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US and European strategies for resilient supply chains

Balancing globalization and sovereignty

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Summary

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- Global supply chains have come under the spotlight in the wake of the COVID-19 pandemic and recent semiconductor shortages. But the rethinking and reconfiguration of global production networks have been driven by many pre-existing structural trends, such as increased geopolitical and geo-economic tensions as well as the shift towards digital and low-carbon economies.
 - While the private sector and public policy approaches have traditionally emphasized efficiency (for instance, by prioritizing low costs and speed of production), now the focus is on strengthening supply-chain resilience. This paper defines supply-chain resilience as an adaptive capability to prepare for, respond to and recover from unexpected disruption by returning quickly to normal operations. As a starting point, a resilient supply chain is one that is visible, agile, and sustainable.
 - Governments have different – at times overlapping – rationales for supporting supply-chain resilience. As well as addressing market failures, these include: enhancing crisis preparedness and response regarding health and personal safety; strengthening national security; boosting industrial strength and economic competitiveness; creating domestic jobs; and promoting human rights and sustainability.
 - Supply-chain resilience is ultimately strengthened at the level of firms, but governments play a critical role by encouraging or constraining the sourcing and production decisions of companies, and by being the primary actor in some areas, for instance regarding national stockpiles. This paper argues that a mix of public policy tools is needed to build resilient supply chains. Such measures should encompass limited reshoring and increasing domestic production capacity for essential products and sectors, the diversification of sources of supply, and the holding of strategic reserves. Even though domestic policies to foster supply-chain resilience are necessary, they are not sufficient. International cooperation at the bilateral, regional and global level is key to success.
 - Given the position held by the US and Europe in international trade and the world economy, their recent resilience-oriented efforts will have wide-ranging implications for global supply chains. Moreover, the US, EU and UK offer a natural starting point for strengthening supply-chain resilience by leveraging their partnerships with like-minded countries in the Asia-Pacific region as well as their role in international forums such as the G7/G20 and World Trade Organization (WTO). For the US and Europe, reducing global dependencies and increasing self-sufficiency do not have to mean dispensing with economic openness and international cooperation.

01

Introduction

With the COVID-19 pandemic and recent semiconductor shortages having put a spotlight on supply chains, the US and Europe are critical players in strengthening the resilience of global production networks.

Global supply chains have come under increased scrutiny in the light of the vulnerabilities which have been exposed by recent developments: notably, these include supply-chain disruptions related to the COVID-19 pandemic, geo-economic and geopolitical tensions between the US and China, semiconductor shortages, and a reliance on critical raw materials for the transition towards green and digital economies. These developments have raised concerns about excessive dependencies on foreign suppliers, and have given rise to calls for national self-sufficiency with regard to essential goods and strategic sectors. Proposed solutions have ranged from reshoring production to diversifying supply chains and increasing stockpiles. Much has been made of the supposed shift in attitudes from ‘just-in-time’ systems of production to ‘just-in-case’ (meaning extra inventory and lead times) or ‘just-at-home’ models (focused on domestic manufacturing of critical products).¹ This trend has been accompanied by a shift away from the decades-long focus on efficiency in favour of greater supply-chain resilience.

Many drivers and tools are entangled in the current debate and in countries’ efforts to achieve greater supply-chain resilience. A number of pre-existing trends have driven the reconfiguration of global production networks. These include national security concerns, increasing digitalization and a shift to services, a desire to change domestic income distributions and avoid distortions in global trade, and efforts to tackle issues pertaining to climate change and human rights. Although declarations of the ‘death of globalization’ are exaggerated, a new era of the global economy has begun – the hallmarks of which are an increased regionalization and a convergence of industrial, trade and investment policies.

¹ A similar point was made by Dr Ngozi Okonjo-Iweala, Director-General at the World Trade Organization (WTO), in September 2020 when she was a candidate for her current role. Brookings (2020), ‘Ngozi Okonjo-Iweala’s vision for the WTO’, Dollar & Sense Podcast, 21 September 2020, https://www.brookings.edu/podcast-episode/ngozi-okonjo-iwealas-vision-for-the-wto/?utm_source=feedblitz&utm_medium=FeedBlitzRss&utm_campaign=brookingsrss/programs/global (accessed 6 Jul. 2021).

During its period in office, the administration of Donald Trump aimed at ‘decoupling’ the US economy from that of China. Trump’s successor, President Joe Biden, who was inaugurated in January 2021, has also vowed to bring production back to the US from China in a number of economically and technologically sensitive sectors.² The Biden administration has outlined its approach to building resilient supply chains and revitalizing American manufacturing, affirming its desire to ‘work with America’s allies and partners to strengthen collective supply chain resilience.’³ For its part, the EU is currently pursuing a policy of ‘open strategic autonomy’, thereby retaining its commitment to open and fair trade while reducing its dependence on external suppliers and strengthening the security of supply across key industries.⁴ China, meanwhile, is also seeking to reduce its dependence on overseas markets and technology. In May 2020, President Xi announced the ‘dual circulation’ strategy of economic development, which seeks to focus increasingly on ‘internal circulation’ – the domestic production and consumption of goods and services – while supplementing this with ‘external circulation’, based on Chinese exports.⁵

The current focus on supply-chain resilience can help to find a new balance between globalization and sovereignty. This research paper seeks to contribute to the debate by focusing on the role of governments and international forums in strengthening supply-chain resilience. The future of supply chains is considered within the broader context of what has been termed the ‘new nexus’ of economics, national security and technology.

The paper focuses specifically on the US and Europe, and on opportunities for transatlantic collaboration to boost supply-chain resilience, as well as on the hurdles faced. Decisions taken by US and European policymakers and industry leaders will have implications for global supply chains. Together, the US, the EU-27 and the UK account for close to one-third of world GDP (in terms of purchasing power) and for roughly the same share of global trade.⁶ US–European supply chains are deeply intertwined, given the high proportion of transatlantic trade that takes place on an ‘intra-firm’ basis (i.e. transactions occurring between a parent company and its affiliates, as opposed to those occurring ‘at arm’s length’ between independent parties). It is estimated that intra-firm trade accounts for one-third of total trade between the EU and US. During past economic shocks – such as the Asian crisis of 1997 and the global financial and economic crisis which began in 2007 – intra-firm trade has been the more resilient of the two. Thus, transatlantic policymakers will be able to expand on this inbuilt resilience.

² Biden-Harris campaign platform (2020), ‘The Biden Plan to Rebuild U.S. Supply Chains and Ensure the U.S. Does Not Face Future Shortages of Critical Equipment’, <https://joebiden.com/supplychains> (accessed 12 Feb. 2021).

³ The White House (2021), ‘Building Resilient Supply Chains, Revitalizing American Manufacturing, and Fostering Broad-Based Growth’, 100-Day Reviews under Executive Order 14017, June 2021, <https://www.whitehouse.gov/wp-content/uploads/2021/06/100-day-supply-chain-review-report.pdf> (accessed 6 Jul. 2021).

⁴ European Commission (2020), ‘Europe’s moment: Repair and Prepare for the Next Generation’, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, COM(2020) 456 final, 27 May 2020, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0456&from=EN> (accessed 12 Feb. 2021).

⁵ Pettis, M. (2020), ‘The problems with China’s “Dual Circulation” economic model’, *Financial Times*, 25 August 2020, <https://www.ft.com/content/a9572b58-6e01-42c1-9771-2a36063a0036> (accessed 12 Feb. 2021).

⁶ Hamilton, D. S. and Quinlan, J. P. (2021), *The Transatlantic Economy 2021: Annual Survey of Jobs, Trade and Investment between the United States and Europe*, Washington, DC: Foreign Policy Institute, Johns Hopkins University SAIS/Woodrow Wilson Center, https://transatlanticrelations.org/wp-content/uploads/2021/03/TransatlanticEconomy2021_FullReportHR.pdf (accessed 6 May 2021).

Moreover, the transatlantic partners are leading players in key structures for global economic governance, such as the G7 and G20 forums of major global economies, and the World Trade Organization (WTO). If the US and Europe threw their combined weight behind improved international coordination efforts and the development of an updated global trade ‘rule book’, they could boost attempts to build resilient supply chains. Similarly, because both partners share the same broad approaches towards the governance of emerging technologies that can promote supply-chain resilience, enhanced transatlantic cooperation in this space is a natural starting point. The US and Europe can leverage their own (at times overlapping) security and economic partnerships to encourage supply-chain resilience. Thus the transatlantic partners would be at the centre of a hub-and-spoke network to strengthen supply-chain resilience that encompasses advanced industrial democracies around the world.

A mix of efforts to increase local production of critical goods, combined with the reinforcement of the international trade system, offers the best opportunities for the US and Europe to contribute to a strengthening of supply-chain resilience.

In particular, the purpose of this paper is to offer useful insights into how the US, the EU and the UK can better harness the opportunities offered by globalization by providing legitimate protection to strategic supply chains without sliding into protectionism. The paper presents a definition of supply-chain resilience, discusses the long-term structural drivers behind supply-chain reconfiguration and analyses supply-chain vulnerabilities and government objectives for boosting resilience. Based on an assessment of both the public policy instruments available and existing supply-chain resilience efforts, the paper develops a set of principles and recommendations that should guide government action at the domestic, regional and global level.

A mix of efforts to increase local production of critical goods, combined with the reinforcement of the international trade system, offers the best opportunities for the US and Europe to contribute to a strengthening of supply-chain resilience.

02 Global supply chains: Definition, trends and misperceptions

The COVID-19 pandemic has accelerated structural trends driving the reconfiguration of global supply chains. A new balance is emerging between efficiency and resilience as well as between globalization and national self-sufficiency.

Global supply chains – sometimes called global value chains⁷ or global production networks – have become a key feature of the world economy. In fact, approximately 70 per cent of international trade is for the purpose of production in global supply chains, whereby intermediate goods and services are exchanged across borders before being incorporated into a final product which can be delivered to consumers around the world.⁸ Supply chains are actually more regional in character than the term ‘global’ suggests: they are often structured around intra-regional links

⁷ While the literature does identify some differences between these terms to focus on a particular feature, they are often used interchangeably. The concept of global value chains tends to emphasize the process by which a firm adds value to a product, and includes aspects such as product design, manufacturing, marketing and distribution. Global production networks emphasize the non-linear aspects of the dispersed production structure. This paper does not take a strong view and thus generally treats these terms as synonymous. The author generally applies the designate ‘supply chains’, except when using sources that specifically employ an alternative term.

⁸ Trade in finished goods and services accounts for the remaining 30 per cent of global trade. Organisation for Economic Co-operation and Development (2020), ‘Trade Policy Implications of Global Value Chains’, Trade Policy Brief, February 2020, https://issuu.com/oecd.publishing/docs/trade_policy_implications_of_global (accessed 12 Feb. 2021).

and are mostly clustered around Europe, North America and Asia.⁹ These major supply-chain blocs interlink, with a significant degree of interregional production-sharing. Despite the rise of China, the US and Germany remain the most important hubs in complex global production networks.¹⁰

Since 2011, the expansion of global value chains has slowed, according to the Organisation for Economic Co-operation and Development (OECD).¹¹ In other words, even before the rise of economic nationalism (or protectionism) and the outbreak of the COVID-19 pandemic, the reconfiguration of supply chains has been driven by several structural factors in the last decade. These factors include:¹²

- A slowdown in growth of trade volumes, relative to the growth in global GDP, following the global financial and economic crisis which began in 2007, as well as a shift in orientation by China away from exports and towards supplying its domestic market;
- Diminishing labour cost arbitrage, as wages have risen in many emerging countries and the differential between countries in terms of labour costs has become less important as a determining factor for locating production;¹³
- Increased political risk and trade tensions, with firms facing higher costs as a consequence of the imposition of tariffs and policy uncertainty;
- A higher frequency of business interruptions stemming from natural disasters or other disruptive events such as the COVID-19 pandemic;¹⁴
- Shifting social values and consumer preferences, including popular demands for a more sustainable and responsible sourcing of products;
- The rise of the so-called ‘service economy’ (which often implies production closer to consumers) and the ‘servicification of manufacturing’ (which means that firms are increasingly reliant on services as inputs, or are producing services that are bundled with the goods they sell);¹⁵

⁹ World Bank, WTO (2019), *Global Value Chain Development Report 2019: Technological Innovation, Supply Chain Trade, and Workers in a Globalized World*, <http://documents.worldbank.org/curated/en/384161555079173489/Global-Value-Chain-Development-Report-2019-Technological-Innovation-Supply-Chain-Trade-and-Workers-in-a-Globalized-World> (accessed 12 Feb. 2021).

