



The Economics of Supply Chain Politics: Dual Circulation, Derisking and the Sullivan Doctrine

By Dan Ciuriak

This Verbatim develops and elaborates on remarks by the author at the Trade Policy Research Forum Webinar, “Friends making sense of Friend-shoring: Costs, Benefits and Prospects,” with Emily Benson, moderated by Mia Mikic, and hosted by Ben Shepherd and Hanna Norberg.

Dan Ciuriak is a Fellow in Residence at the C.D. Howe Institute and is Director and Principal, Ciuriak Consulting Inc. (Ottawa).

1 INTRODUCTION

The globalization of supply chains has been a significant source of economic growth over the past several decades. This was driven largely by firm-level decisions about how to organize production in the context of steeply falling transportation costs due to containerization and scaling up of container ships, the steep increase in long-distance air travel that facilitated long-distance high-value air cargo shipments, and steady improvements in border transit procedures such as single windows, electronic documents, advance rulings, etc. There have also been steep improvements in the supporting technologies for supply chain management and logistics, including *inter alia* steeply falling telecommunications costs, use of RFID codes for tracking shipments, and sophisticated logistics systems for monitoring and optimizing flows of production inputs enabling “just in time” business models. The evolution of this “made in the world” production system was also supported by

Keywords: supply chains, nearshoring, reshoring, friendshoring, allyshoring, derisking, decoupling, dual circulation, Sullivan Doctrine.

JEL Codes: F13, F15

reductions in tariffs at the multilateral level under the World Trade Organization (WTO) and through proliferating regional trade agreements (RTAs), many with robust dispute settlement arrangements; and the conclusion of the ambitious WTO Trade Facilitation Agreement (TFA) with strong buy-in from developing countries eager to participate in the global division of labour. These developments took place amid the dampening of political risk during the unipolar moment that followed the end of the Cold War and the enrollment of China and Russia, the two main geopolitical rivals to the United States, into the WTO system.

Today, that model is under attack with calls for reshoring, nearshoring and friendshoring (aka allyshoring) as well as related calls for decoupling and derisking. One set of arguments holds that recent events have highlighted the potential risks associated with this model, in particular the pandemic-related disruptions to supply and supply chains (including lockdown-related work stoppages, reductions in air travel, which interrupted high-value cargo transported by passenger aircraft, spiking freight shipping costs, and misaligned location of containers). These shocks re-awakened similar concerns previously raised by natural disasters such as the flooding in Thailand that disrupted computer chip supply chains and the Fukushima earthquake, underscoring for firms and governments the dangers of complacency.

A second set of arguments claims that globalization went too far in the enthusiasm for outsourcing/off-shoring and efficiency-seeking, resulting in a fragile system that was prone to disruption, while also driving a variety of negative impacts in the industrialized countries. The latter include distributional inequities as “good jobs” were off-shored to low-wage competitors, a decline in industrial skills in the advanced countries as they forgot how to “make things” as manufacturing was shipped out to China and elsewhere, and an undermining of regulatory safeguards as corporations used the threat of off-

shoring to pre-empt regulation, allowing them to thereby externalize (i.e., socialize) the costs of risk-taking rather than internalizing them.

A third set of arguments focuses on geopolitical rivalry and supports export controls to ensure dominance by democratic countries in critical new technologies such as artificial intelligence and green energy, as well as the use of wide-ranging sanctions in response to events such as Russia’s invasion of Ukraine and allegations of human rights violations such as forced labour in Xinjiang. Further, with the rising importance of ESG (environmental, social, and governance) considerations in corporate decision-making, companies have had to pay increasing attention to their externalities to manage reputation risks and to maintain their social license (Pérez et al. 2023). At the same time, companies have had to contend with rising political risks as countries adopt new doctrines in prosecuting their international rivalries. These doctrines include China’s “dual circulation” model, which prioritizes domestic self-sufficiency in a range of industrial areas (Zhang 2020; Collins 2001); the European Union’s attempt to walk the fine line between decoupling and full engagement with what it has termed “derisking” (Leino 2023); and what might be termed the Sullivan Doctrine in the United States, which sets out ambitious objectives for reorganization of global production systems and supply chains to preserve and extend America’s lead in critical technologies (Sullivan 2022).

Here, I explore the economics of the various “shorings” and the implications for supply chain organization of the new supply chain politics. We begin by distinguishing the various “shorings” conceptually and clarifying the underlying economics and how they relate to the alternative criteria of robustness, flexibility and resilience that have been adduced in the debate (often interchangeably).

