

# SUPPLY CHAIN RESILIENCE: THE DANGERS OF 'PICK N MIX'

BRIEFING PAPER 67 - APRIL 2022

MICHAEL GASIOREK  
UK TRADE POLICY OBSERVATORY

## KEY POINTS

- Economic and geopolitical shocks have raised concern over supply chain resilience whilst environmental problems highlight the need for sustainable supply chains.
- Resilient and sustainable supply chains require firms to have detailed knowledge of their production processes, and possibly labour standards both upstream and downstream and digitisation is making this traceability easier.
- In recent years, various countries have brought in a range of measures with a focus on enhancing the resilience of supposedly strategic sectors, but some of these policies have been introduced to protect domestic industry from foreign competition.
- The US has consistently introduced the greatest number of trade restricting measures, followed by the EU.
- Many of the policy interventions are also a direct response to concerns regarding China's role in the global economy and policies pursued in China.
- The risk is that supply chain resilience is used as a get-out clause for a wide range of industrial policy interventions to disguise protectionism.
- We need to recognise that vulnerability can be either domestic or international and we need a taxonomy for understanding different possible legitimate reasons for being concerned about supply chains.
- In many circumstances, businesses themselves will be best placed to build resilience, hence we need clearer analysis of the circumstances under which government policies may be justifiable.
- Supply chain vulnerabilities have a strong international and multilateral dimension and will require cooperation and coordination between countries.
- This Briefing Paper suggests ten ways more coordination could be achieved. The aim is not simply to foster greater supply chain resilience, but also to avoid the poor use of, and justification for, a suite of pick and mix national policies and to minimise the risks of disguised protectionism.

## INTRODUCTION

When I was a child, I used to enjoy going to the local sweet shop with my grandmother. The shop was old fashioned with big glass jars of different varieties of sweets. I loved being able to pick and mix the sweets I wanted, ensuring some of the old favourites were selected and trying out new ones. The analogy between this and the increasing call for policies for supply chain resilience, or secure supply chains, is that the reasons for supply chain vulnerability, the motives behind policies, and hence, the policies options themselves are highly varied. There is a real

risk, therefore, that policymakers 'pick' the motive they want, and 'mix' it with a given policy, which could be an old favourite, or something new all in the hope that it will taste nice. As with choosing sweets, the old favourite may not be as good as expected, and the new varieties may not be as palatable as had been hoped when looking at the jar. In this Briefing Paper, these issues are explored in more detail leading to a series of recommendations on how to approach policy options.

**UKTPO**  
UK TRADE POLICY  
OBSERVATORY

**US**  
UNIVERSITY  
OF SUSSEX

**CHATHAM  
HOUSE**  
The Royal Institute of  
International Affairs

## BACKGROUND

The last 20 or more years have seen the well-documented rise of 'global value chains' (GVCs). This is a wide-ranging term used in a variety of contexts. Loosely speaking it refers to the closer integration of firms in one country in the supply chains of another country. That closer integration may be in the form of the purchasing of intermediate inputs from the foreign suppliers, or in the form of the supply of intermediate inputs to foreign suppliers. In each case, the purchase or supply of inputs may in turn be used to produce further inputs, or for the sale of final goods either domestically or abroad. Note too that the supply or purchase of intermediate inputs does not only apply to goods but may also apply to services such as design, legal, marketing, logistics etc. Goods and services in supply chains are increasingly complementary. In short - production processes in the world have become somewhat more complicated.

These changes in supply chains have been driven by a range of factors of which three are probably the most important:

- 1) The decline in shipping and transport costs has made it much easier to transport bits of any given product across greater distances.
- 2) The decline in market access barriers between countries. These barriers range from traditional barriers such as tariffs and quotas to behind the border non-tariff barriers (measures), such as differences in regulations between countries, differences in competition policy or public procurement, or the role of subsidies.
- 3) Changes in information and communications technology (ICT) have made it much easier to transmit data and information – be this with regard to production, service inputs, or financial flows across geographical boundaries.