¹⁰ Ibid.

¹¹ OECD (2020), ‘Trade Policy Implications of Global Value Chains’. In calculating global import intensity of production, the OECD ‘takes into account all trade flows of intermediates inputs used in any stage of the value chain, and expresses their overall value as a share of the final output’.

¹² The literature covering these trends is extensive: it includes the reports by the OECD and WTO cited above, and private sector reports, such as: Lund, S., Manyika, J., Woetzel, J., Bughin, J., Krishnan, M., Seong, J. and Muir, M. (2019), *Globalization in transition: The future of trade and value chains*, McKinsey Global Institute, <https://www.mckinsey.com/featured-insights/innovation-and-growth/globalization-in-transition-the-future-of-trade-and-value-chains> (accessed 12 Feb. 2021); and Fan, I., Holzheu, T. and Wong, C. (2020), *De-risking global supply chains: rebalancing to strengthen resilience*, Swiss Re Institute, sigma No 6/2020, <https://www.swissre.com/dam/jcr:cff737e5-ac7f-4d67-b0cc-6634fe378feb/sigma-6-2020-en.pdf> (accessed 12 Feb. 2021).

¹³ For instance, a report by the McKinsey Global Institute finds that the share of trade based on labour-cost arbitrage declined from 55 per cent in 2005 to 43 per cent in 2017 for labour-intensive goods such as textiles and clothing. See Lund et al. (2019), *Globalization in transition*, p. 36.

¹⁴ According to a report by the McKinsey Global Institute, disruptions lasting a month or longer now occur every 3.7 years on average. See Lund, S., Manyika, J., Woetzel, J., Barriball, E., Krishnan, M., Alicke, K., Birshan, M., George, K., Smit, S., Swan, D. and Hutzler, K. (2020), *Risk, resilience, and rebalancing in global value chains*, McKinsey Global Institute, <https://www.mckinsey.com/business-functions/operations/our-insights/risk-resilience-and-rebalancing-in-global-value-chains> (accessed 12 Feb. 2021).

¹⁵ Miroudot, S. (2020), ‘Reshaping the policy debate on the implications of COVID-19 for global supply chains’, *Journal of International Business Policy*, 3: pp. 430–42, doi:10.1057/s42214-020-00074-6 (accessed 12 Feb. 2021).

- Technological change – for instance, the increasing availability of 3D printing and robotics technologies, allowing production facilities to be located closer to the end-consumer and reducing cost arbitrage between countries (by means of automation, which has reduced the contribution of labour in the production process). At the same time, however, cyberattacks have become a source of supply-chain vulnerability.

The COVID-19 pandemic has given added impetus to many of these trends. Resilience has become the new buzzword in relation to supply chains: however, there is no agreed definition.¹⁶ Some authors distinguish between resilience (returning to normal operations post-disruption) and robustness (the ability to maintain operations during a crisis).¹⁷

For the purposes of this paper, supply-chain resilience is defined as an adaptive capability to prepare for, respond to and recover from unexpected disruption by returning quickly to normal operations.¹⁸

The coronavirus pandemic has also given rise to some common misperceptions. First, while it highlighted the pressure points on global production networks, supply chains were able to adapt to the stresses of the pandemic, proving to be quite resilient. Imports and increased domestic production helped to overcome initial shortages and supply-chain disruptions for personal protective equipment (PPE), food products and other goods. And while discussions around an over-reliance on imports for COVID-19-related products have mostly framed the latter as a problem specific to China, the information available points to a more complex picture (see Box 1).

Second, there seems to be a false dichotomy between efficiency and resilience. While it is true that companies have prioritized efficiency in recent decades (for instance, by optimizing both the cost and the speed of production) and have paid less attention to potential vulnerabilities, the two objectives are not necessarily mutually exclusive. Some scholars have argued that both efficiency and resilience need to be maintained for companies to survive in the long term.¹⁹ In the short term, tensions certainly exist between the two. This does not mean that companies need to focus solely on one or the other: rather, they need to balance the two objectives, and manage any resulting trade-offs.

¹⁶ See, for example, Ponomarov, S. Y. and Holcomb, M. C. (2009), 'Understanding the concept of supply chain resilience', *The International Journal of Logistics Management*, 20(1): pp. 124–43, doi:10.1108/09574090910954873 (accessed 12 Feb. 2021).

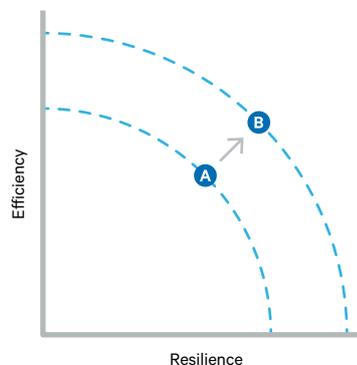
¹⁷ Miroudot, S. (2020), 'Resilience versus robustness in global value chains: Some policy implications', in Baldwin, R. E. and Evenett, S. J. (eds) (2020), *COVID-19 and Trade Policy: Why Turning Inward Won't Work*, pp. 117–30, London: CEPR Press, https://voxeu.org/system/files/epublication/Covid-19_and_Trade_Policy.pdf (accessed 12 Feb. 2021); Brandon-Jones, E., Squire, B., Autry, C. W. and Petersen, K. J. (2014), 'A contingent resource-based perspective of supply chain resilience and robustness', *Journal of Supply Chain Management*, 50(3): pp. 55–73, doi:10.1111/jscm.12050 (accessed 12 Feb. 2021).

¹⁸ This definition is based on the work by Ponomarov and Holcomb (2009).

¹⁹ Gölgeci, I., Yildiz, H. E. and Andersson, U. (2020), 'The rising tensions between efficiency and resilience in global value chains in the post-COVID-19 world', *Transnational Corporations Journal*, 27(2), pp. 127–41, https://unctad.org/system/files/official-document/diaeia2020d2a7_en.pdf (accessed 12 Feb. 2021).

It should be noted that, as Figure 1 shows, there is not always a trade-off, since certain steps can be taken to benefit both objectives, thereby moving beyond the traditional trade-offs facing supply chains. For instance, by moving the curve outwards, Point B is both more efficient and resilient compared to Point A. As a practical example, the appliance manufacturer Whirlpool boosted both the efficiency and the resilience of its supply chains by using standardized components in a wide range of products.²⁰ By utilizing the same screw in a washing machine and a clothes dryer, supply chains could be simplified, and more flexible production was facilitated across different sites. As outlined in Chapter Four, digital technologies can play a major role in resolving the traditional tensions between efficiency and resilience.²¹

Figure 1. Moving beyond the traditional trade-off between efficiency and resilience



Source: Data reused with permission of the Economist Intelligence Unit. Adapted from Economist Intelligence Unit (2010), *Resilient supply chains in a time of uncertainty*, Briefing Paper, http://graphics.eiu.com/upload/eb/Oracle_Supply_Chain_WEB.pdf.

Third, policymakers have often falsely presented a binary choice between globalization and national self-sufficiency. For instance, Thierry Breton, the European Commissioner for the Internal Market, stated in 2020 that Europe may have gone ‘too far in [...] globalization’,²² while French President Emmanuel Macron was calling for ‘full independence’²³ in the country’s production of critical medical goods.

But strategies to reduce global dependencies can coexist with the maintenance of economic openness.²⁴ Some studies highlight how a dependence on the rest

²⁰ Economist Intelligence Unit (2010), *Resilient supply chains in a time of uncertainty*, Briefing Paper, http://graphics.eiu.com/upload/eb/Oracle_Supply_Chain_WEB.pdf (accessed 6 May 2021).

²¹ A similar argument is made by Petersen, T. (2020), ‘How to respond to global supply chain disruptions caused by Covid-19?’, Bertelsmann Stiftung, *New Perspectives on Global Economic Dynamics*, 14 May 2020, <https://ged-project.de/trade-and-investment/how-to-respond-to-global-supply-chain-disruptions-caused-by-covid-19> (accessed 12 Feb. 2021).

²² *Le Figaro* (2020), ‘Thierry Breton estime nécessaire l’émission d’obligations pour faire face à la crise’ [Thierry Breton considers it necessary to issue bonds to cope with the crisis], 2 April 2020, <https://www.lefigaro.fr/flash-eco/thierry-breton-estime-necessaire-l-emission-d-obligations-pour-faire-face-a-la-crise-20200402> (accessed 12 Feb. 2021).

²³ Agence France-Presse (2020), ‘Macron announces push to produce coronavirus masks, ventilators’, *France 24*, 31 March 2020, <https://www.france24.com/en/20200331-macron-announces-push-to-produce-coronavirus-masks-ventilators> (accessed 12 Feb. 2021).

²⁴ Schneider-Petsinger, M. (2020), ‘National Self-Sufficiency or Globalization is Not a Binary Choice’, Chatham House Expert Comment, 29 June 2020, <https://www.chathamhouse.org/2020/06/national-self-sufficiency-or-globalization-not-binary-choice> (accessed 12 Feb. 2021).

of the world for products such as medical goods and medicines has been a solution, rather than a problem, during the coronavirus pandemic.²⁵

In short, two things can be true at the same time: on the one hand, global supply chains can create vulnerabilities and transmit shocks, but on the other hand they can also help to absorb shocks during a crisis by shifting production across different locales or by facilitating the substitution of different inputs and sources of supply. The challenge is finding the right balance – and that will differ between specific sectors of the economy and according to the type of emergency being confronted.

Box 1. The COVID-19 pandemic and beyond – China’s grip on supply chains?

The COVID-19 pandemic has raised questions in many countries – especially the US and Europe – about an over-reliance on China and India for supplies of active pharmaceutical ingredients (APIs) used to manufacture drugs, and for supplies of PPE. It is difficult to assess the actual extent of US and European dependence on foreign supplies in general, and on Chinese supplies in particular. According to the US Food and Drug Administration (FDA), 72 per cent of the manufacturing facilities making APIs to supply the US market are located overseas – including 18 per cent in India and 13 per cent in China.²⁶ While the FDA acknowledges that the available data has limitations, the ‘increasing number of API manufacturing sites in China and other countries suggests that the United States’ reliance on Chinese and other foreign sources of API is growing’.²⁷

Some authors believe that the US’s reliance on health commodities produced in China is a ‘localized problem’ for specific goods (such as PPE).²⁸ They also argue that at the core of the supply-chain problems during the early stages of the pandemic was a surge in demand that could not be met by ramping up supply domestically or abroad.

China has played an important role in helping solve the global shortage of PPE. At the start of the coronavirus pandemic, China accounted for approximately one-half of global production of medical-grade face masks: it then increased its production by a factor of 10 during the crisis.²⁹ In contrast, production increased less dramatically in other countries (for example, by a factor of three in France).³⁰

²⁵ See, for example, Guinea, O. and Forsthuber, F. (2020), ‘Globalization Comes to the Rescue: How Dependency Makes us More Resilient’, European Centre for International Political Economy Occasional Paper 06/2020, https://ecipe.org/wp-content/uploads/2020/09/ECI_20_OccPaper_06-2020_LY03.pdf (accessed 12 Feb. 2021). Other authors find that while engagement in global supply chains increases exporters’ vulnerability to foreign shocks, it can reduce their vulnerability when domestic production is disrupted. See Espitia, A., Mattoo, A., Rocha, N., Ruta, M. and Winkler, D. (2021), *Pandemic Trade: Covid-19, Remote Work and Global Value Chains*, Policy Research Working Paper no. WPS 9508, World Bank, <http://documents1.worldbank.org/curated/en/843301610630752625/pdf/Pandemic-Trade-Covid-19-Remote-Work-and-Global-Value-Chains.pdf> (accessed 12 Feb. 2021).

²⁶ See testimony before the House Committee on Energy and Commerce, Subcommittee on Health, by Woodcock, J. (2019), ‘Safeguarding Pharmaceutical Supply Chains in a Global Economy’, 30 October 2019, <https://www.fda.gov/news-events/congressional-testimony/safeguarding-pharmaceutical-supply-chains-global-economy-10302019> (accessed 12 Feb. 2021).