Focusing on friendshoring and the related concepts of decoupling and derisking, we then consider the economic implications of incorporating political

objectives in supply chain restructuring, the entailed role of public subsidies in this process or alternatively the creation of economic rents for preferred suppliers through non-tariff measures that eliminate non-friend suppliers from bidding, and the implications for the rules-based system. Against this background, we unpack the economics of the new supply chain politics and its rivalries.

To preview the conclusions, the “made in the world” system that evolved under the World Trade Organization remains alive and well and actually builds in the desired supply chain features of robustness, flexibility and resilience. For most countries, it is entirely impractical to pursue self-reliance and responses to shocks are necessarily a combination of emergency preparedness (including stockpiles of critical supplies such as energy, food and medical equipment) and international sourcing. But even larger economies that are much less reliant on trade overall performed better during the pandemic disruptions when relying on the trade system to meet critical needs than when pursuing “me first” policies and self-reliance schemes.

Further, while industrial policies are irresistible to governments when major new technologies are in competitive play, the same rationales do not extend to most goods and services and thus do not constitute a general argument for playing supply chain politics. Supply chain organization should remain mostly within the purview of the firm, allowing the myriad firms participating in supply chains to adapt to changing economic and technological conditions to keep the system robust, flexible and resilient.

Finally, politically motivated supply chain restructuring implies potentially significant costs to the public purse, both in terms of subsidizing the restructuring of production at home and offsetting ongoing efficiency costs. Even more importantly, the weaponization of supply chains, such as called for under the Sullivan Doctrine, to gain short-term but likely transient advantages over China in developing

critical technologies raises much larger risks in the longer term, given that China has clearly established that its path to the technological frontier is open. In the life span of nations, whether China arrives there in five years or ten is likely of no material consequence. The tenor of relationships adopted during its approach to that frontier may, however, heavily influence the tenor when it arrives.

2 BACKGROUND: WHAT'S THE WORD ON SUPPLY CHAIN SHORINGS

In the debate over supply chain policies, there are several terms that are often used interchangeably, but which have distinct meanings. One of these terms is “**nearshoring**,” which refers to the practice of relocating production facilities closer to home in order to reduce shipping distance, time costs, and logistical complexity. Nearshoring is primarily concerned with the spatial length of the supply chain and involves trade-offs between choosing the optimal location for supply and the costs associated with shipping inputs. This is well-trodden turf conceptually in the study of the proximity-efficiency trade-off in the literature on the multinational corporation (MNC) and, of course, in practical experience as the MNC became a dominant force in the global economy in the 1970s and since.

As the global economy evolves and the relative cost and infrastructural advantages of particular locations change, firms will continually reassess their supply chain organization from this perspective. This could lead to a natural supply chain consolidation or shortening if, for example, the real wage advantage of a distant production location is eroded by rising real wages due to income convergence driven by globalization. Rising real wages is clearly part of the economic case for the relocation of some production out of China by MNCs to other parts of the world, including back to their home countries. Putting funded policies in place to promote this simply

socializes the private cost that MNCs would in any event absorb to optimize their global operations.

Another term that is often used is “**reshoring**,” which refers to the practice of bringing off-shored economic activity back to a nation’s own economy. While reshoring likely also shortens supply chains, its distinguishing feature is economic nationalism, explicit or not. In this regard, reshoring motivated by judgements that globalization has been harmful for a given economy could be supported by classic industrial policy considerations such as capturing gains from “learning by doing,” increasing local knowledge spillovers that drive innovation and dynamism, as well as conventional multiplier effects from the income generated by local economic activity. That being said, there are considerations about sectoral reallocation of resources that must be taken into account in pursuing reshoring as an economic strategy – ultimately, a policy-induced reallocation of resources toward one industry, even one deemed “strategic,” means giving up competitiveness in another.

As regards policy-driven reshoring to attenuate risks in international sourcing, this requires strategic assessments of the viability of the reshored activity in between crises (Ciuriak and Goff 2021; Grootendorst et al. 2022). Bown and Irwin (2021) describe the trajectory during the pandemic from the industrial-policy-induced expansion of supply of medical personal protective equipment to meet shortages, to the subsequent pleas for protection against dumping of foreign imports once the supply crunch passed.