All this has made it easier for firms to manage production processes and delivery of goods and services across diverse and sometimes wide-ranging markets where the primary focus has been that of cost-saving and efficiency-enhancing fragmentation

There is substantial empirical evidence that suggests that this 'vertical fragmentation' of production has had a positive impact on overall economic growth in both developed and developing countries, but also differential impacts within countries leading to considerable discussion regarding the winners and losers from globalisation. The fragmentation of production has allowed for more specialisation and thus exploiting comparative advantages, but at finer levels of disaggregation. Hence instead of one country specialising in motor vehicles and another in textiles, we now have firms in one country specialising in

some of the parts which are needed for motor-vehicle production, and possibly in textile design, while other countries specialise in other motor vehicle parts and in textile finishing. The second reason for the positive impact is that this process of vertical fragmentation has increased firm-level productivity – be this through encouraging more competition, more investment or more positive technological or managerial spill-overs between firms.<sup>1</sup>

Despite this positive narrative around the growth in global supply chains, we currently see considerable discussion and growing concern over the issue of 'supply chain resilience'. The concern is that in allowing and seeking higher growth rates through the close integration of supply chains, governments and firms have neglected to consider the robustness of those supply chains in the face of economic or political shocks.<sup>2</sup> This issue is part of the debate regarding 'decoupling' from China, and became particularly apparent following the onset of the COVID-19 pandemic in the spring of 2020, and has been reinforced by the geopolitical shock following Russia's invasion of Ukraine and the economic consequences of the ensuing sanctions.

For example, the EU's 2021 industrial strategy update aims to take "full account of the new circumstances following the COVID-19 crisis and ... drive the transformation to a more sustainable, digital, resilient and globally competitive economy;<sup>3</sup> and the EU's 2021 Trade Policy Review, calls for "strengthening the resilience and sustainability of the EU economy, and its supply chains (as) a pillar of the European Union's drive towards open strategic autonomy."<sup>4</sup>; and the UK Government's strategic plan to support and grow exports, published in November 2021, is underpinned by the assumption that "moves to enhance supply chain resilience (will) lead to increased reshoring of manufacturing"<sup>5</sup>. There have also been moves for greater international coordination with regard to supply chain resilience. This can be seen, for example, in the UK-Australia supply chain resilience capability building initiative, and recently in the context of the UK-Korea Free Trade Area (FTA) negotiations, the two governments announced that cooperation on building

1 See the animations 'Who gains from trade' 1: <https://youtu.be/x51SlwwZKEE> and 2: <https://youtu.be/6RpHW5tYAKA>

2 See also Schneider-Petsinger, M., "US and European strategies for resilient supply chains", Chatham House Research Paper, September 2021.

3 [https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/european-industrial-strategy\\_en](https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/european-industrial-strategy_en)

4 [https://trade.ec.europa.eu/doclib/docs/2021/february/tradoc\\_159438.pdf](https://trade.ec.europa.eu/doclib/docs/2021/february/tradoc_159438.pdf)

5 <https://www.gov.uk/government/publications/export-strategy-made-in-the-uk-sold-to-the-world/made-in-the-uk-sold-to-the-world-web-version>

supply chain resilience will form part of the agenda.<sup>6</sup>

## WHY IS GREATER SUPPLY CHAIN RESILIENCE DESIRED?

Economic and political shocks frequently provoke reactions along the lines of 'why didn't we see this coming?' and then 'how can we prevent this from happening again?'. COVID-19 is an excellent example of such a shock. Although it was supposedly well-known that, statistically speaking, the world was due another pandemic, it is clear that countries and businesses were poorly prepared, for example, with regard to supply of personal protective equipment (PPE).

The economic shock of COVID-19 can be seen as having three closely interrelated aspects. First, there was a substantial negative impact on global supply. This was driven by numerous factors including: lockdown policies by countries which restricted firms' ability to produce; labour shortages arising from Covid infections; an inability to produce through lack of access to intermediate inputs arising either from output contractions by suppliers, transportation difficulties, or constraints to supply chain finance. Second, there was a major contraction in demand. This was driven again by lockdown measures that restricted individuals' ability to access shops and spend, from declines in income as jobs were either lost, or workers furloughed, and from the contraction in expenditure from the uncertainty faced by consumers due to the severity and duration of Covid and the related restrictions. The third factor was the negative impact on transport and international trade. This ranged from simply a lack of haulage drivers due to the spread of Covid to trade restrictions introduced by some governments to protect the domestic market and to try to ensure domestic supplies, as well as major disruptions to shipping routes and ensuing bottlenecks.

Other factors have also raised concerns over the resilience of supply chains. For example, in 2021 the rise in the price of gas led to a near shortage of CO<sub>2</sub> needed for processed and packaged foods. Production was only maintained following government intervention. Similarly, following restrictions by China in 2021 of urea exports, there was then a shortage of diesel exhaust fluid in countries such as Korea and Australia.