²⁷ Ibid.

²⁸ For instance, see Evenett, S. J. (2020), ‘Chinese whispers: COVID-19, global supply chains in essential goods, and public policy’, *Journal of International Business Policy*, 3, pp. 408–29, doi:10.1057/s42214-020-00075-5 (accessed 12 Feb. 2021).

²⁹ OECD (2020), ‘The face mask global value chain in the COVID-19 outbreak: Evidence and policy lessons’, OECD Policy Responses to Coronavirus (COVID-19), 4 May 2020, <https://www.oecd.org/coronavirus/policy-responses/the-face-mask-global-value-chain-in-the-COVID-19-outbreak-evidence-and-policy-lessons-a4df866d> (accessed 6 May 2021).

³⁰ Ibid.

There was no apparent shortage of drugs during the COVID-19 pandemic as a consequence of limitations on exports from China to the US.³¹ And while China has dominated in the public discourse concerning vulnerabilities stemming from the concentration of production for APIs, a fact which is frequently overlooked is that the EU accounts for 26 per cent of manufacturing facilities making APIs to supply the US market.³² The EU's export restrictions on COVID-19 vaccines serve to highlight that the policy risk is not limited to China or India.

The broader context of US–China strategic competition helps to explain why US policymakers have moved away from a risk assessment that focuses on the suppliers of the main pharmaceutical producers towards a more strategic assessment – that the problem is specific to China, even though the country is not a major player in terms of the production of most drugs.

The concentration of production for certain goods – such as face masks or rare-earth elements, in the case of China – seems to lie at the heart of the issue. This situation creates specific vulnerabilities that could be exploited.

Improving the resilience of supply chains for rare-earth elements, for which there is currently an over-reliance on China (the world's largest producer), is closely linked to national security and economic competitiveness, and to meeting climate targets.

The US has some domestic rare-earth deposits, but imports approximately 80 per cent of its rare-earth requirements from China.³³ The latter imposed export restrictions on rare-earth minerals between 2010 and 2014, and the issue came to the fore again in early 2021. Not only did reports³⁴ emerge claiming that China was considering export restrictions, but rare-earth minerals were identified as one of the four critical supply chains – along with semiconductors and advanced packaging, high-capacity batteries, and APIs – in President Biden's Executive Order on America's Supply Chains³⁵ and the corresponding 100-day Supply Chain Review³⁶ published by the White House in June 2021. Global competition over these raw materials is likely to intensify, and they could be used as a tool of geo-economic leverage, which risks putting the US and Europe in a vulnerable position.

In sum, there is some overlap between actual resilience concerns and those more directly related to economic competitiveness and national security, as well as other aspects which are motivating the current focus on supply-chain resilience. Chapter Three seeks to disentangle the various public policy motivations for strengthening supply-chain resilience in general.

³¹ In April 2020, FDA Commissioner Stephen Hahn stated: '[...] we don't have any evidence that there's a drug in short supply because of [other countries] blocking the active pharmaceutical agreement ingredients coming to [the US]'. See Kaplan, T. (2020), FDA commissioner Hahn: 'We have been working with vaccine manufacturers for weeks now', Fox News, 5 April 2020, <https://www.foxnews.com/media/fda-commissioner-hahn-we-have-been-working-with-vaccine-manufacturers-for-weeks> (accessed 6 May 2021).

³² Woodcock, J. (2019), 'Safeguarding Pharmaceutical Supply Chains in a Global Economy'.

³³ Tracy, B. S. (2020), *An Overview of Rare Earth Elements and Related Issues for Congress*, Congressional Research Service, Report R46618, 24 November 2020, <https://crsreports.congress.gov/product/pdf/R/R46618> (accessed 12 Feb. 2021).

³⁴ Yu, S. and Sevastopulo, D. (2021), 'China targets rare earth export curbs to hobble US defence industry', *Financial Times*, 16 February 2021, <https://www.ft.com/content/d3ed83f4-19bc-4d16-b510-415749c032c1> (accessed 24 Feb. 2021).

³⁵ The White House (2021), 'Executive Order on America's Supply Chains', 24 February 2021, <https://www.whitehouse.gov/briefing-room/presidential-actions/2021/02/24/executive-order-on-americas-supply-chains> (accessed 24 Feb. 2021).

³⁶ The White House (2021), 'Building Resilient Supply Chains, Revitalizing American Manufacturing, and Fostering Broad-Based Growth'.

03 Supply-chain vulnerabilities and objectives for resilience

Policymakers and corporate leaders must think about the sources of supply-chain vulnerabilities and building resilience in different ways. Key public policy considerations include economic competitiveness and national security.

In considering supply-chain risks, objectives and strategies, it is important to distinguish between the corporate and government levels. This chapter identifies the sources of supply-chain risks faced by individual firms and the rationales for government intervention.

Sources of supply-chain vulnerabilities

According to a report by McKinsey,³⁷ supply-chain vulnerabilities at company level can arise from the following areas:

1. The structure of supplier networks: issues might include a geographic concentration of production, the substitutability of suppliers, interconnectivity

³⁷Lund et al. (2020), *Risk, resilience, and rebalancing in global value chains*.

- between suppliers, the number of tiers of suppliers in the production network and the visibility/traceability of the relationship between the tiers;
2. Demand planning and inventory management: for example, unexpected surges in demand during times of crisis, or an inability to hold inventory;
 3. Transportation and logistics: such as unexpected disruptions to physical or digital infrastructure, border closures or customs delays;
 4. The financial fragility of suppliers in a network: this includes vulnerabilities in the debt and liquidity levels of downstream suppliers;
 5. Certain product characteristics: for example, the degree of product complexity, degree of product substitutability or degree of labour intensity.

Government motivations for strengthening supply-chain resilience

While firms focus primarily on commercial priorities when trying to increase supply-chain resilience, broader economic, societal and strategic factors constitute the main rationales for strengthening supply-chain resilience at the national and international level.

- Addressing market failures in supply chains: Government intervention is typically justified when there are market failures. These could arise because of information gaps in complex supply chains, or following a potentially incorrect assessment by individual companies of the risk of crises.³⁸ Moreover, there could be externalities along the supply chain: in deciding how much to diversify or how much inventory to hold, firms might not consider the impact of their decisions on other firms in the production network.
- Enhancing crisis preparedness and response regarding health and personal safety: As the COVID-19 pandemic has highlighted, protecting supply chains is critical to support the provision of essential goods in the areas of food and agriculture, as well as pharmaceuticals and medical products.
- Strengthening national security: Certain industries – such as defence or energy – have long been considered strategic because of their role in national security. More recently, the technology sector has been at the centre of government attention and efforts to reconfigure supply chains, driven in particular by concerns regarding the concentration of the semiconductor industry and the security of foreign-owned or -controlled 5G telecommunications networks.
- Boosting industrial strength and economic competitiveness: In an effort to boost national industrial strength, countries around the world are taking steps that could reshape supply chains. To some extent there is an overlap here with the previous category: after all, economic security is closely related to national

³⁸ Bacchetta, M., Bekkers, E., Piermartini, R., Rubinova, S., Stolzenburg, V. and Xu, A. (2021), 'COVID-19 and Global Value Chains: A discussion of arguments on value chain organization and the role of the WTO', World Trade Organization Staff Working Paper ERSD-2021-3, 11 January 2021, https://www.wto.org/english/res_e/reser_e/ersd202103_e.pdf (accessed 6 May 2021).

security. This is especially true for the technology sector more generally, and the semiconductor industry in particular. But while some elements of this category could be folded into the preceding one, the economic drivers warrant a separate grouping. For instance, the aerospace, automotive and machine-building industries are frequent targets for government intervention (with implications for supply chains) because of their high-value contributions to national economic output and international competitiveness. With the transformation to more highly digitalized economies, industrial strategies – for instance the EU’s new European Industrial Strategy – emphasize emerging technologies and aspects that affect their supply chains by focusing on securing innovation and investment, and ‘levelling the playing field’.³⁹

- Creating domestic jobs: With globalization facing challenges in recent years, in part driven by labour market dislocations, calls for ‘reshoring’ production and bringing back jobs have abounded. While the Trump administration focused on this aspect of supply-chain reorganization, President Biden has also stated a desire to ‘shift production of a range of critical products back to U.S. soil, creating new jobs’.⁴⁰ But, while some limited reshoring has happened there is little evidence that manufacturing jobs are returning on a significant scale.⁴¹ Even if they were, reshored production is increasingly carried out by robots, and does not necessarily lead to higher levels of domestic employment or of wages.⁴²
- Promoting human rights and sustainability: In support of the green and digital transformation of the economy, important considerations include reducing the environmental footprint of supply chains and securing access to critical raw materials that are needed for the transition. Moreover, requiring companies to strengthen human rights and environmental due diligence⁴³ and to report on their supply chains needs to be seen in the context of ‘building back better’ following the coronavirus pandemic and will have implications for the trade relationship with China, given the country’s human rights and environmental practices.

Because governments are pursuing a variety of different objectives in their efforts for greater supply-chain resilience in the wake of the COVID-19 pandemic, US–China strategic competition and the ongoing structural shift towards digital and low-carbon economies, more public policy interventions are likely.

³⁹ European Commission (2020), ‘Questions & Answers: European Industrial Strategy Package’, 10 March 2020, https://ec.europa.eu/commission/presscorner/detail/en/QANDA_20_418 (accessed 12 Feb. 2021).

⁴⁰ Biden-Harris campaign platform (2020), ‘The Biden Plan to Rebuild U.S. Supply Chains and Ensure the U.S. Does Not Face Future Shortages of Critical Equipment’.

⁴¹ Kearney (2021), ‘Global pandemic roils 2020 Reshoring Index, shifting focus from reshoring to right-shoring’, US Reshoring Index Full Report, <https://www.kearney.com/operations-performance-transformation/us-reshoring-index/full-report> (accessed 6 May 2021).

⁴² Krenz, A., Prettner, K. and Strulik, H. (2018), ‘Robots, reshoring, and the lot of low-skilled workers’, cege Discussion Papers, No. 351, University of Göttingen, Center for European, Governance and Economic Development Research (cege), <https://www.econstor.eu/bitstream/10419/180197/1/1026007828.pdf> (accessed 12 Feb. 2021).

⁴³ Members of the European Parliament passed a resolution in March 2021, setting out principles for proposed new legislation that requires companies to protect human rights and environmental standards in their supply chains. The European Commission is expected to table its legislative proposal on the issue in the autumn of 2021. See European Parliament (2021), ‘Texts adopted – Corporate due diligence and corporate accountability’, 10 March 2021, https://www.europarl.europa.eu/doceo/document/TA-9-2021-0073_EN.html (accessed 6 May 2021).

Corporate vs government level

Policymakers have to think about supply-chain resilience in a different light to business leaders, in that they need to take different sectors into account, as well as the economy more broadly.⁴⁴ For instance, diversifying the sources of supply could require firms to reduce their dependence on inputs from a specific supplier or country. However, if all companies were to take similar actions, their efforts would not combine to create more resilient supply chains: instead, the risk would just be shifted to a different location.

In addition, certain risks or shocks might occur, to which firms will not be able to adjust without the help of governments. For example, in order to deal with exceptional surges in demand, it could be helpful to maintain national stockpiles which go beyond inventory requirements for individual companies. Stress-testing and risk-management strategies for governments will be different from those for firms.

In terms of specific risks facing supply chains, there are some areas where the concerns of governments and private industry converge, and others where they diverge. The predominant thinking in policymaking circles about ‘dependence’ and ‘over-reliance’ on China is more about political-strategic considerations and less about actual economic resilience.⁴⁵ Companies primarily want to work with reliable suppliers and are – to a certain degree – equivocal about whether their supply comes from China (or another country). During the COVID-19 pandemic, some firms have found Chinese suppliers more reliable than North American ones which have been hit by lockdown closures.⁴⁶ This experience shows that being ‘dependent’ on China-heavy supply chains can sometimes be compatible with the goal of boosting resilience. To the extent that policy decisions (stemming from the imposition of tariffs, for example) become a risk to economic resilience for individual firms, the latter are more likely to think in the same terms as policymakers (i.e. along the lines of ‘dependence’ and ‘over-reliance’).