Finally, there is the term “**friendshoring**,” which is inherently political in nature and is closely related to the concepts of decoupling and derisking that have been put in play in connection with the discussion of European and American relations with China. Friendshoring involves choosing suppliers based on political alliances or relationships rather than simply on a distance/efficiency trade-off or on pure domestic industrial policy objectives. The concept of friendshoring has gained prominence as concerns have risen about the weaponization of supply chains

in the new Cold War context. Given the US use of export restrictions to slow China’s technological advance (as will be discussed below) and China’s prior attempt to weaponize its dominant position in the production of rare earth elements (REEs) for advanced manufacturing applications, political risk has inevitably moved front and centre in private sector decisions on supply chain organization.

Friendshoring is closely related to the concept of “**decoupling**” in the context of trade in advanced technology between China and the West. Decoupling implies reducing or cutting off altogether the economic interdependence between the two regions in strategically sensitive goods and services. This could include limiting the flow of technology, data, or investment between the two regions.

The term gained prominence as the Trump Administration built an almost comprehensive tariff wall against China, matched by China against US imports, and increasingly stringent export controls, since extended by the Biden Administration, which established a “strike force” to identify supply chain bottlenecks and shortages (White House 2021). The Biden Administration has since expanded the scope of its policy under the Sullivan Doctrine, whose logical endpoint would be the emergence of separate but parallel production ecosystems for the new and foundational technologies of the digital age, with a de-Americanization of China’s supply chains and a de-Sinification of America’s. This of course has potentially far-reaching implications for small open economies like Canada’s that trade across the security divide. As Singapore Prime Minister Lee put it, “ASEAN member states do not want to choose sides. We want to engage all sides” (cited in Baharudin 2022).

Derisking is a term used in financial regulation that was recently introduced into this policy space by the European Union. It is related to decoupling and friendshoring in that it refers to the reduction or elimination of risk in business relationships across security divides (as opposed to operational risk from natural shocks such as the pandemic), but targets an

intermediate zone – decoupling à la carte as it were, as described by European Commission President Von der Leyen (2023):

“I believe it is neither viable – nor in Europe’s interest – to decouple from China. Our relations are not black or white – and our response cannot be either. This is why we need to focus on de-risk – not de-couple.

...most of our trade in goods and services remains mutually beneficial and ‘un-risky’. ... there are some areas where trade and investment poses risks to our economic and national security, particularly in the context of China’s explicit fusion of its military and commercial sectors. This is true for certain sensitive technologies, dual-use goods or even investment which comes with forced technology or knowledge transfers.

... after de-risking through diplomacy ... the second strand of our future China strategy must be economic de-risking ... That means recognising how China’s economic and security ambitions have shifted. But it also means taking a critical look at our own resilience and dependencies, in particular within our industrial and defence base. This can only be based on stress-testing our relationship to see where the greatest threats lie concerning our resilience, long-term prosperity and security.”

The term was picked up by Jake Sullivan in a speech setting out the new US doctrine vis-à-vis China (discussed below), echoing the distinction between derisking and decoupling.

In the context of supply chain discussions, de-risking requires considering three related concepts: supply chain robustness (the capacity to withstand a shock), resilience (the ability to rebound quickly from work flow disruption), and flexibility (the ability to adjust and adapt).

For a firm, business continuity is the primordial consideration. Measures can include maintaining

precautionary stocks of “just-in-time” inputs, having contingency plans in place for alternative production sites, and in general ensuring the ability to re-assign tasks within the supply chain in light of new conditions.

For nations, keeping the economy functioning in the face of supply disruptions means maintaining strategic reserves of energy, staple foods, and medical equipment. Moreover, these objectives are advanced by pursuing trade diversification through preferential trade arrangements with different regions to encourage the development of trade links and thus to increase the robustness of their economy. Unfortunately, while plans might be well framed, implementation may fail because emergency preparedness is usually not a priority in between emergencies.

When it comes to national supply chain policies, public sector risk calculations may sometimes need to override private sector decisions, particularly in cases where the potential costs of a supply chain disruption could have significant impacts on national security, public health, or other key priorities. This reflects fundamental differences in risk management between the public and private sectors, a consequence of the fact that social discount rates applied by the public sector are lower than discount rates applied in the private sector, and the unlimited liability of the public sector versus the limited liability of the private sector.