Much more recently and dramatically, the invasion of Ukraine by Russia and the consequent economic sanctions have also highlighted the potential risks

<sup>6</sup> <https://www.gov.uk/government/news/uk-and-south-korea-eye-bigger-deal-following-bumper-year-of-trade>

of supply chain dependence on particular markets. Take wheat for example. Globally, Russia and Ukraine account for 25% of world exports, which appears a relatively small number. Nevertheless, some countries are highly dependent on supplies from either one or both. Hence, China depends on over 65% of its imports from both Russia and Ukraine. Even more prominent have been discussions over the dependence of certain EU countries – Germany, Italy, Slovakia etc - on energy supplies from Russia. Despite the desire to isolate Russia economically, such is the dependence on Russia, that policy was simultaneously ensuring the continued supply of those energy sources and the ability to pay Russia. Russia is also a major supplier of certain rare earth minerals that are important, for example, in the production of semi-conductor chips.

All this has led to a much greater realisation than heretofore that in the face of an economic or political shock supply chains may be vulnerable. Put like this it is self-evident. But it has also led to the conclusion by both businesses and policymakers that more needs to be done about this. Hence, we are seeing the growing introduction of government policies designed, loosely speaking, to promote greater supply chain resilience as well as actions by firms to ensure more resilience.

## THE INTEREST IN SUPPLY CHAINS IS NOT JUST ABOUT RESILIENCE

Supply chains have also received attention for reasons other than that of resilience, in particular, there is increasing discussion of 'sustainable supply chains'.<sup>7</sup> This is a result of concerns about the environment, biodiversity, deforestation, human rights and labour standards across countries. Distant supply chains are then, in part at least, seen to exacerbate some of these problems by, for example, contributing to the rise in emissions. In response to such concerns, and as part of ongoing changes in approaches to corporate social responsibility, businesses are increasingly aware of the need to source 'ethically', or at least to try and be seen to source ethically.<sup>8</sup> For example, while on the one hand several clothing and footwear brands decided to no longer source from the Xinjiang region in China due to concerns about the treatment of the Uighurs<sup>9</sup>, businesses such as Nike, Coca Cola and Apple have also lobbied Congress to weaken

<sup>7</sup> <https://www.ft.com/content/69c756f4-3bd9-41c3-bd9b-91706c5e34d5>; <https://www.ft.com/content/a6be1399-d07a-4bc4-9f4f-50071ca0fae3>; <https://www.businesswire.com/news/home/20210617005543/en/>

<sup>8</sup> <https://www.ft.com/content/42c5c336-8282-4b9b-ab2d-613bde546ab6>

<sup>9</sup> <https://fortune.com/2021/07/18/china-cotton-forced-labor-xinjiang/>

the US proposed Uighur Forced Labour Prevention Act (2021) in the interests of preserving their supply chains.<sup>10</sup> We have also seen the emergence of mobile apps that rate companies with regard to their sustainability practices, which in turn may impact on consumers' desire to purchase from companies that score badly. Note that sustainability and resilience also have a direct connection because concerns about a given firm's approach to sustainability may in turn make the supply chain vulnerable. For example, a 2021 international survey found that sustainability was increasingly important for firms and as part of the strategy of building resilience.<sup>11</sup> An additional factor has been the response of China to firms, such as H&M and Nike, withdrawing some of their operations from the Xinjiang region. That response entailed blocking all their digital sales in China, and thus has made firms more concerned about reliance on the Chinese market not just for inputs but also for sales.

The need for more sustainable sourcing is not just recognised by businesses but also by governments through policies. With regard to trade, this can be seen in the increasing role of environmental and labour chapters in free trade agreements (FTA). Indeed 'shaping rules for a more sustainable and fairer globalisation' is one of the three core objectives underpinning the EU's 2021 Trade Policy Review.<sup>12</sup> While some of these FTA clauses notably with regard to environmental standards are largely non-binding best-effort clauses; on labour standards explicit binding commitments are typically made.

Once again, the Russian invasion of Ukraine has dramatically underlined these issues as numerous companies chose (at least for now) to withdraw from the Russian market and to refuse to trade with Russia. This is clearly in the face of widespread condemnation of the Russian invasion. While this is specific to this particular crisis, it has served to significantly raise public consciousness over who we trade with, and the ethics underpinning (at least some) trade flows. Concern over who we trade with and buy from is likely to grow in the future. Russia's invasion of Ukraine may well lead to a repositioning of trade and investment within (like-minded countries) democratic countries leading to more decoupling from other countries such as China and Russia. The value of democracy and related ethical concerns are becoming a more significant factor for businesses.