There is also a tension between the objectives of governments in terms of supply-chain resilience and of actual resilience, as defined previously. For instance, government efforts to reshore production are likely to reduce the capacity of firms to manage risks by shifting production across sites in different countries. Moreover, government interventions and market forces are at times pulling in opposite directions – as discussed below in the section on supply-chain design, there is limited evidence that firms are shifting production out of China on a large scale.

In sum, even though supply-chain resilience is ultimately boosted at the corporate level, strengthening supply-chain resilience means something different at the national and international level. This has implications for the role that governments can play in supporting moves to greater resilience.

⁴⁴ A similar point is made by Evenett, S. J. (2021), ‘Trade policy and medical supplies during COVID-19’, Chatham House Briefing, 8 April 2021, <https://www.chathamhouse.org/2021/04/trade-policy-and-medical-supplies-during-covid-19> (accessed 6 May 2021).

⁴⁵ The author would like to thank an anonymous peer reviewer for drawing attention to this point.

⁴⁶ Rastello, S. (2021), ‘Canadian Tire Pads Inventories to Avoid Repeat of 2020 Shortages’, Bloomberg, 23 March 2021, <https://www.bloomberg.com/news/newsletters/2021-03-23/supply-chains-latest-canadian-tire-pads-inventories-for-2021> (accessed 6 May 2021).

04

A public policy toolbox and potential hurdles

While supply-chain resilience is ultimately strengthened at the level of firms, public policy plays an important role, and a mix of government action offers the best chance of success.

This chapter explores the public policy tools available to assist governments in fostering supply-chain resilience, as well as the potential stumbling blocks which exist.

As shown in Table 1, the different strategies making up the government ‘toolbox’ for strengthening supply-chain resilience can be divided into two broad groups, depending on whether the government actions in question are targeted at firms, or whether the government itself is to be the primary actor.

It should be noted that firms are the principal actors in the drive to increase supply-chain resilience, as they are better able to adopt strategies that take the situation of both the individual company and the broader sector into account.⁴⁷ However, governments can also play a critical role by encouraging or constraining the sourcing and supply-chain decisions made by firms. Strengthening public-private approaches to supply-chain resilience is thus important and can take many forms, ranging from joint ventures to informal dialogue and information sharing.

In addition to making the distinction between the corporate and governmental levels, useful insights can also be gained by further classifying public policy aimed at promoting supply-chain resilience. Government strategies fall into one of three categories, according to their specific focus on restrictions, encouragement

⁴⁷ Miroudot (2020), ‘Reshaping the policy debate on the implications of COVID-19 for global supply chains’.

or cooperation. The ‘restrictive’ category includes strategies that seek to limit investment and trade (for example, through tariffs). Actions such as introducing tax concessions or subsidies fall into the category of ‘encouragement’, as do policies which foster the creation of a conducive business and regulatory environment which allows strategic sectors to flourish. This category also entails measures in support of national infrastructure.

Firms are the principal actors in the drive to increase supply-chain resilience, as they are better able to adopt strategies that take the situation of both the individual company and the broader sector into account.

At the international level, the third category of ‘cooperative’ action between like-minded countries can help to diversify supply chains. The policy recommendations in Chapter Six focus on this category, specifically exploring actions that can be undertaken by the governments of the US and its European partners, working both bilaterally and at the global level.

Table 1. Overview of strategies for supply-chain resilience

Strategy focus	Government action targeted at firms	Government as primary actor
Supply-chain design		
i. Location of production	<ul style="list-style-type: none"> • Constraints on foreign production (taxes, tariffs, or local content requirements) or incentives (tax concessions or subsidies) for reshoring, near-shoring or diversifying supply chains; • Free-trade agreements (FTAs), which could shift production or otherwise diversify supply chains; and • Other efforts to work with allies and trusted partners to secure supply. 	<ul style="list-style-type: none"> • Government ownership for sensitive sectors; and • Legislating for requirements in public procurement.
ii. Supplier network	<ul style="list-style-type: none"> • ‘Matchmaking’ with suppliers; and • Public-private consortiums. 	
Product design and production capacity		
	<ul style="list-style-type: none"> • Simplifying products and reducing their complexity (i.e. by removing unnecessarily divergent regulation); and • Supporting additional or more flexible production and distribution capacity. 	

Strategy focus	Government action targeted at firms	Government as primary actor
Demand planning and inventory management		
i. Buffers	<ul style="list-style-type: none"> Setting requirements and/or providing support for: <ul style="list-style-type: none"> extra inventory/stockpiles; and excess lead time. 	<ul style="list-style-type: none"> Creation of national stockpiles (or stockpiles held jointly with allies) for sensitive products.
ii. Preparedness	<ul style="list-style-type: none"> Setting requirements and/or providing support for: <ul style="list-style-type: none"> monitoring of supply-chain performance; visibility and sharing of information along the supply chain; and risk screening. Stress testing. 	<ul style="list-style-type: none"> Stress tests for national stockpiles; and Risk-management strategies for governments.
Transportation, logistics and security		
	<ul style="list-style-type: none"> Making available sufficient infrastructure funding to ensure availability and quality of transportation; Establishing more efficient customs formalities and expedited processes at the border for critical goods in times of emergency; and Developing and supporting a national strategy for protection against the theft or damage of products, as well as strengthening physical/cyber systems. 	
Financial fragility of suppliers		
	<ul style="list-style-type: none"> Providing assistance with financial capacity/revenue management. 	
Conducive business environment		
	<ul style="list-style-type: none"> Establishing a predictable regulatory environment; Supporting investment and technological innovation; and Reinforcing an open and rules-based global trade system (e.g. exercising restraint in the use of export restrictions; supporting WTO reform; negotiating FTAs). 	

Sources: Author's compilation, building on the supply-chain vulnerabilities identified by Lund et al. (2020), *Risk, resilience, and rebalancing in global value chains*. It also draws on the categorization of resilience-oriented investments by Melnyk, S. A., Closs, D. J., Griffis, S. E., Zobel, C. W. and Macdonald, J. R. (2014), 'Understanding supply chain resilience', *Supply Chain Management Review*, 18(1): pp. 34–41, https://www.researchgate.net/profile/Stanley-Griffis/publication/285800059_Understanding_supply_chain_resilience/links/5963894ba6fdccc9b15c0550/Understanding-supply-chain-resilience.pdf (accessed 12 Feb. 2021).

Government action targeted at firms

Supply-chain design

In terms of affecting the design of supply chains, varying the location of production (by making supply chains shorter, more domestically- or more regionally-based), and diversifying supplier networks are key aspects for consideration in attempts to reduce over-reliance on a handful of (or, at times, single) countries or suppliers.

Much discussion is currently focused on reshoring supply chains. Governments can encourage or compel companies to revert to domestic production (or to secure a minimum production capacity within the domestic economy) through subsidies, taxation, tariffs, local content requirements or restrictions on outbound foreign investment. While such policies could potentially support the desired outcome of securing supply in an emergency, these measures also come with inherent pitfalls – including the potential for economic distortions, with adverse effects on innovation and competitiveness. Specifically, measures to repatriate supply chains could result in higher production costs (reflected in higher domestic prices) and thus in lower overall productivity and reduced growth, though this is hard to quantify.⁴⁸ Some economies of scale might also be lost through having multiple suppliers.⁴⁹ These measures could also lead to retaliatory action by other countries, thereby triggering a wave of protectionism. Moreover, increasing domestic production substitutes one source of vulnerability with another. Specifically, a greater reliance on domestic production is accompanied by a greater exposure to local shocks (such as natural disasters or disease outbreaks).

Measures to repatriate supply chains could result in higher production costs (reflected in higher domestic prices) and thus in lower overall productivity and reduced growth.

In short, the costs of extensive reshoring outweigh the limited benefits. Reshoring is not desirable as a singular strategy, but should target critical areas. There is little evidence of extensive reshoring taking place.⁵⁰ Business surveys have confirmed that firms have limited interest in reshoring. For example, Euler Hermes found in December 2020 that only 10 to 15 per cent of surveyed companies were considering relocating production to their home country.⁵¹

⁴⁸ Fan, Holzheu and Wong (2020), *De-risking global supply chains*.

⁴⁹ Economies of scale are cost advantages that enterprises reap when production becomes more efficient due to the scale of operation (i.e. the cost per unit of output decreases with increasing scale, because the overall cost of production is spread over more units of production).

⁵⁰ Beattie, A. (2020), 'Coronavirus-induced 'reshoring' is not happening', *Financial Times*, 30 September 2020, <https://www.ft.com/content/e06be6a4-7551-4fdf-adfd-9b20feca353b> (accessed 12 Feb. 2021).

Sutherland, B. (2021), 'Are U.S. Manufacturers Coming Home or Not?', Bloomberg, 19 February 2021, <https://www.bloomberg.com/opinion/articles/2021-02-19/are-u-s-manufacturers-coming-home-or-not> (accessed 6 Jul. 2021).

⁵¹ Euler Hermes (2020), 'Survey: After Covid-19 disruption', 10 December 2020, https://www.eulerhermes.com/en_global/news-insights/news/supply-chain-survey-press-release.html (accessed 12 Feb. 2021).

A broader and more appropriate strategy is to diversify supply chains and the supplier network. Concluding FTAs, which could entail shifts in production, could be one element of this. There are additional ways (the topic of Chapters Five and Six) in which working with trusted democratic partners can play a role in diversification efforts. Some authors refer to this notion of working with allies to rebuild supply chains as ‘ally-shoring’.⁵² Such steps would align with a shift towards the regionalization of supply chains.

To actively support diversification at the corporate level, a ‘strategic supply chain diversification fund’ could be set up.⁵³ Governments can also support firms in ‘matchmaking’ with suppliers – for instance, by supporting trade fairs or digital platforms for connecting buyers and sellers.⁵⁴ Strengthening public-private partnerships – for instance, in the form of consortiums to help manufacture essential medicines domestically or to boost domestic processing of critical raw materials – could play a role in creating more resilient supply chains.

However, diversifying supply chains comes with drawbacks and faces hurdles. Increasing the diversification of suppliers and source countries can be costly, and takes time. Among the common impediments to moving the location of production are a number of physical as well as financial and regulatory considerations, as follows:

- Access to natural resources and raw materials;
- The availability of skilled workers and specialized knowledge;
- The existence of an ecosystem of specialized business networks;
- Path dependence for capital-intensive industries (for example, those exhibiting large fixed investments and economies of scale);
- The existence of a conducive business environment (this can depend on the ease of doing business at the production location; technical barriers to investment and trade; taxation; and regulatory aspects); and
- Environmental or human rights concerns.

One key consideration regarding the practical feasibility of diversifying suppliers – and especially if this is being done to reduce dependence on China – is the strength of market forces, relative to the policy levers. First, multinational companies base their production in countries such as China – not with the primary objective of exporting from there, but increasingly in order to serve the local markets. With a growing middle class, and thus a burgeoning consumer population that will drive future demand growth, the business rationale of desiring proximity to major consumer markets stands in contrast to national governments’ efforts to sever economic ties with China. Second, as China has emerged from the COVID-19

⁵² See Dezenski, E. and Austin, J. (2020), ‘Ally-shoring’ will help US rebuild economy and global leadership’, The Hill, 10 September 2020, <https://thehill.com/opinion/finance/515405-ally-shoring-will-help-us-rebuild-economy-and-global-leadership> (accessed 12 Feb. 2021).

⁵³ For example, the Group of the European People’s Party (EPP Group) in the European Parliament has called for the creation of such a fund at the EU level. See EPP Group (2020), ‘EPP Group Position Paper on a European Union for Health’, 1 July 2020, <https://www.eppgroup.eu/newsroom/publications/epp-group-position-paper-on-a-european-union-for-health> (accessed 12 Feb. 2021).

