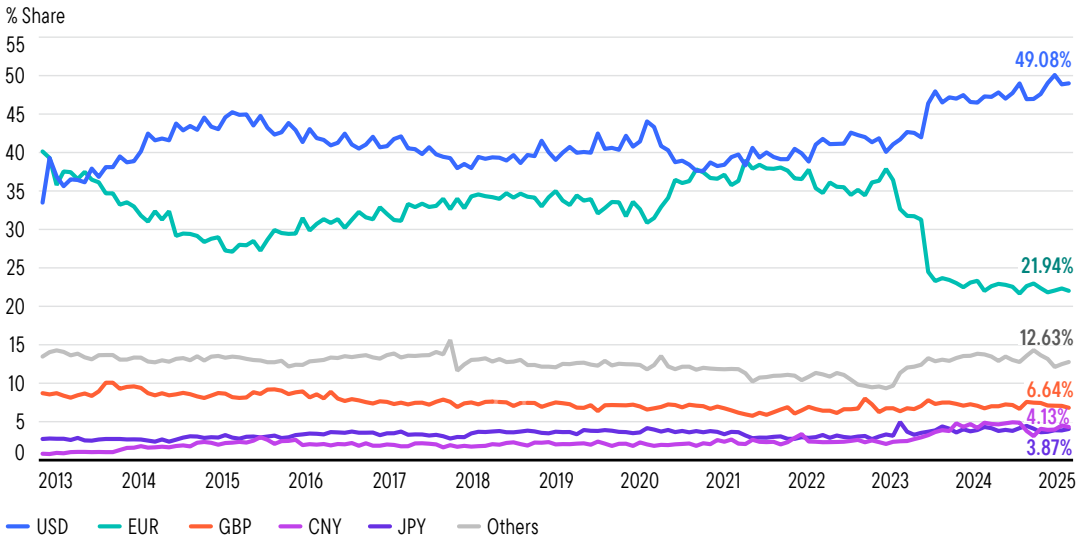
Investment takeaway

If the United States builds a tariff wall, international trade will decrease, reducing demand for USD. This trend may continue if more countries join trade agreements like the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP)[63] or the Regional Comprehensive Economic Partnership (RCEP),[64] which represented 45%[65] of global trade in 2024 and excluded the United States. Despite this, the USD still accounts for 49%[66] of global payments.

Exhibit 6: US Dollar Most Often Used for Global Payments

Currency Used Most Often for Global Payments through SWIFT Systems

As of March 2025



Sources: SWIFT, Macrobond. Note: Based on value.

Digital currencies are advancing at the margin

The definition of money is evolving beyond traditional government-backed fiat currency and alternative mediums of exchange and payment are emerging, like CBDCs. However, progress in cross-border payments has lagged due to high costs, low speed, limited access and insufficient transparency. Efforts to enhance cross-border payments are focused on improving interoperability, upgrading legal frameworks and creating better data messaging standards.[67]

The Atlantic Council reports that 134 countries, accounting for 98% of global gross domestic product, were exploring CBDCs in 2024. Eleven G20 nations have advanced pilot programs. The digital euro is in a two-year preparation phase ending in 2025, with some transactions already tested. Brazil, Japan, India, Australia, South Korea, South Africa, Russia and Türkiye are also conducting pilots. China leads with its digital yuan (e-CNY), which has reached 260 million wallets in 25 cities. In October 2023, PetroChina completed its first international crude oil trade using e-CNY.[68]

As an instrument of trade, CBDCs and their development clearly have a geopolitical element. Reduced transactional friction between certain countries should encourage commerce and the growth of new trading routes. This is likely to strengthen some trading networks but challenge others. Notable examples of developments at this international level in 2024 alone include:

- Project mBridge, a collaboration between the Bank of International Settlements (BIS) Innovation Hub and the central banks of Thailand, the UAE, Hong Kong, China and Saudi Arabia, has reached its minimum viable product phase.[69]
- India and the UAE signed a memorandum of understanding to "jointly conduct proof of concept and pilots of a bilateral CBDC bridge to facilitate cross-border CBDC transactions of remittances and trade."[70]
- The Bank of Russia is ready to test digital currencies for settlement of transactions with China and the countries making up the Eurasian Economic Union—Belarus, Kazakhstan, Armenia and Kyrgyzstan. Russia's finance minister also disclosed that it is looking at CBDC initiatives with the oil-rich Gulf nations and potentially other BRICS nations—Brazil, India and China.[71]

These efforts illustrate how having an ability to plug into the new payment infrastructure may become not just a matter of convenience or efficiency, but a matter of strategic importance to compete in a changing world. For more on this topic, please see The Future of Investing: Future of Money article by Sandy Kaul and Robert Crossley from Franklin Templeton Industry Advisory Services.

Investment takeaway

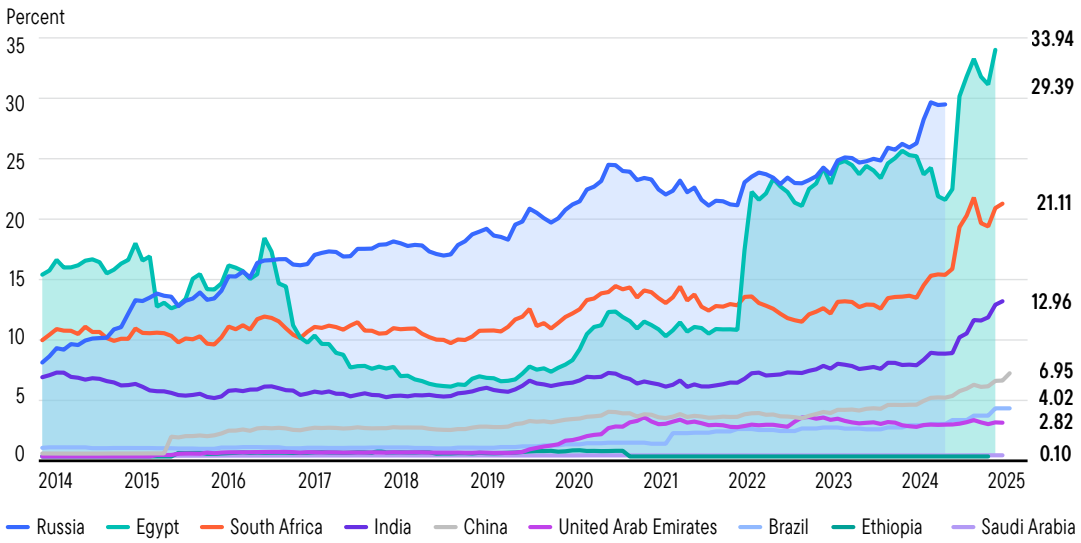
In a "multipolar" world, there is a generalised move away from using the USD as the dominant currency for trade finance. Since increasing volumes of trade are likely to be completed between countries of the "Global South" who tend to do a lot of government-to-government deals, it seems logical to expect increasing use of CBDCs, rather than traditional currencies.

Foreign exchange reserves unaffected for now

The IMF's latest Currency Composition of Official Foreign Exchange Reserves (COFER),[72] shows the value of currencies in foreign reserves is down -4.8% over the last five years, eroded by sustained purchases of gold, which is not captured by COFER. Within COFER, the USD is still the most widely held reserve currency, accounting for 58% of total. The euro is second at 20%, followed by the Japanese yen (5.8%), British pound (4.7%), Canadian dollar (2.8%) and Chinese RMB (2.18%). However, gold has been growing at the BRICS+ central banks, as can be seen in Exhibit 7.

Exhibit 7: Gold Is Increasing its Share of BRICS+ Central Bank Reserves

Gold as a Percent of Total Reserves
As of March 2025 or latest available



Sources: IMF, Macrobond. Note: Data for Iran not available.

Conclusion

The USD and the euro are two major currency blocs that coexist with multiple floating currencies. The USD bloc is the largest, although this could change if Beijing were to "unpeg" its currency from the USD.[73] China's capital controls and history of unilaterally adjusting the effective exchange rate to its advantage reduce the likelihood of a RMB bloc forming soon.