Second, to mitigate the climate crisis and global warming, countries are introducing a range of policies

<sup>10</sup> <https://www.nytimes.com/2020/11/29/business/economy/nike-coca-cola-xinjiang-forced-labor-bill.html>

<sup>11</sup> <https://www.gsb.stanford.edu/insights/sustainable-supply-chains-helped-companies-endure-pandemic>

<sup>12</sup> [https://trade.ec.europa.eu/doclib/docs/2021/february/tradoc\\_159438.pdf](https://trade.ec.europa.eu/doclib/docs/2021/february/tradoc_159438.pdf)

to try and restrict carbon emissions. A key policy tool is carbon pricing and carbon emissions trading schemes. By putting a price on carbon emission such policies aim to discourage carbon intensive production techniques. If domestic carbon pricing is not matched by other countries, then this poses two issues. First, production may simply shift to those locations where emissions are not taxed. Second, firms in those countries where there is no carbon pricing (or less restrictive) may gain a competitive advantage in the domestic market. One possible solution to these challenges is to tax imports from destinations that do not have matching carbon pricing policies. The EU has announced it will be introducing such a carbon border adjustment mechanism (CBAM) in 2023. The implementation of this policy would require information on the underlying carbon intensity of production of the imported product. In turn, this would require the firm to have the required supply chain information and be able to supply the requisite evidence. Relatedly, the resolution of the steel dispute between the US and the EU, and more recently between the US and the UK, calls for future cooperation on the introduction of domestic policies to facilitate trade in low carbon-intensity steel and aluminium.

Ethical sustainability, border carbon taxes, and policies focussed on low-carbon intensity trade require firms to have detailed knowledge of their supply chains, and to be able to document these supply chains. This is much more than simply knowing who a firm is buying from or selling to, but also requires knowledge of the production processes, and possibly labour standards both upstream and downstream.<sup>13</sup> The increasing digitisation of the process of trading is slowly making such supply chain traceability easier – at least for some companies. As it becomes easier it is likely to increasingly enter the trade policymakers toolkit.

## WHAT HAVE BEEN SOME OF THE POLICY RESPONSES?

There are a range of reasons why policymakers may wish to introduce domestic and international policies that impact supply chains. Indeed, in recent years, various countries have brought in a range of measures with a focus on supposedly strategic sectors. For example, in the US, Executive Order 14017 was introduced by President Biden in 2021 with the explicit aim to examine US supply chains and their vulnerabilities and resilience. Four sectors of critical importance to the US were identified: semiconductors; large capacity batteries for electrical vehicles, critical and rare minerals and materials; and pharmaceuticals and pharmaceutical ingredients. Six Phase 2 policy

<sup>13</sup> <https://www.forbes.com/sites/sap/2021/11/03/sustainable-supply-chain-3-businesses-making-a-difference/?sh=61bc1de54460>

reviews with specific policy recommendations were published in February with a wide range of suggested interventions. However common to these are the need to increase domestic production capacity, to limit/constrain foreign ownership or participation in certain sectors, diversification of foreign supply chains, risk management practices, ensuring more workforce training and capacity enhancements, the importance of environmental sustainability, the development of common international standards, the need for more data and evidence, the importance of international collaboration as well as the role of public procurement in supporting domestic firms and industries. In 2021, the US also introduced the CHIPS (Creating Helpful Incentives to Produce Semiconductors for America) Act.

The EU introduced its Recovery and Resilience Facility in 2021, designed to “help make the Union more resilient and less dependent by diversifying key supply chains and thereby strengthening the strategic autonomy of the Union alongside an open economy”.<sup>14</sup> The EU’s industrial strategy (2021) mentioned earlier identified six strategic areas: raw materials, batteries, active pharmaceutical ingredients, hydrogen, semiconductors and cloud and edge technologies. In 2021, and in addition to existing IPCEIs (Important Project of Common European Interest) in batteries and microelectronics, the EU announced an additional IPCEI with a focus on the resilience of Europe’s supply chain in semiconductors. This was aimed at focussing on investment in critical points of the supply chain - critical raw materials, equipment, wafers, research, pre-production and design.<sup>15</sup> In 2022, the EU also introduced its version of the US CHIPS.

In Japan, in 2020, we have seen the introduction of the ‘Programme for Investment in Japan to Strengthen Supply Chains’, and the ‘Program for Strengthening Overseas Supply Chains’. These have focussed their attention on industrial machinery, medical equipment and supplies, semi-conductors and IT, and automotive, though not exclusively, and firms in other sectors have also been given support. Korea introduced a semi-conductor strategy in 2021 with the aim of making Korea a leading chipmaker through tax breaks, financial incentives for investment through low-interest rates; skills training with support for industry-academia cooperation; and infrastructure support. An early warning system to help identify the onset of supply chain vulnerabilities has also been introduced. In the UK, a strategy initially entitled ‘Project Defend’ was announced in 2020, with the aim of reducing

reliance on China in PPE and pharmaceutical goods. Sectors that are currently the focus also include semi-conductors; veterinary products; water supply and defence.