⁵⁴ There is, however, the risk that a firm becomes over-reliant on its perfect match as a supplier, thereby reducing resilience.

pandemic-induced economic slump, and as its economy's performance is key to the global recovery, diversification to other countries is challenging. In essence, many companies are reluctant to move their manufacturing out of China. A survey conducted by the American Chamber of Commerce in Shanghai, in partnership with PwC, found that 70.6 per cent of companies did not intend to shift production out of China, 14.0 per cent are moving some production to non-US locations, and only 3.7 per cent are moving some production out of China to the US and its territories.⁵⁵ Likewise, European firms are not leaving China, but instead are doubling down by reinforcing their operations in China. A recent survey conducted by the EU Chamber of Commerce in China, in partnership with Roland Berger, found that over one-quarter of manufacturers are planning to move at least some of their supply chains into China, while the desire to leave the Chinese market has reached record lows.⁵⁶

Product design and production capacity

Governments can also take action aimed at simplifying product design and enhancing production capacity. By changing the regulatory environment, governments can play a role in supporting firms to reduce product complexity (for instance, by removing the need for products to fulfil slightly different requirements between countries). While harmonizing standards would primarily help to reduce costs, and thus increase efficiency, there is also a positive side-effect which can increase resilience. When products (and, in particular, inputs and components) are standardized to a greater extent, they can be substituted much more easily. This allows firms to manage inventory globally and to shift production across different sites in times of crisis. In other words, it allows for more flexible production and distribution capacities on a global scale.

At the same time, steps towards increasing standardization would come with the accompanying challenge of how to differentiate products. Consumers demand greater variety and increasingly personalized products: thus, businesses often have to manage the twin competing forces of standardization and personalization. Technology can help to overcome this tension, however, by allowing for mass customization.

Demand planning and inventory management

Creating buffers can strengthen supply-chain resilience. This can take the form of excess inventories (i.e. stockpiling) or building in additional lead times. However, such extra buffers can have drawbacks. Holding larger inventories is costly for firms, and is not always possible, given the nature of the product or industry under consideration (for instance, because of limitations on the shelf life of food products or pharmaceuticals). Governments could, for example,

⁵⁵ The American Chamber of Commerce in Shanghai (2020), *2020 China Business Report*, September 2020, <https://www.pwccn.com/en/consulting/china-business-report-sep2020.pdf> (accessed 12 Feb. 2021).

⁵⁶ European Union Chamber of Commerce in China (2021), *European Business in China – Business Confidence Survey 2021*, June 2021, https://www.rolandberger.com/publications/publication_pdf/RB_BCS_EN.pdf (accessed 6 Jul. 2021).

require firms operating in critical sectors to increase their inventories. But the question remains as to who will shoulder the associated costs – governments, businesses or consumers?

In order to enhance preparedness, governments can support the ability of firms to anticipate, discover and deal with supply-chain disruption. Key areas for investment could include measures which facilitate the monitoring of supply-chain performance and risk screening.

More broadly, improving transparency, enhancing the visibility as well as the traceability of supply-chain layers, and sharing this information along the supply chain are all beneficial actions for greater public-private cooperation to build more resilient supply chains. The more that is known about the different layers (tiers) of suppliers and the more visible/transparent those layers are, the easier it is for firms to identify potential problems in the supply chain, to improve the speed and quality of information for early warning systems, and to respond to supply-chain problems.

For enhanced preparedness, stress tests could be introduced. Some authors suggest developing such tests for companies in essential supply chains, along the lines of the stress tests which were made mandatory for banks in the wake of the global financial crisis that began in 2007.⁵⁷ Stress-testing could require companies to quantify the cost of supply-chain disruptions under different scenarios, and to prepare mitigation plans.

Stress-testing could require companies to quantify the cost of supply-chain disruptions under different scenarios, and to prepare mitigation plans.

Schmitt and Kennedy have recommended a supply-chain analysis by drawing inspiration from the Committee on Foreign Investment in the United States (CFIUS).⁵⁸ While CFIUS is currently set up to scrutinize the risks to US national security posed by investments of foreign entities, it could serve as a model for reviewing imports of critical products.

Transportation, logistics and security

Public investment in maintaining and building adequate infrastructure affects firms' abilities to develop multiple transportation options and to help supply chains adjust to external shocks. To facilitate the movement of goods in times of crisis, governments can also take steps to expedite customs administration and the

⁵⁷ Simchi-Levi, D. and Simchi-Levi, E. (2020), 'We Need a Stress Test for Critical Supply Chains', *Harvard Business Review*, 28 April 2020, <https://hbr.org/2020/04/we-need-a-stress-test-for-critical-supply-chains> (accessed 12 Feb. 2021).

⁵⁸ Schmitt, G. J. and Kennedy, C. (2020), 'One Concrete Way to Start Decoupling with China', *The American Interest*, 1 May 2020, <https://www.the-american-interest.com/2020/05/01/one-concrete-way-to-start-decoupling-with-china> (accessed 12 Feb. 2021).

timely release of critical goods by simplifying procedures without undermining health and safety (for example, by intercepting the trafficking of counterfeited medical supplies).

Improving the protection of firms and supply networks against the theft or damage of products, as well as strengthening physical and cyber systems, can enhance the security of supply chains.

Financial fragility of suppliers

An important component of a smoothly-operating supply chain is the management of cash flows along that chain. Supply-chain finance fuels the operations across the production network, and thus drives global trade. During an economic crisis, the supply of trade finance can dry up as banks curtail lending. Corporate loan defaults and bankruptcies are not only likely to have a direct impact on the financial sector; they can also have ripple effects along the supply chain. Trade finance scarcity particularly affects small and medium-sized enterprises, and is most pronounced in developing countries.

Governments can assist firms with the management of their revenues and financial capacity through emergency loans or payment holidays. In the wake of the outbreak of the COVID-19 virus, the WTO and six multilateral development banks⁵⁹ extended their trade finance programmes in support of essential imports and exports.⁶⁰

Conducive business environment

Governments can set a conducive business environment which facilitates adjustment to shocks and thus strengthens supply-chain resilience. This entails the establishment of a stable and predictable regulatory, trade and investment regime. In addition, government support for innovation and investment can help firms develop more flexible responses to supply-chain disruptions. Governments can take steps to facilitate the adaptation of new technologies by firms and to promote next-generation industries.

On the trade front, governments can encourage supply-chain resilience by reinforcing the global rules-based trading system, especially via the WTO and bilateral/regional FTAs. The WTO is at the centre of the multilateral trade regime, and plays a critical role in maintaining trade openness, which is crucial for supply-chain resilience. As discussed in Chapter Five, the WTO has taken steps in the context of the pandemic – particularly with regard to the monitoring of trade measures and the use of export restrictions.

Negotiating FTAs plays a role in the above-mentioned diversification of supply chains and reduction of trade barriers. Specifically, greater harmonization or mutual recognition of standards and regulations can not only help to reduce trade costs (and thus enhance efficiency), but also strengthen supply-chain resilience

⁵⁹ International Finance Corporation (IFC), European Bank for Reconstruction and Development (EBRD), Asian Development Bank (ADB), African Development Bank Group (AfDB), Islamic Trade Finance Corporation (ITFC), and the InterAmerican Development Corporation (IDB Invest).

⁶⁰ See World Trade Organization (2020), 'Joint Statement by heads of multilateral development banks and the WTO on supporting trade finance during the COVID-19 crisis', WTO, 1 July 2020, https://www.wto.org/english/news_e/news20_e/trfin_01jul20_e.pdf (accessed 12 Feb. 2021).

by facilitating the production of essential goods. FTAs can also serve to liberalize trade in digital technologies, which are a helpful tool for supply-chain resilience, and set new rules for the conduct of digital trade.

Governments as the primary actor

Areas where governments are the primary actor include public procurement. Critical infrastructure is perhaps the most prominent historical example, although the COVID-19 pandemic has highlighted the need for public authorities to purchase vital products and services needed to tackle public health emergencies. In January 2021, President Biden signed an executive order strengthening 'Buy American' provisions that increase domestic preferences in public procurement contracts.⁶¹ In July, the administration announced further steps in order to increase US-made content in federal purchases and to bolster critical supply chains.⁶²

Governments create and maintain national stockpiles for critical sectors. For instance, in the US, the Strategic National Stockpile⁶³ covers critical pharmaceutical and medical supplies. The US Department of Energy's Strategic Petroleum Reserve is the world's largest emergency reserve of crude oil.

Stress tests could be used to determine if a government's national stockpiling strategy is adequate to prevent shortages. In addition, regular reviews are necessary to identify which critical products, such as materials for advanced technologies, should be added to the stockpile. Under the Obama and Trump administrations, the US added certain rare-earth elements to the National Defense Stockpile.⁶⁴ However, the latter is limited to defence purposes, and is not intended as an economic stockpile. Initiatives are therefore under consideration with regard to expanding the current stockpile in size and scope.⁶⁵

Identifying critical products and stockpiling them is challenging, and is further complicated by the fact that governments would have to anticipate which products will be essential for each specific crisis. Hence, risk-management strategies play a role in governments' preparations for crises.

⁶¹ The White House (2021), 'President Biden to Sign Executive Order Strengthening Buy American Provisions, Ensuring Future of America is Made in America by All of America's Workers', Press Release, 25 January 2021, <https://www.whitehouse.gov/briefing-room/statements-releases/2021/01/25/president-biden-to-sign-executive-order-strengthening-buy-american-provisions-ensuring-future-of-america-is-made-in-america-by-all-of-americas-workers> (accessed 12 Feb. 2021).

⁶² The White House (2021), 'FACT SHEET: Biden-Harris Administration Issues Proposed Buy American Rule, Advancing the President's Commitment to Ensuring the Future of America is Made in America by All of America's Workers', Press Release, 28 July 2021, <https://www.whitehouse.gov/briefing-room/statements-releases/2021/07/28/fact-sheet-biden-harris-administration-issues-proposed-buy-american-rule-advancing-the-presidents-commitment-to-ensuring-the-future-of-america-is-made-in-america-by-all-of-americas> (accessed 4 Aug. 2021).

⁶³ U.S. Department of Health and Human Services (2021), 'Strategic National Stockpile', <https://www.phe.gov/about/sns/Pages/default.aspx> (accessed 12 Feb. 2021).

⁶⁴ Humphries, M. (2019), *Critical Minerals and U.S. Public Policy*, Congressional Research Service, Report R45810, https://www.everycrsreport.com/files/20190628_R45810_b3112ce909b130b5d525d2265a62ce8236464664.pdf (accessed 12 Feb. 2021).

⁶⁵ See, for example, Sullivan, D. (2020), 'Senior DOD Official Commits to Sullivan to Produce Plan on a U.S. Stockpile of Critical Minerals to Combat China', Press Release, 1 October 2020, https://www.sullivan.senate.gov/newsroom/press-releases/senior-dod-official-commits-to-sullivan-to-produce-plan_on-a-us-stockpile-of-critical-minerals-to-combat-china (accessed 12 Feb. 2021).

A number of countries have agreed to share stockpiles in case of emergencies. The Agreement on an International Energy Program, which established the International Energy Agency in the wake of the 1973/74 oil crisis, offers an example. At the present time, participating countries have agreed to hold emergency oil stocks and release them as part of a collective action in the case of a severe shock. Chapter Six explores some ideas for further collaborative steps regarding jointly-held stockpiles.

The role of technology

Technology cuts across all these issues and dimensions: first, it is a driver for government action. As discussed in Chapter Three, there are national security and economic rationales for strengthening supply chains of critical technologies, such as semiconductors. Second, technology is a tool to build resilient production networks. Increased automation and the use of robotics have the potential to shorten supply chains. End-to-end data platforms offer greater data security along the supply chain and can help to identify and manage supply-chain risks.⁶⁶ Blockchain, for example, increases transparency and visibility in global production networks by creating an unchangeable record of supply-chain data. Third, technology also creates stumbling blocks for supply chains – with examples being cybersecurity concerns or a reliance on critical minerals for certain technologies.

As mentioned in Chapter Two, technologies such as 3D printing can help bridge the divide in terms of the traditional trade-off between efficiency and resilience. In other words, the adoption of new technologies means that greater resilience does not have to mean reduced efficiency. However, technology alone is not a magical solution for strengthening supply-chain resilience. Each approach outlined above comes with its own set of advantages and disadvantages. In addition, these strategies are not all mutually exclusive: rather, some can be interoperable and can build on each other.

⁶⁶ Fan, Holzheu and Wong (2020), *De-risking global supply chains*.

05

Existing efforts for supply-chain resilience

Recent supply-chain resilience initiatives by the US, EU and UK, and like-minded partners, provide opportunities to address shared vulnerabilities and to maintain trade-openness, with a key role for the WTO.