For example, in the case of critical inputs for national defence, the government may choose to subsidize domestic production even if it is more expensive than sourcing from abroad, in order to ensure that the supply chain is robust and resilient in the face of potential disruptions, including by hostile parties. The US government, for example, continues to retain production capacity for special purpose computer chips for its military, even though production of the commercial chips on which it also relies has been off-shored to Taiwan and Korea. Similarly, in the case of medical supplies or other critical inputs for public health, the government may

choose to support some level of domestic production in order to ensure that there is domestic supply capability that can be ramped up quickly to respond to emergencies. This can be done through producer subsidies for private sector suppliers, procurement at favourable rates (creating rents for the preferred supplier) or establishing state-owned enterprises that fulfill the public function on a non-market basis.

Multilateral rules accommodate measures genuinely necessary for defense, security, the protection of public health and the environment, and other potential emergencies; at the same time, they are framed to put boundaries on the invocation of these reasons for the purpose of protecting specific industries from competition. Recall in this regard, Sweden's failed attempt to maintain subsidies for footwear production on grounds that these were critical supplies for its army in times of war (WTO n.d.).

3 THE NEW SUPPLY CHAIN POLITICS

Against the background of the review of the concepts employed in the discussion of the new supply chain politics, we now turn to an examination of the three major doctrines in play: China's Dual Circulation; the EU's Derisking Doctrine; and the US's Sullivan Doctrine.

3.1 *Dual Circulation*

"Dual circulation" is a concept that China has adopted to characterize its efforts to insulate its domestic market from external disruption of its supply chains for resources and technology while maintaining its

global market access including through its Belt and Road Initiative.

Dual circulation involves two interrelated aspects:

- (a) Domestic Circulation: This refers to the promotion of domestic consumption as the main driver of China's economic growth. By boosting domestic consumption, China aims to reduce its reliance on exports and foreign markets, which it perceives as unstable and subject to external shocks.
- (b) International Circulation: This aspect refers to the promotion of China's international economic and trade relations, including through the Belt and Road Initiative. The Belt and Road Initiative is a massive infrastructure and investment project aimed at building connectivity and cooperation among countries in Asia, Africa, Europe, and beyond. It involves investments in ports, roads, railways, and other infrastructure projects, with the aim of creating new markets for Chinese goods and services and enhancing China's economic and political influence.

While dual circulation was first mentioned in a Xinhua report on a Politburo discussion in May 2020, it has deeper roots in China's industrial policy framework. Made in China 2025, adopted in 2015 (Malkin 2018), set ambitious targets for expanding Chinese content in advanced technology sectors so as to reduce China's reliance on foreign suppliers and to increase its capabilities in information technologies, particularly computer chips, which it viewed as being critical enablers for breakthroughs in other technological domains.¹

The pandemic-related supply chain shocks and the launch of the trade and technology war on China by the Trump Administration put a priority on

1 The Made in China 2025 priority sectors were: 1) New advanced information technology; 2) Automated machine tools & robotics; 3) Aerospace and aeronautical equipment; 4) Maritime equipment and high-tech shipping; 5) Modern rail transport equipment; 6) New-energy vehicles and equipment; 7) Power equipment; 8) Agricultural equipment; 9) New materials; and 10) Biopharma and advanced medical products (Kennedy 2015). These were commonly targeted by all the leading economies at time under similar schemes, including the US Advanced Manufacturing initiative, Germany's Industry 4.0 and others (See Ciuriak and Ptashkina 2021 for a discussion and sources).

development of high-end inputs, access to which was being increasingly denied by US-mandated export restrictions.

Dual circulation has three salient features for supply chain politics: industrial policy-driven development of Chinese indigenous supply chains for classic industrial policy motives; insulation from foreign supply chain shocks (in other words a reshoring risk mitigation strategy); and preparation for a world of weaponization of supply chains due to geopolitical rivalry (analogous to friendshoring or geopolitical derisking).

3.2 *The EU's Derisking Doctrine*

The EU's economic derisking strategy has three pillars.

- The first pillar aims to build capabilities in green and digital technologies. For example, the EU's *Net-Zero Industry Act* aims to capture 40% of the manufacturing of these future technologies for Europe and establishes the basis for national and Union-level subsidies into these sectors.
- The second targets greater self-sufficiency in critical raw materials and diversified sourcing internationally.
- The third aims to improve traditional instruments for export control, foreign direct investment screening, including on outbound investments into "systemic rivals," and countervailing of foreign subsidies. Leino (2023) describes the derisking strategy as a mashup of the *US Foreign Investment Risk Review Modernization Act* (FIRRMA) and the proposed *National Critical Capabilities Defence Act* (NCCDA).