However, these policies should not be seen merely as a consequence of the fragilities exposed by COVID-19, and in turn driven by a narrow focus on ‘supply chain resilience’. While there is no doubt that the Covid pandemic has indeed exposed fragilities and has provided a powerful impetus to such policy measures, some policies are longer lasting, the motives pre-date the pandemic and have a wider motivational remit than supply chain resilience, though that is part of the story. Hence, in the US we have seen long-standing policies targeting washing machines, solar panels, as well as steel and aluminium (on the grounds of national security) against a range of countries. In 2018, the US saw the introduction of the Export Control Reform Act with the aim of restricting the export of key emerging technologies by US firms to another country; and the Foreign Investment Risk Review Modernization Act with a focus on reviewing foreign investment in US technology, notably by China. To that we can add the use of the Entity list, which comprises a list of foreign entities with whom US companies are banned from exporting or trading with, except for under a special licence<sup>16</sup>; the widespread tariffs against China, justified by alleged Chinese unfair trade practices, as well as tariffs on automobiles on a range of countries – again on grounds of national security.

While the US has been very active in this regard, other countries have also introduced policies. In 2021, the EU proposed new regulations designed to offset the distortive effects of foreign subsidies in the EU market and which are seen to harm the ‘level playing field’ in the Single Market. The regulation would allow the EU to seek information on foreign subsidies received and, where it deems appropriate, to respond with remedial measures. In Korea, 2013 saw the introduction of the ‘Support for foreign-invested companies return to Korean law’ – incentives for reshoring, and in 2017 the subsidy program for the Development of Core Technology in Industrial Fields, together with a scheme for fisheries resource management.

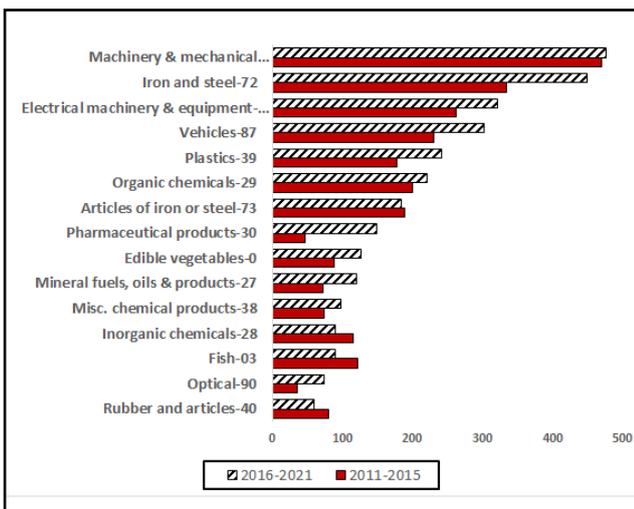
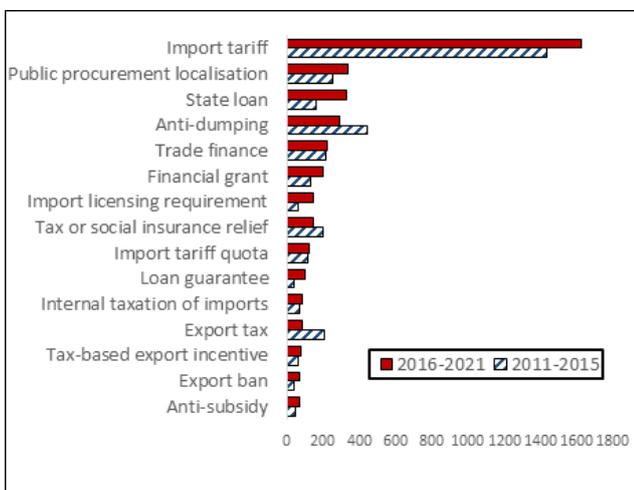
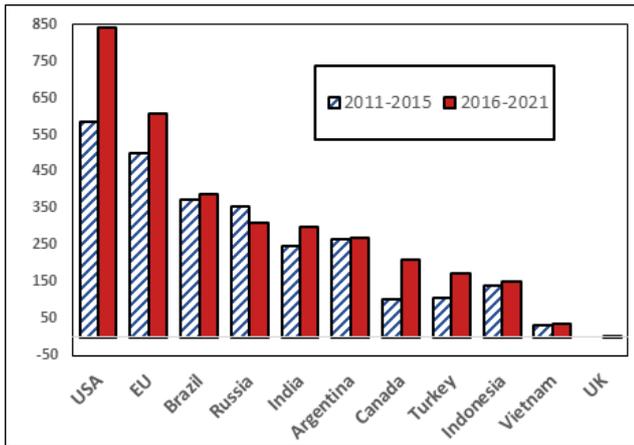
Some of the preceding policies are focussed on domestic policy options and not on trade, but some do impact trade and are explicitly intended to do so. The Global Trade Alerts database monitors and reports on all measures introduced by countries that are likely to impact international trade. The database lists both trade liberalising and trade restricting measures, and also identifies the HS chapters (2-digits) and HS sub-headings (6-digit) which are affected by such policies.