China aims to internationalise the RMB to increase its global influence and protect against potential sanctions. The RMB's share in global reserves and trade will grow, especially with BRICS+ members, though lifting capital controls is unlikely in the near term. Efforts to use CIPS and CBDC for financial transactions will likely continue, aiming to shield countries from future sanctions and reduce reliance on SWIFT and CHIPS.

Increased trade among non-G7 countries may boost CBDC usage. Investors should monitor alternatives like CIPS, RMB acceptance in BRICS+ trade and cross-border CBDC projects like mBridge, as these developments could affect the demand for US Treasury bonds. Despite potential changes, we believe the USD is likely to remain the preferred global reserve currency due to its incumbency, liquidity, efficiency and confidence.

Investors have a fiduciary duty to regularly re-evaluate the possibility that this trajectory could eventually lead to a reduced global appetite for US Treasury bonds, although the likelihood remains low at present, in our view. Key indicators for investors to monitor include the development of alternative financial systems like CIPS, the acceptance level of the RMB in intra-BRICS+ trade and the evolution of cross-border wholesale CBDC projects like mBridge, which connects China, Thailand, the UAE and Hong Kong, and is expected to expand to 11 countries this year. In our opinion, this will be the real test case for a potential replacement of SWIFT in the future.

Ultimately, barring significant changes to institutional strength in the United States (for example, loss of independence of the Federal Reserve) we expect the USD to remain the preferred global reserve currency in the foreseeable future. Even as other currencies increase their participation in foreign reserves, trade invoicing and transactions, incumbency, liquidity, efficiency and confidence in the USD mean there is no obvious single challenger in the medium term.

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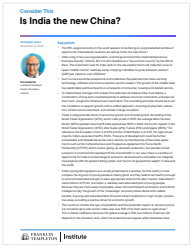

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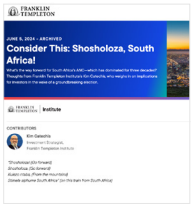
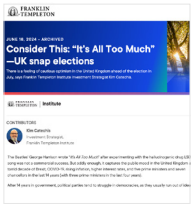
What's the way forward for South Africa's ANC—which has dominated for three decades? Thoughts from Franklin Templeton Institute's Kim Catechis.



June 2024

Consider This: "It's All Too Much"—UK snap elections

There is a feeling of cautious optimism in the United Kingdom ahead of the election in July.



July 2024

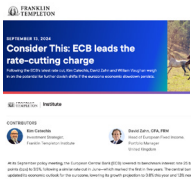
Consider This: I'm a gnu—spelled G-N-U

A coalition government in South Africa that includes the Democratic Alliance is likely to raise hopes (and expectations) of a new world of rational liberal economic policy.

September 2024

Consider This: ECB leads the rate-cutting charge

Following the ECB's latest rate cut, Kim Catechis, David Zahn and William Vaughan weigh in on the potential for further dovish shifts if the eurozone economic slowdown persists.



February 2025

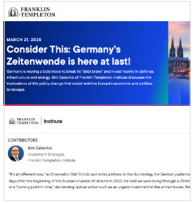
Consider This: Could Europe build a structural advantage via cheap electricity?

Kim Catechis explores the new economic and geopolitical order that is shaping up, the key players, and the critical role of energy security.

March 2025

Consider This: Germany's Zeitenwende is here at last!

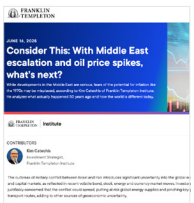
Germany is making a bold move to break its "debt brake" and invest heavily in defense, infrastructure and energy.



June 2025

Consider This: With Middle East escalation and oil price spikes, what's next?

While developments in the Middle East are serious, fears of the potential for inflation like the 1970s may be misplaced, according to Kim Catechis.