In short, the EU strategy is highly similar to China's dual circulation model in that it combines an industrial policy component aimed at capturing significant shares of future industries for Europe; reduction of exposure to supply chain shocks abroad (risk mitigation through reshoring); and a game plan for its participation in technology wars, focussing in

the EU's case on preserving its technology assets and advantages.

3.3 *The Sullivan Doctrine*

In a speech on September 16, 2022, at the Special Competitive Studies Project Global Emerging Technologies Summit (Sullivan 2022), White House Security Advisor Jake Sullivan articulated what has been labelled the "Sullivan Doctrine," namely the US government's intent to hobble China's capabilities in "foundational" technologies. As Sullivan explained:

"Fundamentally, we believe that a select few technologies are set to play an outsized importance over the coming decade: Computing-related technologies, including microelectronics, quantum information systems, and artificial intelligence.

Advancements in computing hardware, algorithmic design, and large-scale datasets are leading to new discoveries in virtually every scientific field. They are new sources of economic growth. They are also driving advanced military modernization efforts.

Biotechnologies and biomanufacturing.

We now can read, write, and edit genetic code, which has rendered biology programmable. Together with advances in computing, we are poised for breakthroughs in everything from drug discovery to chemical and material manufacturing.

And finally, clean energy technologies.

The global transition to clean energy is not only necessary for the health of our planet, but it will also be a major source of economic and jobs growth in the coming years. And it will ensure long-term U.S. energy independence and energy security.

That is not to say that other technologies initiatives are inconsequential – far from it ... But computing-related technologies, biotech, and clean tech are truly “force multipliers” throughout the tech ecosystem. And leadership in each of these is a national security imperative” Sullivan (2022).

The US approach sets out the goal of not just staying a few generations ahead in the new foundational technologies but to make the lead as large as possible. As per the Sullivan Doctrine:

“... we have to revisit the longstanding premise of maintaining “relative” advantages over competitors in certain key technologies. We previously maintained a “sliding scale” approach that said we need to stay only a couple of generations ahead.

That is not the strategic environment we are in today.

Given the foundational nature of certain technologies, such as advanced logic and memory chips, we must maintain as large of a lead as possible.”

To appreciate the implications of this effective escalation of what might be termed the technology “war,” it suffices to consider China’s share of global semiconductor supply – it fell from 7.7% in 2021 to 7.6% in 2022 – and the number of Chinese firms in the top 25 semiconductor vendors globally: zero (Chen 2023). In other words, it amounts to a pre-emptive strike.

The Sullivan Doctrine has three basic components: industrial policy expenditures to bring home the production of the foundational technologies (reshoring big time), a push to capture the top STEM talent globally (a “brain gain” to counter China’s investment in STEM education), and export controls to restrict China’s access to not only the technologies themselves but to all the technical inputs (weaponization of supply chains).

The main instruments of the industrial policy component to date are the following (Sullivan 2022):

- The \$52 billion *CHIPS Act*, which is intended to reduce US “overreliance on foreign-produced chips.” Notably, the *CHIPS Act* is described as larger than the real cost of the Manhattan Project.
- The Executive Order on Advancing Biotechnology and Biomanufacturing Innovation, which similarly aims to ensure that the US entities “...not only design the next generation of medicines, materials, and fuels here, but also make them here. From lab to fab, as they say.”
- The *Inflation Reduction Act*, which is described as “the single largest investment in climate and clean energy solutions in American history.”

These are to be supported by investments in the US “domestic research and education pipeline” and policies designed to ensure that “top foreign talent can come and stay in the United States” (Sullivan 2022).

On the export-controls side, the main feature of the Sullivan Doctrine is to go well beyond the longstanding controls that already embargo products designed, intended or modified for military applications to cover commercial products that are foundational to creating military applications, even if the commercial products have not themselves been modified in any way for military applications.

However, Jake Sullivan himself muddied the waters considerably in an address to the Brookings Institution in which he invoked a number of criticisms of globalization as motivating US policies. These include:

“A shifting global economy left many working Americans and their communities behind.”

“America’s industrial base had been hollowed out ... America didn’t just lose manufacturing – we eroded our competitiveness in critical technologies that would define the future.”