<sup>14</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32021R0241&from=EN>

<sup>15</sup> [https://ec.europa.eu/commission/commissioners/2019-2024/breton/blog/ipcei-microelectronics-major-step-more-resilient-eu-chips-supply-chain\\_en](https://ec.europa.eu/commission/commissioners/2019-2024/breton/blog/ipcei-microelectronics-major-step-more-resilient-eu-chips-supply-chain_en)

<sup>16</sup> <https://www.belfercenter.org/publication/united-states-entity-list-limits-american-exports>

## SUPPLY CHAIN RESILIENCE: THE DANGERS OF 'PICK N MIX'



Source: Global Trade Alerts, [https://www.globaltradealert.org/data\\_extraction](https://www.globaltradealert.org/data_extraction)

This can be seen in the three charts. In each chart, we compare the number of measures introduced where China is at least one of the countries being targeted. In the charts, we compare two time periods: 2011-2015 and 2016-21. In the first chart, we list the 10 countries introducing the most measures; in the second chart we look at which types of measures have been introduced, and in the third chart we consider which industries have been most affected. In each case, we only consider the trade restricting measures

The information contained in the charts is illuminating. It shows that the US has consistently introduced the most trade restricting measures, followed by the EU, and that for each of them, as well as most of the other countries there has been a rise in the use of trade restrictive practices. While the use of tariffs has dominated other policies measures, we are seeing a rise in the use of public procurement, state loans, financial grants and import licencing. Finally, we see that the industries most targeted by the measures are machinery and mechanical appliances, iron and steel, and electrical machinery, and vehicles.

Clearly, not all these policies are directly concerned with supply chain resilience. Arguably, in many cases they may have been designed more to protect domestic producers – be this steel, aluminium, solar panels, washing machines or other industry - from perceived unfair foreign competition. Many of the policy interventions are also a direct response to concerns regarding China's role in the global economy and policies pursued in China ranging from the extensive use of industrial policies, financing and subsidies to private enterprises and state-owned enterprises (SOEs); a lack of access for western firms in the Chinese market, weak enforcement of intellectual property rights, investment being conditional on technology transfer, and concerns regarding cyber-economic espionage. This is an additional and significant factor that permeates the debate over supply chain resilience.<sup>17</sup> With the rapid growth of importance of the Chinese economy in world trade and GDP, these concerns have assumed growing importance.

2015 also saw the launch of China's 'Made in China 2025' strategy. This is based on a 'dual circulation' model involving boosting domestic demand and limiting exposure to foreign markets and external volatility. The strategy aims to develop Chinese leads in ten high technology industries ranging from information technology, to aerospace and aeronautics, and biopharmaceuticals and advanced medical products. It can also be seen as a strategy to develop more secure (domestic) supply chains in China. Concerns about the rising share and competitiveness

<sup>17</sup> For a highly readable discussion see Nylander, J., "The Epic Split".

of China in world trade were also reinforced during the COVID pandemic when, in the first instance, it became clear how dependent the West was on some medical supplies from China, but later, also on a wide range of further inputs.

## THE LEGITIMACY OF POLICY RESPONSES TO SUPPLY CHAIN RESILIENCE

The core idea behind supply chain resilience is to ensure that the domestic market has continued access to inputs / products for consumption often mixed with encouraging (selectively) more domestic production. From the earlier discussion, the non-exhaustive list of possible motives for governments to desire greater supply chain resilience includes: general concerns about vulnerability in the face of 'shocks', environmental sustainability, ethical sustainability with regard to social standards, worries about the growth of China coupled with dissatisfaction over Chinese policy, and a desire for domestic technological self-sufficiency, if not superiority. This means policymakers can 'pick' from a range of motives to justify a 'mix' of policy choices – all in the name of what, on the face of it, seems like a reasonable concern with supply chain vulnerability. As a result, we risk a world where countries continue to gain from trade where they can but with a growing focus on restricting trade for a range of 'legitimate' purposes (managed trade), with supply chain resilience becoming a growing part of this narrative. This is in a context where the COVID pandemic has, for good reason, resulted in significantly more government intervention in the economy.