A number of countries have launched initiatives to strengthen supply-chain resilience. While most efforts are focused on domestic policy, the shared concerns and the universal desire to build more resilient supply chains offers an opportunity for international collaboration. Some initiatives specifically include an element of working with trusted partners. While this chapter focuses on existing efforts for supply-chain resilience in the US and Europe, initiatives by other countries (such as Japan) or among groups of countries are included to examine best practice and identify scope for greater collaboration between like-minded partners. Finally, global initiatives are discussed, with a particular focus on the WTO, not only because these efforts have implications for transatlantic measures to build resilient supply chains, but also because the US and Europe play an important role in driving these multilateral efforts.

The US

Initiatives to bolster supply-chain resilience have proliferated in the wake of the outbreak of COVID-19, but efforts predate the pandemic. In 2012, for instance, the Obama administration released the National Strategy for Global Supply Chain

Security,⁶⁷ which highlighted the importance of the global supply-chain system to US national security and economic prosperity. And in 2017, President Trump issued an Executive Order on Assessing and Strengthening the Manufacturing and Defense Industrial Base and Supply Chain Resiliency of the United States.⁶⁸

Following the onset of the coronavirus pandemic, various pieces of legislation aimed at the medical supply chain have been introduced in the US. The Coronavirus Aid, Relief, and Economic Security Act (also known as CARES – a \$2.2 trillion economic stimulus package signed into law in March 2020) provided for the assessment of gaps and the strengthening of supply chains for drugs and medical devices. In May 2020, the Trump administration invoked the Defense Production Act and issued an executive order authorizing the International Development Finance Corporation to provide funds for expanding domestic production of strategic resources and strengthening the resilience of relevant domestic supply chains.⁶⁹ Subsequent executive orders were aimed at strengthening the US medical supply chain⁷⁰ and addressing import dependence on ‘foreign adversaries’ in the supply of critical minerals.⁷¹

On his first full working day – 21 January 2021 – President Biden issued an executive order focused on securing supply chains of critical items needed to respond to the COVID-19 pandemic.⁷² On 24 February, the Biden administration ordered a government-wide review of critical supply chains, including for (1) pharmaceuticals and APIs, (2) semiconductors, (3) large-capacity batteries and (4) rare-earth elements.⁷³ In June 2021, the administration published the findings of this 100-day review.⁷⁴ In assessing supply-chain vulnerabilities in these four areas and providing recommendations, the report stressed the need to expand domestic production of critical goods, while strengthening international trade rules and ‘work[ing] with America’s allies and partners to strengthen collective

⁶⁷ The White House (2012), *National Strategy for Global Supply Chain Security*, 23 January 2012, https://obamawhitehouse.archives.gov/sites/default/files/national_strategy_for_global_supply_chain_security.pdf (accessed 12 Feb. 2021).

⁶⁸ The White House (2017), ‘Presidential Executive Order on Assessing and Strengthening the Manufacturing and Defense Industrial Base and Supply Chain Resiliency of the United States’, 21 July 2017, <https://trumpwhitehouse.archives.gov/presidential-actions/presidential-executive-order-assessing-strengthening-manufacturing-defense-industrial-base-supply-chain-resiliency-united-states> (accessed 12 Feb. 2021).

⁶⁹ The White House (2020), ‘EO on Delegating Authority Under the DPA to the CEO of the U.S. International Development Finance Corporation to Respond to the COVID-19 Outbreak’, 14 May 2020, <https://trumpwhitehouse.archives.gov/presidential-actions/eo-delegating-authority-dpa-ceo-u-s-international-development-finance-corporation-respond-covid-19-outbreak> (accessed 12 Feb. 2021).

⁷⁰ The White House (2020), ‘Executive Order on Ensuring Essential Medicines, Medical Countermeasures, and Critical Inputs Are Made in the United States’, 6 August 2020, <https://trumpwhitehouse.archives.gov/presidential-actions/executive-order-ensuring-essential-medicines-medical-countermeasures-critical-inputs-made-united-states> (accessed 12 Feb. 2021).

⁷¹ The White House (2020), ‘Executive Order on Addressing the Threat to the Domestic Supply Chain from Reliance on Critical Minerals from Foreign Adversaries’, 30 September 2020, <https://trumpwhitehouse.archives.gov/presidential-actions/executive-order-addressing-threat-domestic-supply-chain-reliance-critical-minerals-foreign-adversaries> (accessed 12 Feb. 2021).

⁷² The White House (2021), ‘Executive Order on a Sustainable Public Health Supply Chain’, 21 January 2021, <https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/21/executive-order-a-sustainable-public-health-supply-chain> (accessed 12 Feb. 2021).

⁷³ The White House (2021), ‘Executive Order on America’s Supply Chains’.

⁷⁴ The White House (2021), ‘Building Resilient Supply Chains, Revitalizing American Manufacturing, and Fostering Broad-Based Growth’.

supply chain resilience'.⁷⁵ By 24 February 2022 (i.e. within one year of the original executive order), the Biden administration intends to complete its review of six critical sectors.⁷⁶

While the Biden administration's emphasis on working closely with allies represents a break with the mostly unilateral approaches of the Trump administration, there are nonetheless similarities between the two approaches. First among these is an emphasis on increasing domestic manufacturing. Second, many of the same sectors – notably medical goods, pharmaceuticals, semiconductors and critical minerals – are at the focus of efforts to strengthen supply-chain resilience. Finally, supply chains in these sectors are considered vulnerable because of alleged over-reliance on 'foreign adversaries' – especially China.

While the Biden administration's emphasis on working closely with allies breaks with the mostly unilateral approaches of the Trump administration, there are similarities between the two in terms of safeguarding critical supply chains.

Legislative actions have also been taken in the US to safeguard critical supply chains in the face of strategic competition with China. In June 2021, the US Innovation and Competition Act was passed by the Senate with bipartisan support.⁷⁷ The Act encompasses seven major divisions by combining different bills, including the Endless Frontier Act and the Strategic Competition Act of 2021. The overall US Innovation and Competition Act seeks to establish 'a supply chain resiliency and crisis response program' within the US Department of Commerce.⁷⁸ It also includes measures explicitly aimed at helping US companies diversify their supply chains away from China. In this regard, the act specifically mentions working with transatlantic partners.⁷⁹

Europe

Diversifying and strengthening supply chains has become a strategic priority for the EU, and specifically for the European Commission, which considers it to be a key tool in pursuit of its goal of 'open strategic autonomy'.⁸⁰ Supply-chain resilience is also closely linked to the renewed focus on industrial policy for Europe. In its

⁷⁵ Ibid.

⁷⁶ Ibid. The year-long supply chains review covers the following six critical sectors: (1) defence, (2) public health and biological preparedness, (3) information and communications technology, (4) energy, (5) transportation, and (6) production of agricultural commodities and food products.

⁷⁷ 117th Congress (2021–22), 'S.1260 – United States Innovation and Competition Act of 2021', <https://www.congress.gov/117/bills/s/1260/BILLS-117s1260es.pdf> (accessed 6 Jul. 2021).

⁷⁸ Ibid. See Sec. 2505.

⁷⁹ Ibid. See Sec. 3255.

⁸⁰ The model of open strategic autonomy means 'shaping the new system of global economic governance and developing mutually beneficial bilateral relations, while protecting [the EU] from unfair and abusive practices.' European Commission (2020), 'Europe's moment: Repair and Prepare for the Next Generation'.

resolution of 25 November 2020 on a New Industrial Strategy for Europe,⁸¹ the European Parliament has emphasized the need to increase supply-chain resilience and has called for ‘smart reshoring [to] relocate industrial production in sectors of strategic importance for the Union’.⁸² In order to enhance the EU’s industrial and strategic autonomy, the European Commission is focused in particular on securing the supply of critical raw materials (for instance by launching the European Raw Materials Alliance⁸³) and pharmaceuticals (by adopting a Pharmaceutical Strategy for Europe⁸⁴). In May 2021, the European Commission updated its 2020 New Industrial Strategy, including an in-depth review of a number of sectors and supply chains that are considered strategic for Europe’s interests, such as raw materials, semiconductors and APIs.⁸⁵ Moreover, progress has been made in efforts to strengthen mandatory due diligence requirements for EU companies concerning human rights and environmental considerations in global supply chains.⁸⁶

For its part, the UK government is reviewing vulnerabilities in supply chains for essential goods (with particular emphasis on the perceived over-reliance on China) in the light of the COVID-19 pandemic. However, few details have emerged about this internal exercise, named ‘Project Defend’.⁸⁷

Japan

As part of its emergency response to the outbreak of the COVID-19 virus, Japan announced a package of stimulus measures in April 2020, which included financial grants to firms undertaking projects to diversify their supply chains. It is noteworthy that the measures are not simply targeted at reshoring production, but also include funds aimed at shifting operations to other countries. As part of the Program for Promoting Investment in Japan to Strengthen Supply Chains, 146 firms were chosen to receive government subsidies, amounting to 247.8 billion yen (approximately \$2.32 billion) in total.⁸⁸ Meanwhile, the Japanese External Trade Organization (JETRO)’s Program for Strengthening Overseas Supply Chains

⁸¹ European Parliament (2020), ‘A New Industrial Strategy for Europe’, European Parliament resolution of 25 November 2020 on a New Industrial Strategy for Europe, 25 November 2020, https://www.europarl.europa.eu/doceo/document/TA-9-2020-0321_EN.html (accessed 12 Feb. 2021).

⁸² Ibid.

⁸³ European Commission (2020), ‘New alliance to strengthen resilience of the raw materials value chain’, 29 September 2020, https://ec.europa.eu/growth/content/new-alliance-strengthen-resilience-raw-materials-value-chain_en (accessed 12 Feb. 2021).

⁸⁴ European Commission (2020), ‘Pharmaceutical Strategy for Europe’, Commission Communication COM(2020) 761 final, 25 November 2020, <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52020DC0761&from=EN> (accessed 12 Feb. 2021).

⁸⁵ European Commission (2021), ‘In-depth reviews of strategic areas for Europe’s interests’, 5 May 2021, https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/european-industrial-strategy/depth-reviews-strategic-areas-europes-interests_en (accessed 6 Jul. 2021).

⁸⁶ As mentioned in Chapter Three concerning public policy motivations for strengthening supply-chain resilience, in March 2021 the European Parliament passed a resolution with recommendations to the European Commission on corporate due diligence and corporate accountability for human rights and environmental impacts throughout supply chains. The Commission is expected to present its legislative proposal later in 2021.

⁸⁷ House of Commons International Trade Committee (2020), *The COVID-19 pandemic and international trade*, First Report of Session 2019–21, 29 July 2020, pp. 39–40, <https://committees.parliament.uk/publications/2177/documents/20125/default> (accessed 12 Feb. 2021).

⁸⁸ Using an average annual exchange rate in 2020 of ¥106.775:US\$1, OECD, <https://data.oecd.org/conversion/exchange-rates.htm> (accessed 6 Jul. 2021). The 146 successful applicants were selected from among 1,679 applications. This degree of oversubscription shows the high level of interest in the scheme. See Ministry of Economy, Trade and Industry (2020), ‘Successful Applicants Selected for the Program for Promoting Investment in Japan to Strengthen Supply Chains’, 20 November 2020, https://www.meti.go.jp/english/press/2020/1120_001.html (accessed 12 Feb. 2021).

offers financial support to Japanese companies which seek to strengthen supply chains between Japan and the 10 member states of the Association of Southeast Asian Nations (ASEAN),⁸⁹ including by shifting production to those states and away from other countries.⁹⁰ While China is not singled out directly, the measures are aimed at China-dominated supply chains. At the same time, these efforts do not amount to a policy of complete decoupling from China, but should rather be seen as part of a broader strategy of enhancing resilience.⁹¹

‘Minilateral’ initiatives

A small number of countries are working together and have launched ‘minilateral’ efforts to strengthen supply-chain resilience.⁹² In March 2020, Australia, Brunei Darussalam, Canada, Chile, Myanmar, New Zealand and Singapore issued a statement highlighting their commitment to ‘maintaining open and connected supply chains’ and ‘removing any existing trade restrictive measures on essential goods, especially medical supplies’.⁹³

It is notable that the US is currently absent from the Supply Chain Resilience Initiative, given that it shares many concerns with Australia, India and Japan regarding supply-chain issues.