“The vision of public investment that had energized the American project in the postwar

years – and indeed for much of our history – had faded. It had given way to a set of ideas that championed tax cutting and deregulation, privatization over public action, and trade liberalization as an end in itself ... in the name of oversimplified market efficiency, entire supply chains of strategic goods – along with the industries and jobs that made them—moved overseas. And the postulate that deep trade liberalization would help America export goods, not jobs and capacity, was a promise made but not kept.”

“Another embedded assumption was that the type of growth did not matter. All growth was good growth. So, various reforms combined and came together to privilege some sectors of the economy, like finance, while other essential sectors, like semiconductors and infrastructure, atrophied. Our industrial capacity – which is crucial to any country’s ability to continue to innovate – took a real hit (Sullivan 2023).

This echoes the well-known litany of complaints about globalization. Unfortunately, this raises doubts about exactly what the true intent of the policies are (commercial gain, political posturing or truly national security) and prompts skeptical comments that it all might be a “SNO job” (Wolfe 2022).²

4 Discussion

The geographical organization of global supply chains has been impacted by several unrelated shocks: the black swan event of a pandemic that sent a rolling shock wave through the global economy, disrupting supply chains around the world in an arbitrary

sequence that no supply chain contingency plan could realistically have anticipated; an ongoing backlash against globalization; and the precipitation of a geopolitical contest to dominate new foundational technologies for both economic rent capture and for military dominance reasons, driven by the steady march of technology in an age of accelerated technological change.

Supply chains were politicized and various terms entered the lexicon: reshoring, nearshoring, friendshoring, derisking, and decoupling. This note has tried to clarify the economics of supply chain politics and to describe how the doctrines adopted by the major economic powers line up against these conceptual distinctions and relate to standard supply risk-management strategies by firms and governments.

Several general comments may be made on this muddled nexus of issues:

First, the issue that triggered supply chain politics in the first instance – the pandemic-related shock to production due to supply chain disruptions – has moved into the background of the discussion. While firms and governments will want to draw lessons for the resilience of their supply chains in the face of such unanticipated shocks, in the end, the “made in the world” production system responded well to the shocks. Trade as a share of global GDP continues to rise, if much more gradually than in the heyday of the “second unbundling” (Baldwin 2016) when value chain formation was at its peak.

Second, the most significant factor impacting supply chains at present is the geopolitical contest over foundational technologies. All the major economies are on the same page on this: they all want

2 Janet Yellen, in her remarks on US-China economic relations at Johns Hopkins School of Advanced International Studies on 20 April 2023 also muddled the waters by stating “Our goal is not to use these tools to gain competitive economic advantage” and followed up with a clarification that the United States seeks “a healthy economic relationship with China: one that fosters growth and innovation in both countries,” with the proviso that this be on a “fair” basis (which as per the US position it isn’t). See Yellen (2023).

to dominate or at least capture a significant share. Those controlling technologies that are part of the supply chain for the development of the foundational technologies – the United States and the EU – are seeking to withhold access to their rivals (i.e., China). Those seeking to catch up (i.e., China) are investing heavily to create parallel independent sources of supply.

Third, the water is being muddied by the introduction into the debate of a range of claims about globalization and/or China's role in it that have entered the category of received wisdom through sheer repetition, despite a lack of professional consensus.

Overall, the “made in the world” system that evolved under the World Trade Organization remains alive and well and actually builds in the desired supply chain features of robustness, flexibility and resilience. For most countries, it is entirely impractical to pursue self-reliance and responses to shocks are necessarily a combination of emergency preparedness (including stockpiles of critical supplies such as energy, food and medical equipment) and international sourcing. But even larger economies that are much less reliant on trade overall performed better during the pandemic disruptions when relying on the trade system to meet critical needs than when pursuing “me first” policies and self-reliance schemes.

Industrial policies remain irresistible to governments when major new technologies are in competitive play notwithstanding a questionable history (see, e.g., Posen 2023). However, the same rationales do not extend to most goods and services and thus do not constitute a general argument

for playing supply chain politics. Supply chain organization should remain mostly within the purview of the firm, allowing the myriad firms participating in myriad supply chains to adapt to changing economic and technological conditions to keep the system robust, flexible and resilient.