The risk is that the broad concern over supply chain resilience is used as a get-out clause for a wide range of industrial policy interventions. This may lead to countries competing over policies / subsidies to support and encourage particular industries (e.g. as appears to be happening with semi-conductor chips) and we sink into disguised protectionism and subsidy wars. In turn, this may further undermine the rules based international trading system, especially with the likely increased use of GATT, Article XXI, the national security exception.

The motives, the issues, and the policy responses are complex – because they are many and because they are interrelated. There are few clear policy guidelines. However, if we want policy to be effective, if we want to resist the danger of disguised protectionism, then it is important to be clear about the legitimate reasons for being concerned about supply chains. To perhaps stretch the earlier analogy, we need to label our sweet jars very clearly and be careful not to mix the sweets and know why we are dipping our hands into which jar.

First, we need some taxonomy for understanding different possible legitimate reasons for being concerned about supply chains (the labels on those sweet jars), about what we trade, who we trade with and what constitutes a strategic industry:

- a. Supply chain vulnerability on the grounds of economic security: This concerns disruptions to sectors that are economically important to an economy, or to a sensitive aspect / area of a given economy. Some industries may be considered to have strategic economic significance for a given economy but do not threaten national security.
- b. Supply chain vulnerability on the grounds of national security: Key technologies, armaments, health and some transport goods probably fall into the category of national security, because disruptions to supply may cause more existential threats to a country. Not surprisingly, national security (defined appropriately), matters more than economic security, and the strategic interest is somewhat different to the pure economic interest.
- c. Supply chain sustainability: Here the concern is with the impact on the environment ranging from issues such as overfishing, deforestation, pollution, biodiversity and climate change.
- d. Ethical trade: Labour standards and human rights issues are one example of this. Another example is trade with 'rogue' countries because of a concern with some of their policies or actions. The restrictions on trade with Russia fall into this category, as do concerns about human rights practices in China.

Secondly, and to the extent that the concern is genuinely about vulnerability, we need to have a clear understanding of what is meant by vulnerability, and we need to recognise that vulnerability can be either domestic or international. We thus need to be careful not to portray this as a uniquely international issue and that the solution lies in more domestic production. Indeed, resilience may derive from close engagement in international supply chains.<sup>18</sup> A recent OECD report clearly documents this in relation to vaccines, face masks and COVID tests.<sup>19</sup> Supply chains can be complex and take different forms, from highly linear supply chains to others characterised much more by hub and spoke relationships. There are, thus, a wide range of possible factors as to why supply chains may be vulnerable, ranging from finance, transportation, input supply, workforce, to government actions. In many cases, significant dependence on a particular supply chain partner or location in the

<sup>18</sup> [https://voxeu.org/article/integration-global-value-chains-might-not-increase-exposure-risk-after-all#\\_Yh4OR1TLg0.twitter](https://voxeu.org/article/integration-global-value-chains-might-not-increase-exposure-risk-after-all#_Yh4OR1TLg0.twitter)

<sup>19</sup> <https://www.oecd.org/coronavirus/policy-responses/global-supply-chains-at-work-07647bc5/>

production of the final product is likely to lead to vulnerability. That dependence could concern any of the above factors.

This concern is illustrated in Table 1 which is indicative of the potential vulnerability of (some) UK suppliers to imports from China. In this table, we take all the 5,000 or more products the UK imports from China, and for each product calculate the share of imports that China accounts for. We then group these by share ranges. Hence, in the first line of the table we see that for 3,876 of the products the UK imports, China accounts for between 0 to 20% of UK imports of those products. Conversely in the last three rows of the table, for 588 products, China accounts for more than 40% of UK imports of those products, and these products account for 48% of total UK imports from China. Finally, the last column of the table indicates for each share range, the share of capital and intermediate goods in those imports. Overall, over 61% of UK imports from China are intermediates, and for those products for which China accounts for between 60-80% of UK total imports, the share of intermediates is 67%.

In the same vein, if the concern is about sustainability, or ethical trade, then we need a clear understanding of what the sustainability issues and the ethical concerns are and a good evidence base. Hence, they need analysing and defining by policymakers so that there is transparency as to the issue being addressed and thus the appropriate policy responses, private sector responses and public responses.

Thirdly, we need more analysis of the circumstance under which government policies may be needed - in order to respond to any of the four supply chain concerns listed above - or whether it is sufficient to allow individuals / firms to respond; and if so, what forms of government intervention may be desirable. In many cases, it is businesses themselves that are best placed to respond to concerns about resilience. The need for government interventions requires

an understanding of why private individuals and businesses will not take the desired action in the absence of that intervention, and whether or not the lack of private action matters. Hence, suppose a producer of widgets is highly dependent on inputs from supplier X, and that those inputs become disrupted such that the producer of widgets risks going out of business. The producer has not acted to protect their input supply (eg. through diversification), but this is not sufficient to justify government intervention. Otherwise, governments would be intervening to rescue all firms that fail through poor planning. In turn, understanding why individuals / businesses fail to undertake the actions needed (what economists refer to as market failure) be this with regard to vulnerability or sustainability, or ethical concerns will help to identify policy measures that may be appropriate.