Meanwhile, Australia, India and Japan have been driving forward a cooperative effort to improve supply chains. In September 2020, the three countries issued a trilateral statement⁹⁴ announcing their intention to collaborate on supply-chain resilience in the Indo-Pacific region, by means of a Supply Chain Resilience Initiative (SCRI).⁹⁵ The SCRI was formally launched in April 2021, with representatives from the three countries stating that the initiative could be expanded to other countries

⁸⁹ Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam.

⁹⁰ See JETRO (2020), ‘Program for Strengthening Overseas Supply Chains’, https://www.jetro.go.jp/ext_images/thailand/pdf/ProgramEngStrengtheningOverseasSupplyChain.pdf (accessed 12 Feb. 2021).

⁹¹ A similar point is made by Duchâtel, M. (2020), ‘Resilience, not Decoupling: Critical Supply Chains in China-Japan Relations’, Institut Montaigne, 28 August 2020, <https://www.institutmontaigne.org/en/blog/resilience-not-decoupling-critical-supply-chains-china-japan-relations> (accessed 12 Feb. 2021).

⁹² Minilateralism is a form of international cooperation that is often characterized by informal platforms, a small number of participating countries and issue-specific scope.

⁹³ Joint ministerial statement by Australia, Brunei Darussalam, Canada, Chile, the Republic of the Union of Myanmar, New Zealand and Singapore (2020), ‘Joint Ministerial Statement’, 25 March 2020, <https://www.trademinister.gov.au/minister/simon-birmingham/media-release/joint-ministerial-statement-australia-brunei-darussalam-canada-chile-republic-union-myanmar-new-zealand-and-singapore> (accessed 6 May 2021).

⁹⁴ Australian Government, Department of Foreign Affairs and Trade (2020), ‘Australia-India-Japan Economic Ministers’ Joint Statement on Supply Chain’, 1 September 2020, <https://www.dfat.gov.au/news/media-release/australia-india-japan-economic-ministers-joint-statement-supply-chain> (accessed 12 Feb. 2021).

⁹⁵ Bloomberg News (2020), ‘Japan, Australia and India to Launch Supply Chain Initiative’, 1 September 2020, <https://www.bloomberg.com/news/articles/2020-09-01/japan-australia-and-india-to-discuss-supply-chains-alliance> (accessed 12 Feb. 2021).

in due course.⁹⁶ It is notable that the US is currently absent from the collaboration, given that it shares many concerns with Australia, India and Japan regarding supply-chain issues in general – and in particular, regarding overdependence on China for some critical products. The US absence is doubly conspicuous in that the announcement of the SCRI coincided with proposals to boost regional security cooperation within the so-called ‘Quad’ – the Quadrilateral Security Dialogue between the US, Japan, Australia and India.⁹⁷

Even the Trump administration – which seldom seemed to favour collaboration with partners and allies – gave serious consideration to creating an Economic Prosperity Network, an alliance of like-minded countries, companies, institutions, and civil society organizations from Australia, India, Japan, New Zealand, South Korea and Vietnam.⁹⁸ Although the future of this initiative under President Biden is not apparent, it is clear that the new US administration is engaging allies and partners on supply-chain issues. The Biden administration has suggested convening ‘a new Presidential Forum’ to expand engagement on supply-chain resilience with groupings of like-minded countries such as the Quad and G7.⁹⁹

Global initiatives

In May 2020, G20 trade ministers proposed a number of actions to support global trade in response to the COVID-19 pandemic and to build resilience in global supply chains.¹⁰⁰ Ministers focused on short-term collective actions, such as refraining from implementing export restrictions and streamlining customs procedures, and on specific long-term measures, such as sharing information, improving transparency and supporting the multilateral trading system and WTO reform.

The WTO is at the centre of the multilateral trade regime. It is the key forum for countries to discuss issues related to trade, and plays a critical role in maintaining trade openness, which in turn is crucial to supply-chain resilience. In the wake of the COVID-19 pandemic, the WTO has played a role in strengthening supply-chain resilience and global trade more broadly.¹⁰¹

First, the WTO Secretariat stepped up monitoring of its members’ policies with respect to trade and trade-related measures adopted in the context of the pandemic. Such transparency facilitates information sharing between governments, which in turn supports the flow of essential products at a time

⁹⁶ Australian Government, Department of Foreign Affairs and Trade (2021), ‘Joint Statement on the Supply Chain Resilience Initiative by Australian, Indian and Japanese Trade Ministers’, 27 April 2021, <https://www.dfat.gov.au/news/media-release/joint-statement-supply-chain-resilience-initiative-australian-indian-and-japanese-trade-ministers> (accessed 6 Jul. 2021).

⁹⁷ This argument draws on Goto, S. (2020), ‘Deglobalization or Re-Globalization? Asia May Be Diverging From the U.S.’, Wilson Center, 3 November 2020, <https://www.wilsoncenter.org/blog-post/deglobalization-or-re-globalization-asia-may-be-diverging-us> (accessed 12 Feb. 2021).

⁹⁸ Pamuk, H. and Shalal, A. (2020), ‘Trump administration pushing to rip global supply chains from China: officials’, Reuters, 4 May 2020, <https://www.reuters.com/article/us-health-coronavirus-usa-china-idUSKBN22G0BZ> (accessed 12 Feb. 2021).

⁹⁹ The White House (2021), ‘Building Resilient Supply Chains, Revitalizing American Manufacturing, and Fostering Broad-Based Growth’.

¹⁰⁰ G20 (2020), ‘G20 Trade and Investment Ministerial Meeting: Ministerial Statement’, 14 May 2020, <http://www.g20.utoronto.ca/2020/2020-g20-trade-0514.html> (accessed 6 May 2021).

¹⁰¹ Bacchetta et al. (2021), ‘COVID-19 and Global Value Chains’.

of crisis. While WTO members have submitted a total of 404 notifications related to the COVID-19 pandemic (as of 30 July 2021),¹⁰² the current notification process is not adequate. It understates the number of measures introduced when compared to other independent trade-policy monitoring accounts.¹⁰³

Second, the WTO plays a role in addressing the use of export restrictions. WTO rules generally prohibit export restrictions, but allow flexibilities in emergency situations. However, the widespread use of these measures has impeded worldwide access to medical supplies and vaccines during the COVID-19 pandemic. It has also raised questions about whether the measures are consistent with WTO obligations and about the impact on countries that rely on the import of such goods.

Third, a number of initiatives have been launched among a subset of WTO members. For instance, the Ottawa Group – led by Canada and consisting of 14 like-minded WTO members¹⁰⁴ – is advancing a Trade and Health Initiative which includes efforts to strengthen the resilience of supply chains to respond to health emergencies.¹⁰⁵

In short, various endeavours to build resilient supply chains are under way – ranging from working bilaterally with trusted partners and cooperating with groups of like-minded countries, to multilateral efforts at the WTO. The next chapter includes recommendations to further build on these initiatives.

¹⁰² World Trade Organization (2021), 'WTO members' notifications on COVID-19', https://www.wto.org/english/tratop_e/covid19_e/notifications_e.htm (accessed 4 Aug. 2021).

¹⁰³ For example, the Global Trade Alert (<https://www.globaltradealert.org>).

¹⁰⁴ In addition to Canada, the other 12 founding members of the Ottawa Group (which was formed in October 2018) were Australia, Brazil, Chile, the EU, Japan, Kenya, Mexico, New Zealand, Norway, Singapore, South Korea and Switzerland. The UK joined the Ottawa Group in March 2021. Department for International Trade (2021), 'UK statement to Ottawa Group', Statement from International Trade Secretary Liz Truss to the Ottawa Group on WTO reform, 22 March 2021, <https://www.gov.uk/government/speeches/uk-statement-to-ottawa-group> (accessed 6 May 2021).

¹⁰⁵ World Trade Organization (2020), 'COVID-19 and Beyond: Trade and Health, Communication from Australia, Brazil, Canada, Chile, the European Union, Japan, Kenya, Republic of Korea, Mexico, New Zealand, Norway, Singapore and Switzerland', 23 November 2020, <https://docs.wto.org/dol2fe/Pages/SS/directdoc.aspx?filename=Q:/WT/GC/223.pdf> (accessed 12 Feb. 2021).

06

Conclusions and recommendations

Although necessary, domestic efforts to strengthen supply-chain resilience are not sufficient. International cooperation can help the US and Europe reduce global dependencies in strategic sectors without sliding into protectionism.

Based on this paper's analysis of existing vulnerabilities in global supply chains (Chapter Three), the public policy 'toolbox' described in Chapter Four, and building on the existing range of efforts for strengthening supply-chain resilience as detailed above, this chapter will outline some guiding principles and concrete recommendations for action by the US and Europe at three levels: domestic; bilateral/with groups of regional allies; and global.

This chapter also offers concluding observations. An important insight is that domestic policy is necessary, but not sufficient, to strengthen supply-chain resilience. Transatlantic cooperation, the leveraging of regional alliances, and efforts at the global level are key to success.

Domestic level: principles for supply-chain resilience

The following broad guidelines can help policymakers in the US and Europe adopt policies that promote supply-chain resilience. Although the recommendations are aimed at the domestic level, policymakers on both sides of the Atlantic could cooperate to exchange information and share best practice in developing and implementing these principles.

- Government action to strengthen supply-chain resilience should be targeted at critical industries and products – such as health, energy, defence, infrastructure, and key digital technologies and related raw materials. The list of targeted sectors needs to be revised on a regular basis. Because of evolving technologies, market developments, and future crises, what is considered a critical good or service could change significantly over time.
- Support for supply-chain resilience in these specific industries should not be given in the form of general industrial policies. Not only would this potentially violate WTO rules, it also risks bringing about a ‘cycle of competitive subsidization’.¹⁰⁶ Moreover, it could make any efforts by the transatlantic partners to persuade China to make meaningful reform on state-owned enterprises or government subsidies more challenging: for instance, by prompting accusations of hypocrisy. Thus, any policies aimed at strengthening supply-chain resilience should be compatible with WTO rules. Competition law and commitments contained in FTAs should also be respected.

Working with the private sector is of particular importance for policymakers in the US and Europe in the light of the high proportion of transatlantic trade taking place on an ‘intra-firm’ basis.

- There can be no one-size-fits-all government policy for fostering supply-chain resilience. The toolbox detailed in Chapter Four includes a mix of policies, including limited reshoring and the strengthening of domestic production for essential products and sectors, the diversification of sources of supply, and stockpiling.
- Public policy efforts should recognize that supply chains are ultimately strengthened at the level of firms, as it is companies along the supply chain which ultimately make the relevant decisions on sourcing and production. What works best will differ between firms and industries. Working with the private sector is of particular importance for policymakers in the US and Europe in the light of the high proportion of transatlantic trade taking place on an ‘intra-firm’ basis. At the same time, cooperation with the private sector should not be limited to domestic firms in the US and Europe, but should involve all companies along a supply chain. Greater international cooperation, discussed below, can play a role in this regard.
- At a time when global trade and supply chains have come under pressure – and have also been subjected to increased scrutiny – transparency and consultations with relevant stakeholders are critical. These include not only the firms along the supply chain, but also national and regional governments, trade unions and research organizations, as well as civil society.

¹⁰⁶ See Dueterberg, T. J. (2020), ‘Trade, Manufacturing and Critical Supply Chains: Lessons from Covid-19’, Testimony before the US House of Representatives, Committee on Ways and Means, Subcommittee on Trade Hearing, 23 July 2020, <https://www.congress.gov/116/meeting/house/110939/witnesses/HHRG-116-WM04-Wstate-DueterbergT-20200723.pdf> (accessed 6 May 2021).

- Different stakeholders on both sides of the Atlantic should collectively assess what supply-chain resilience actually means, and looks like, for specific sectors. Without a common definition, and without pre-identified criteria by which to judge what is a resilient as opposed to a fragile supply chain, it is difficult to develop actionable strategies to achieve greater supply-chain resilience. As a starting point, a resilient supply chain is one that is visible, agile, and sustainable.