Endnotes

1. Source: Power Engineering. 20 December 2024.
2. Source: "Global electricity demand: What's driving growth, and why it matters." The Oxford Institute for Energy Studies. January 2025.
3. Source: Fleck, Anna. "Which Countries Have The Most Data Centers?" Statista.com. 20 September 2024. The author calculated the amount for European data centres using information in this article quoted from Cloudscene platform data as of March 2024.
4. Source: "Virginia State Profile and Energy Estimates." US Energy Information Agency. Accessed 20 April 2025.
5. Source: "To Secure Undersea Cables, Take Lessons from the British Empire's All-Red Line." US Naval Institute, Proceedings, Vol. 150/7/1,457. July 2024.
6. Source: theverge.com. 16 April 2024.
7. Brett's Submarine Telegraph Company laid the first ocean cable in 1850 across the English Channel.
8. Severing Taiwan's cables is considered the first step of a Chinese war plan to besiege or invade the island.
9. Source: "Cableships of the World." International Cable Protection Committee (ICPC). 27 March 2025. Note: Only three Chinese ships appear on this register, which seems unlikely to be a true picture.
10. Source: "US Warns Telcos That Chinese-British Submarine Cable Repair Ships Are a Security Risk." commsrisk.com. 14 June 2024.
11. Source: Notice of Final Determination on 2023 DOE Critical Materials List, a notice by the Energy Department. Federal Register. 4 August 2023.
12. Source: "An EU critical raw materials act for the future of EU supply chains." European Council. 18 March 2024.
13. Source: "Restructuring of Critical Mineral Supply Chain Faces 'Trilemma.'" JRI Research Journal, Vol. 7, No. 2. Japan Research Institute. 23 January 2024.
14. Source: "The Role of Critical Minerals in Clean Energy Transitions." International Energy Agency (IEA), World Energy Outlook Special Report. March 2022.
15. There is no assurance that any estimate, forecast or projection will be realised.
16. Source: Critical Minerals & Materials Program, Final Critical Minerals List 2023. US Department of Energy.
17. Source: "What are rare earth elements, and why are they important?" American Geosciences Institute.
18. The concept of specialisation (division of labour) was pioneered by Adam Smith. Adam Smith Institute.
19. Sources: UNCTAD and Statista. 31 July 2024.
20. Source: "China bans export of rare earth processing technologies." *Financial Times*. 21 December 2023.
21. Source: "Global Critical Minerals Outlook 2024." IEA.
22. Source: "Resilience for the Future: The UK's Critical Minerals Strategy." UK Department for Business & Trade. Updated 13 March 2023.
23. This term refers to the ideas of the political philosopher Thomas Hobbes (1588–1679), especially the idea that humans (and nations) naturally compete and fight for their own interests, absent a set of laws to constrain them.
24. Source: "The Consequences of China's New Rare Earths Export Restrictions." Center for Strategic & International Studies. 14 April 2025.
25. Source: "Q&A: Trump's Executive Order on US Domestic Mineral Production." Center on Global Energy Policy at Columbia SIPA. 21 March 2025.
26. Source: "Rebuilding the Arsenal of Democracy." Center for Strategic & International Studies. March 2024.
27. Source: "What Are Critical Materials and Critical Minerals?" US Department of Energy. 2023.
28. Source: "Section 232 Actions on Processed Critical Minerals and Derivatives Products." The White House. 15 April 2025.
29. Source: "DoD Enters Agreement to Expand Domestic Lithium Mining for US Battery Supply Chains." US Department of Defense.
30. Source: "Teck CEO says miner could sell to Asia to avoid Trump's new tariffs." Reuters. 4 March 2025.
31. Source: "What Are Critical Materials and Critical Minerals?" US Department of Energy.
32. Source: "An EU critical raw materials act for the future of EU supply chains." European Council. 18 March 2024.
33. Source: "Automotive Supply Chain: Pursuing Long-Term Resilience." Capgemini Institute. 2023.
34. Source: "Volkswagen to invest in mines in bid to become global battery supplier." Reuters. 17 March 2023.
35. Source: "Winning the Industrial War: Comparing Russia, Europe and Ukraine, 2022-2024." Royal United Services Institute (RUSI). 3 April 2025.
36. Source: The Hague Centre for Strategic Studies, "Strategic Raw Materials for Defence." January 2023.
37. Source: "Rheinmetall to convert German factories to make defence equipment." Reuters. 24 February 2025.
38. Source: "Hensoldt Offers to Take Over Continental, Bosch Workers." Bloomberg. 31 January 2025.
39. Source: "Historic German train factory to build tanks under new deal." Deutsche Welle. 2 May 2025.
40. Source: "ZF progresses with strategic realignment." zf.com. 20 March 2025.
41. Source: "Shipping and world trade: driving prosperity." International Chamber of Shipping. As of 2020.
42. Source: Ibid.
43. Source: "On National Maritime Day and Every Day, U.S. Economy Relies on Waterborne Shipping." US Bureau of Transportation Statistics. 12 May 2021.
44. Source: UN Trade and Development (UNCTAD) calculations, based on MDS Transmodal data.
45. Source: Ship Inventory. US Navy's Military Sealift Command.
46. Source: Number and Size of the U.S. Flag Merchant Fleet and Its Share of the World Fleet. US Dept of Transportation, Bureau of Transportation Statistics.
47. Source: "As Prepared: Navy League of the U.S. Sea-Air-Space Service Chiefs Panel." US Department of Transportation, Maritime Administration. 3 April 2023.
48. The Jones Act is Section 27 of the Merchant Marine Act of 1920. However, the terms "Jones Act" and "Merchant Marine Act of 1920" are commonly used interchangeably, including by the US Maritime Administration (MARAD). See, for example, "The Maritime Administration's First 100 Years: 1916–2016." US Department of Transportation, US Maritime Administration.
49. Source: "China far outpacing US in military, commercial ship numbers." VOA news. 9 March 2025.
50. Source: "Select Committee on CCP Holds Hearing – From High Tech to Heavy Steel: Combatting the PRC's Strategy to Dominate Semiconductors, Shipbuilding and Drones." House Select Committee on the CCP. 26 June 2024.
51. Source: Section 301-China-Targeting the Maritime, Logistics, and Shipbuilding Sectors for Dominance. Office of the United States Trade Representative. The five labour union petitioners are the United Steel, Paper and Forestry, Rubber, Manufacturing, Energy, Allied Industrial and Service Workers International Union, AFL–CIO CLC (USW), the International Brotherhood of Electrical Workers (IBEW), the International Brotherhood of Boilermakers, Iron Ship Builders, Blacksmiths, Forgers and Helpers, AFL–CIO/CLC (IBB), the International Association of Machinists and Aerospace Workers (IAM) and the Maritime Trades Department of the AFL–CIO (MTD).