Finally, politically motivated supply chain restructuring implies potentially significant costs to the public purse, both in terms of subsidizing restructuring and offsetting ongoing efficiency costs. Even more importantly, the weaponization of supply chains under the Sullivan Doctrine to extend short-term, and ultimately likely transient, advantages over China in developing critical technologies raises much larger risks in the longer term. China has proven it has the capabilities to reach the technological frontier. Moreover, and perhaps paradoxically given the restrictions on exporting technology to China, China remains the world's largest market for semiconductor sales (mostly imports) and in 2021 in moved into first place just ahead of the United States as the country making the largest international payments for intellectual property. Accordingly, far from being cut off from global technology, China has become the leading importer of technology.

Further, China's progress up the learning curve on semiconductors continues. We are now some five years into the technology war. Initial estimates that it would take China up to 15 years to master the technologies required for computer chip production are being revised down as reports surface of progress on various aspects of process.³ In the life span of nations, whether China arrives there in five years or

3 Claims of advances on lithography have been made with regard to Shanghai Micro Electronics Equipment (SMEE) on deep ultra violet (DUV) and by Changchun Optics on extreme ultra violet (EUV) processes, although these are contested (see, e.g., Pao 2023). Meanwhile, Huawei has announced a breakthrough on electronic design automation (EDA) tools for processes at the 14 nanometre (nm) level (Kharpal 2023) and Shanghai Semiconductor Manufacturing Corporation (SMIC) has reportedly achieved 7nm process technology, without EUV, using an alternative approach – self-aligned quad patterning or SAQP based on argon fluoride immersion (ArFi) lithography – (Patel 2023).

ten is likely of no material consequence. The tenor of relationships adopted during its approach to that frontier may, however, heavily influence the tenor when it arrives. In the meantime, interventions to move or shape supply chains for geopolitical or old-fashioned industrial policy purposes continue to expand, with not inconsequential costs.

REFERENCES:

- Baharudin, Hariz. 2022. "PM Lee urges ASEAN to stay united amid escalating geopolitical tensions," *Straits Times*, 11 November. <https://www.straitstimes.com/asia/pm-lee-urges-asean-to-stay-united-amid-escalating-geopolitical-tensions>
- Baldwin, Richard. 2016. *The Great Convergence: Information Technology and the New Globalization*. Cambridge, MA: Belknap Press of Harvard University Press.
- Bown, Chad P., and Douglas A. Irwin. 2021. "Why Does Everyone Suddenly Care About Supply Chains?" *The New York Times*, 14 October. www.nytimes.com/2021/10/14/opinion/supply-chain-america.html.
- Chen, Gabby. 2023. "Gartner: Chinese mainland companies' semiconductor revenue drops 0.5% year-on-year to \$45.8 billion in 2022," *JW Insights*, 3 April. <https://jw.ijiwei.com/n/855251>
- Ciuriak, Dan, and Patricia Goff. 2021. "Economic Security and the Changing Global Economy," Centre for International Governance Innovation Series: Reimagining a Canadian National Security Strategy Report No. 8. 13 December. <https://www.cigionline.org/publications/economic-security-and-the-changing-global-economy/>
- Ciuriak, Dan, and Maria Ptashkina. 2021. "Technology Rents and the New Great Game," Book Chapter in Rahul Nath Choudhury (ed.), *The China-US Trade War and South Asian Economies*. Taylor & Francis/Routledge. <https://www.routledge.com/The-China-US-Trade-War-and-South-Asian-Economies/Choudhury/p/book/9780367513818>. Also available at SSRN: <https://papers.ssrn.com/abstract=3663385>
- Collins, Michael. 2021. "China's dual-circulation model is a plan for a hostile world but a catchable US," Magellan Financial Group, May. <https://www.magellangroup.com.au/insights/chinas-dual-circulation-model-is-a-plan-for-a-hostile-world-but-a-catchable-us/>
- Grootendorst, Paul, Javad Moradpour, Michael Schunk, and Robert Van Exan. 2022. *Home Remedies: How Should Canada Acquire Vaccines for the Next Pandemic?* Commentary 622. Toronto: C.D. Howe Institute., 3 May. <https://www.cdhowe.org/public-policy-research/home-remedies-how-should-canada-acquire-vaccines-next-pandemic-0>
- Kennedy, Scott. 2015. "Made in China 2025: Critical Questions," Center for Strategic and International Studies (CSIS), 1 June. <https://www.csis.org/analysis/made-china-2025>
- Kharpal, Arjun. 2023. "China's chip industry will be 'reborn' under U.S. sanctions, Huawei says, claiming breakthrough," *CNBC*, 31 March. <https://www.cnbc.com/2023/03/31/chinas-chip-industry-will-be-reborn-under-us-sanctions-huawei-says.html>
- Leino, Janne. 2023. "EU's bid for multipolarity: De-risking from China, without naming the US," EURACTIV, 3 April. <https://www.euractiv.com/section/eu-china/opinion/eus-bid-for-multipolarity-de-risking-from-china-without-naming-the-us/>
- Malkin, Anton. 2018. "Made in China 2025 as a Challenge in Global Trade Governance: Analysis and Recommendations," CIGI Papers No. 183 – August.
- Pao, Jeff. 2023. "Chip war burns and churns as Biden presses Kishida," *Asia Times*, 14 January. <https://asiatimes.com/2023/01/chip-war-burns-and-churns-as-biden-presses-kishida/>
- Patel, Dylan. 2023. "The Gaps In The New China Lithography Restrictions – ASML, SMEE, Nikon, Canon, EUV, DUV, ArFi, ArF Dry, KrF, and Photoresist," Semianalysis, 29 January. <https://www.semianalysis.com/p/the-gaps-in-the-new-china-lithography>
- Pérez, Lucy, Vivian Hunt, Hamid Samandari, Robin Nuttall, and Krysta Biniek. 2022. "Does ESG really matter – and why?" McKinsey & Company, 10 August. <https://www.mckinsey.com/capabilities/sustainability/our-insights/does-esg-really-matter-and-why#/>