Bilateral and regional level: working with allies

Increased cooperation between the US and Europe, and greater collaboration between the transatlantic partners and other like-minded countries, could strengthen supply-chain resilience. It could also help to foster greater policy coherence and to address shared concerns regarding China's concentration of production in critical areas. At the same time, increasing cooperation on supply-chain resilience would require a high degree of shared ambition among the supply-chain partner countries, involving delicate issues such as trust, solidarity and collective decision-making across borders.

The following areas offer an opportunity for US and European policymakers – as well as other partners – to work jointly and with the private sector:

- Greater cooperation is needed to identify existing and potential supply-chain risks – particularly in the context of strategic dependence on China. This involves mapping the key players involved in critical supply chains, as well as collecting and sharing information concerning any vulnerabilities and potential bottlenecks in supply chains. Stress tests can play a critical role, especially for essential supply chains. As a next step, the transatlantic partners could then determine where they have the capacity to supply goods and services.
- In order to create buffers, the transatlantic partners should develop strategies for joint stockpiles or strategic reserves of essential goods. A natural starting point, in the context of the COVID-19 pandemic, is medical supplies: the EU has already suggested the stockpiling of key medical equipment as an area for increased transatlantic cooperation.¹⁰⁷
- In the future, greater transatlantic cooperation will be needed in the area of critical raw materials. Securing supply and working with allied nations – in particular Australia and Canada, which have vast reserves and resources of rare-earth minerals – will be vital for the US and Europe. Japan, South Korea and especially Taiwan are also key partners, and play an important role in securing the supply chains of strategically significant products that rely on rare-earth elements, such as semiconductors and electric vehicle batteries.

¹⁰⁷ European Commission (2020), 'A new EU-US agenda for global change', Joint Communication to the European Parliament, the European Council and the Council, JOIN(2020) 22 final, 2 December 2020, https://ec.europa.eu/info/sites/info/files/joint-communication-eu-us-agenda_en.pdf (accessed 12 Feb. 2021).

One approach could be to offer financial support (for example in the form of subsidized storage) to encourage firms in a partner country to hold larger inventories of rare-earth elements.¹⁰⁸ Another approach could be the establishment of national stockpiles which are shared, and for which stress tests are developed.

In particular, collaboration among the members of ‘Five Eyes’ – the intelligence alliance comprising Australia, Canada, New Zealand, the UK and the US – could be a launching pad to advance supply-chain resilience.¹⁰⁹ The group could become a platform for the development of a strategic economic relationship for critical raw materials, such as rare earths, in the light of China’s dominance in this area. Indeed, Australian Prime Minister Scott Morrison has stated that the Five Eyes alliance will be used to create ‘trusted supply chains’.¹¹⁰ Moreover, cooperation could be extended to other like-minded countries. Proposals have been made for Japan’s integration into an extended version of the Five Eyes alliance.¹¹¹

Furthermore, it would make sense for the US to join the trilateral SCRI established in April 2021 by Australia, India and Japan (see Chapter Five), both to strengthen supply-chain resilience and to align the SCRI more closely with the formation and efforts of the Quad.

- For the US and Europe (specifically, the EU and UK), expanding their respective trade agreements with third countries could help diversify markets and reduce dependencies. Removing tariff and non-tariff barriers, as well as improving cooperation on standards and regulation, could help facilitate trade in essential products. As each other’s most important trading partners, all relevant parties should also revisit and intensify efforts for bilateral US–EU and US–UK trade deals. While the rationale for such efforts to deepen the bilateral transatlantic trade relationships remains strong, the time will not be ripe for comprehensive agreements in the short term. President Biden has vowed to focus on domestic issues first, and Trade Promotion Authority (TPA) – the legislative procedures and conditions under which Congress allows the Executive Branch to pursue new trade agreements – expired on 1 July 2021.
- Concerning technology, efforts to strengthen digital supply-chain security are another potential focus for intensified transatlantic cooperation. Specifically, information exchange and coordination regarding risk-based assessments could be a first step. The US and EU have already identified ‘key policies on technology,

¹⁰⁸ This is one of the recommendations made by Collins, G. B. and Erickson, A. S. (2020), ‘Economic Statecraft: Options for Reducing U.S. Overdependence on Chinese-supplied Materials and Medications’, Rice University’s Baker Institute for Public Policy, 23 April 2020, <https://www.bakerinstitute.org/media/files/files/000f91f7/bi-report-042320-ces-statecraft.pdf> (accessed 12 Feb. 2021).

¹⁰⁹ A similar point is made by Rogers, J., Foxall, A., Henderson, M. and Armstrong, S. (2020), ‘Breaking the China Supply Chain: How the ‘Five Eyes’ can Decouple from Strategic Dependency’, Henry Jackson Society, 14 May 2020, <https://henryjacksonsociety.org/publications/breaking-the-china-supply-chain-how-the-five-eyes-can-decouple-from-strategic-dependency> (accessed 12 Feb. 2021).

¹¹⁰ Whyte, S. (2020), ‘Coronavirus exposes weaknesses in global supply chains, Five Eyes alliance to help’, *Canberra Times*, 10 June 2020, <https://www.canberratimes.com.au/story/6786721/five-eyes-to-be-used-for-supply-chains-as-virus-exposes-weaknesses> (accessed 12 Feb. 2021).

¹¹¹ See for example: Armitage, R. L. and Nye, J. S., Jr (2020), ‘The U.S.-Japan Alliance in 2020: An Equal Alliance with a Global Agenda’, Center for Strategic and International Studies, 7 December 2020, <https://www.csis.org/analysis/us-japan-alliance-2020> (accessed 12 Feb. 2021); Wintour, P. (2020), ‘Five Eyes alliance could expand in scope to counteract China’, *Guardian*, 29 July 2020, <https://www.theguardian.com/uk-news/2020/jul/29/five-eyes-alliance-could-expand-in-scope-to-counteract-china> (accessed 12 Feb. 2021).

digital issues and supply chains' as an area for increased cooperation under the Trade and Technology Council (TTC), which was launched in April 2021.¹¹² Moreover, the TTC could become a transatlantic mechanism to review and develop a joint initiative which would set global standards for the regulation of the key technologies and sectors of the Fourth Industrial Revolution (also known as Industry 4.0): these include, for example, artificial intelligence, machine learning, advanced robotics, quantum computing and synthetic biology.

The US and EU have already identified 'key policies on technology, digital issues and supply chains' as an area for increased cooperation under the Trade and Technology Council, which was launched in April 2021.

- The current focus on reorganizing supply chains offers an opportunity to further strengthen human rights and environmental due diligence. Tackling these issues is not only a matter of values, but is also related to the creation of a level playing field between domestic firms and companies from third countries, as well as building a more sustainable and resilient future.

More broadly, the transatlantic partners should also take steps to address the underlying issue of resource use by scaling up the circular use of resources. Promoting circular supply chains would not only support supply-chain resilience, but would also strengthen governments' efforts to meet sustainability targets.

Global level: the importance of WTO reform

In order to shape discussions at the highest levels of government on the topic of supply-chain resilience, existing mechanisms (such as the G7 or G20) could be enhanced. Nascent platforms among like-minded democracies, such as the UK's D10 initiative (which would add Australia, India and South Korea to the existing G7 format, to create a club of 10 democratic partners) could offer an obvious opportunity to strengthen supply chains among allies.

More broadly, there is a need to advance international governance frameworks for new technologies which can facilitate transparency and visibility along the supply chain (such as blockchain) or help firms adjust production swiftly (such as 3D printing).

At the level of multilateral institutions, the WTO is the key forum for the US and Europe to boost supply-chain resilience by focusing on the following aspects:

¹¹² European Commission (2021), 'EU-US launch Trade and Technology Council to lead values-based global digital transformation', 15 June 2021, https://ec.europa.eu/commission/presscorner/detail/en/IP_21_2990 (accessed 6 Jul. 2021).

- The WTO and its rules were crafted to facilitate traditional trade (i.e. the import and export of final products and commodities). However, the current rules are not fit for purpose in terms of dealing adequately with today's supply chains (which are characterized by trade in intermediate inputs and the fragmentation of production across multiple countries). Reforming the WTO would be an important step in this regard.¹¹³
- The WTO provides an important forum for coordination to avoid the introduction of export controls in times of emergency. As a first step, WTO members should discuss if and how the existing WTO rules concerning the use of export restrictions need strengthening. Further enhancing the trade-policy monitoring function of the WTO would also be an important step, especially during times of crisis.
- Looking forward, the WTO's negotiation agenda is packed, but meaningful progress on sustainability issues and, in the wake of the COVID-19 pandemic, on trade in medical goods is necessary if the organization wants to demonstrate its continued relevance. In other words, by negotiating an agreement on environmental products and medical goods, governments could take concrete steps to bolster supply chains in these critical areas, while also helping to address the global challenges wrought by climate change and the COVID-19 pandemic. In this regard, cooperation between the WTO and other international organizations can be enhanced. In the context of both the current and any future pandemics, there is a strong case for the WTO and World Health Organization to work together and support countries' constructive engagement on the question of how strategic stockpiles of medical supplies should best be used in the event of a health crisis.¹¹⁴
- Moreover, as the COVID-19 pandemic has shown, digital technologies are an important aspect of supporting supply-chain resilience. However, at the same time, the crisis has revealed enduring challenges for digital trade and the broader digital governance space. The US, UK, EU and over 80 like-minded WTO partners should therefore continue to push forward with ongoing e-commerce negotiations.

The bottom line: balancing multiple dimensions

The reconfiguration of supply chains is not a new phenomenon. However, new challenges have arisen from the current context, with the confluence of the COVID-19 pandemic and rising protectionism, as well as ongoing structural drivers – such as the digital transformation and the transition to green economies. This has not only given added impetus to efforts to strengthen supply-chain resilience, but will also lead to long-lasting shifts in the global economy.

¹¹³ A comprehensive discussion of WTO reform is beyond the scope of this paper. For more information, see another paper by the author. Schneider-Petsinger, M. (2020), *Reforming the World Trade Organization: Prospects for Transatlantic Cooperation and the Global Trade System*, Research Paper, London: Royal Institute of International Affairs, <https://www.chathamhouse.org/2020/09/reforming-world-trade-organization> (accessed 12 Feb. 2021).

¹¹⁴ Bacchetta et al. (2021), 'COVID-19 and Global Value Chains'.

US and European strategies to boost supply-chain resilience are set against a backdrop of competition between the world's largest economies. Despite common concerns and the shared ambition to diversify supply chains away from China, the US and Europe are also competing for global markets and access. The focus on shoring up domestic economies which has been a consequence of the COVID-19 pandemic has given rise to a new era of industrial policy. Therefore, at the same time as the US and Europe are cooperating on strengthening supply chains, the transatlantic partners' differing approaches to industrial policy, competition policy and regulatory issues could drive a wedge between them. These potential points of friction need to be carefully managed.

At the same time as the US and Europe are cooperating on strengthening supply chains, there are potential points of friction that need to be carefully managed.

Efforts to bolster the rules-based trading system and modernize competition policy can contribute towards the goal of a level global 'playing field'. Such steps would not only reduce some of the tensions between the US and Europe, but would help tackle some joint concerns regarding China's policies and practices, and would also help to ensure that the US and Europe strengthen supply-chain resilience in strategic sectors without sliding into protectionism.

In order to increase resilience, the US and Europe have to take measures both internally and externally. The most successful strategy will comprise a mix of encouraging domestic production of essential goods (for instance, by securing a minimum production capacity), diversifying sources of supply, and holding strategic reserves. Together – and in tandem with other allies – the US and Europe should be focused not only on the current vulnerabilities, but also on any that might arise in future. In this regard, increasing investment aimed at making global supply chains more sustainable and tackling governance issues related to emerging technologies can both contribute to increasing resilience in the long term.

Resilient supply chains can be built nationally and in partnership with trusted allies. For the US and Europe, reducing global dependencies and promoting self-sufficiency do not have to mean abandoning economic openness and international cooperation.

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Marianne holds a BA in international affairs and economics from the University of Maine. She completed her master's degree, focusing on international trade and finance, at the Fletcher School of Law and Diplomacy at Tufts University and the John F. Kennedy School of Government at Harvard University.

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Cover image: Boxes containing the Moderna COVID-19 vaccine are prepared to be shipped at the McKesson distribution center on 20 December 2020 in Olive Branch, Mississippi, USA.

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