52. "The Jones Act: A Burden America Can No Longer Bear." Cato Institute. 28 June 2018.
53. Source: Swift Traffic Highlights. swift.com. 2022.
54. Source: The Clearing House. February 2024.
55. Source: "The 2023 RMB Internationalization Report." People's Bank of China. As of 2022.
56. Source: Ibid.
57. Source: "Sanctions, SWIFT and China's Cross-Border International Settlement System." CSIS. 20 May 2022.
58. Source: "India Signs Deal to Adopt Moscow's SPFS System for Banking Payments to Russia: Report." The Wire. 25 April 2023.
59. Source: IMF Conference on Geoeconomic Fragmentation. 25 May 2023.
60. Source: "The 2023 RMB Internationalization Report." People's Bank of China. As of 2022.
61. Source: "The BRICS Are Accelerating Their Transition to Local Currencies." Cointribune. 8 May 2025.
62. Source: "Saudi-China ties and renminbi-based oil trade." S&P Global. 20 August 2024.
63. CPTPP is an Asia-Pacific trade bloc made up of 11 countries plus the United Kingdom. The 11 original members are Australia, Brunei Darussalam, Canada, Chile, Japan, Malaysia, Mexico, New Zealand, Peru, Singapore and Vietnam.
64. The Regional Comprehensive Economic Partnership (RCEP) is a free trade agreement initially negotiated between the 10 members of ASEAN (Brunei-Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam) and six regional countries with which ASEAN has existing free-trade agreements (Australia, China, India, Japan, South Korea and New Zealand).
65. Sources: RCEP Trade Tracker, Asia Global Institute, 19 February 2025; "Key Developments that Shaped Global Trade in 2024," International Economics Consultancy, tradeeconomics.com, December 2024.
66. Sources: SWIFT, Macrobond. As of 2023.
67. Source: "Cross-border Payments." Financial Stability Board. 16 August 2024.
68. Source: Ross, Katherine. "Digital yuan used to settle crude oil trade for Chinese oil company: Report." Blockworks. 23 October 2023.
69. Source: "Project mBridge reaches minimum viable product stage and invites further international participation." Bank of International Settlements. 5 June 2024.
70. Source: Singh, Amitoj. "India and UAE to Collaborate on Developing Digital Currencies." CoinDesk. 15 March 2023.
71. Source: Pessarlay, Wahid. "Russia BRICS Bridge eyed for cross-border payments with China, Gulf countries." CoinGeek. March 2024.
72. Source: Currency Composition of Official Foreign Exchange Reserves (COFER). IMF. 25 April 2025.
73. China has managed its currency against a basket of currencies since 2005, and it would be logical to assume that the USD is a significant proportion of that basket.