- Posen, Adam. 2023. "America's Zero-Sum Economics Doesn't Add Up," *Foreign Policy*, 24 March. <https://foreignpolicy.com/2023/03/24/economy-trade-united-states-china-industry-manufacturing-supply-chains-biden/>
- Sullivan, Jake. 2022. "Remarks by National Security Advisor Jake Sullivan at the Special Competitive Studies Project Global Emerging Technologies Summit," The White House, 16 September. <https://www.whitehouse.gov/briefing-room/speeches-remarks/2022/09/16/remarks-by-national-security-advisor-jake-sullivan-at-the-special-competitive-studies-project-global-emerging-technologies-summit/>
- Sullivan, Jake. 2023. "Remarks by National Security Advisor Jake Sullivan on Renewing American Economic Leadership at the Brookings Institution." The White House, April 27, 2023. <https://www.whitehouse.gov/briefing-room/speeches-remarks/2023/04/27/remarks-by-national-security-advisor-jake-sullivan-on-renewing-american-economic-leadership-at-the-brookings-institution/>
- Von der Leyen, Ursula. 2023. "Speech by President von der Leyen on EU-China relations to the Mercator Institute for China Studies and the European Policy Centre," European Commission, Brussels, 30 March. https://ec.europa.eu/commission/presscorner/detail/en/speech_23_2063
- White House. 2021. "Building Resilient Supply Chains, Revitalizing American Manufacturing, and Fostering Broad-Based Growth," Report pursuant to Executive Order 14017, "America's Supply Chains," June. <https://www.whitehouse.gov/briefing-room/statements-releases/2021/06/08/fact-sheet-biden-harris-administration-announces-supply-chain-disruptions-task-force-to-address-short-term-supply-chain-discontinuities/>
- Wolfe, Robert. 2022. "Is using trade policy for foreign policy a "SNO job"? On linkage, friend-shoring and the challenges for multilateralism," Working Paper RSC 2022/74, Robert Schuman Centre for Advanced Studies, Global Governance Programme-486.
- WTO. n.d. "Article XXI - Security Exceptions," in *WTO Analytical Index: Guide to WTO Law and Practice*: 599-610. https://www.wto.org/english/res_e/publications_e/ai17_e/ai17_e.htm
- Yellen, Janet. 2023. "Remarks by Secretary of the Treasury Janet L. Yellen on the U.S. – China Economic Relationship at Johns Hopkins School of Advanced International Studies," U.S. Department of the Treasury, Statements and Remarks, 20 April. <https://home.treasury.gov/news/press-releases/jy1425>
- Zhang, Zoey. 2020. "What is China's Dual Circulation Strategy? And Why Foreign Investors Should Take Note," *Insight Magazine* Nov/Dec. <https://www.amcham-shanghai.org/en/article/what-chinas-dual-circulation-strategy>