WHAT ARE THE RISKS?

All investments involve risks, including possible loss of principal.

Commodity-related investments are subject to additional risks such as commodity index volatility, investor speculation, interest rates, weather, tax and regulatory developments.

Equity securities are subject to price fluctuation and possible loss of principal.

International investments are subject to special risks, including currency fluctuations and social, economic and political uncertainties, which could increase volatility. These risks are magnified in **emerging markets**.

The government's participation in the economy is still high and, therefore, investments in China will be subject to larger regulatory risk levels compared to many other countries. There are special risks associated with investments in **China, Hong Kong and Taiwan,** including less liquidity, expropriation, confiscatory taxation, international trade tensions, nationalisation, and exchange control regulations and rapid inflation, all of which can negatively impact the fund. Investments in Hong Kong and Taiwan could be adversely affected by its political and economic relationship with China.

An **investment in private securities** (such as private equity or private credit) or vehicles which invest in them, should be viewed as illiquid and may require a long-term commitment with no certainty of return. The value of and return on such investments will vary due to, among other things, changes in market rates of interest, general economic conditions, economic conditions in particular industries, the condition of financial markets and the financial condition of the issuers of the investments. There also can be no assurance that companies will list their securities on a securities exchange, as such, the lack of an established, liquid secondary market for some investments may have an adverse effect on the market value of those investments and on an investor's ability to dispose of them at a favourable time or price.

Investment strategies that incorporate the identification of **thematic investment opportunities**, and their performance, may be negatively impacted if the investment manager does not correctly identify such opportunities or if the theme develops in an unexpected manner. Focusing investments in the information technology and/or technology-related industries carries much greater risks of adverse developments and price movements in such industries than a strategy that invests in a wider variety of industries.

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Currency management strategies involve risk of losses if currencies do not perform as expected.

Digital assets are subject to risks relating to immature and rapidly developing technology, security vulnerabilities of this technology, (such as theft, loss, or destruction of cryptographic keys), conflicting intellectual property claims, credit risk of digital asset exchanges, regulatory uncertainty, high volatility in their value/price, unclear acceptance by users and global marketplaces, and manipulation or fraud. Portfolio managers, service providers to the portfolios and other market participants increasingly depend on complex information technology and communications systems to conduct business functions. These systems are subject to a number of different threats or risks that could adversely affect the portfolio and their investors, despite the efforts of the portfolio managers and service providers to adopt technologies, processes and practices intended to mitigate these risks and protect the security of their computer systems, software, networks and other technology assets, as well as the confidentiality, integrity and availability of information belonging to the portfolios and their investors.

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