For example, if there is a risk of input shortages in industries that are considered strategically important for economic security or national security is it advisable for firms / countries to reduce their exposure to foreign shocks and produce more domestically, and thus introduce policies to ensure this occurs? Or, is it better to ensure there are sufficient stockpiles of supplies (for example of medical equipment); or improve inventory management, supply chain finance, or encourage diversification of imported input suppliers.? The answers to these questions will of course vary by industry, but where an overriding objective is to ensure a lack of dependence on any given country on strategically critical supplies.

For any given country to address the preceding it is worth proceeding systematically and transparently:

Step 1: Identification of the industries / firms a given country may consider as economically significant, or strategic from a national security perspective. Separately, there is a need to identify those industries that may be 'vulnerable'. Clearly, these two mapping

**Table 1: UK Imports from China by Import share ranges**

Import Share Ranges	No. of HS 6-dig	Imports Value	Imports share from China	Share of imports which are capital or intermediate goods
0-0.2	3876	16,372,495.21	25.1%	71.56%
0.2-0.4	659	17,527,025.55	26.9%	62.22%
0.4-0.6	323	10,001,987.17	15.3%	40.62%
0.6-0.8	200	19,745,607.64	30.3%	66.74%
0.8-1	65	1,529,303.41	2.3%	25.14%

exercises may give quite different results, and the policymakers interest is in the first instance in the overlap between the two.

Step 2: Mapping of the supply chain vulnerabilities in the industries identified. Here it is important to be clear about what is it that makes a given firm/industry 'vulnerable'. The more complex is any given supply chain then, potentially, the greater the number of critical points which could cause that chain to be disrupted. The flip side of this is the mapping of what might constitute supply chain resilience in the affected firms / sectors.

Step 3: Intervention justification. Decide on the legitimate grounds for any intervention, on the type of intervention, and the means of intervention. This should also require weighing up the costs and benefits of intervention strategies. Note that intervention may be desirable in response to an existing crisis that has emerged; or in advance of a crisis to ensure future continuity or sustainability of a given supply chain.

Step 4: Monitoring and evaluation of the supply chain vulnerabilities and the impacts and efficacy of any policy actions undertaken.

## WHAT IS THE ROLE OF INTERNATIONAL COORDINATION AND FREE TRADE AGREEMENTS?

Many, if not most supply chains have an international dimension. Inevitably, therefore, any policies which impact domestic supply chains also impact international supply chains. This suggests an important role for policy coordination between countries. It is interesting to see the signing of a strategic agreement with the direct objective to bolster supply chain resilience between the UK and Korea as part of the forthcoming renegotiation of the UK-Korea FTA. Other initiatives include the US-EU Trade and Technology Council with a much broader remit, but with 'secure supply chains' forming part of the discussions; the Supply Chain Resilience Initiative by Australia, India and Japan, as well as the similarly UK-Australia initiative. In the Phase 2 sectoral reports published in February 2022, following the US executive order 14017 regarding supply chain vulnerabilities, the need for closer collaboration with international partners is a common recommendation.

These moves towards greater collaboration and coordination are to be welcomed. At present they are largely ad hoc and bilateral in nature. Given the diversity of motives, range of policies and the range of sectors of national concern, the extent to which international agreements can foster greater supply chain resilience is inevitably somewhat limited. To a large extent, and as stated earlier, in many

circumstances businesses themselves are probably best placed to realise greater resilience. But this will not always be the case and, as argued above, there is increasing pressure and desire by governments to intervene in strategic industries.

So, what could be achieved through international coordination/cooperation:

1. Recognition that the issue of supply chain resilience is international in scope, and that the actions of one country impact on another, and possibly to their detriment
2. Agree on a taxonomy of legitimate supply chain concerns, which at least analytically separates out issues of strategic dependence, resilience, from sustainability, ethical and geopolitical concerns.
3. Agree on methods for building an evidence base on supply chain vulnerabilities, and good practices for identifying vulnerabilities, as well as reverse dependencies.
4. Aim to build cooperation and consensus across countries on some core principles of legitimate intervention. The issue has a strong multilateral dimension and hence countries should aim to use the WTO and build on Global Supply Chains Forum to try and work through the WTO. The extent to which existing WTO rules are adequate for the supply chain challenges the world is likely to experience in the near to mid-term needs to be understood and explored. The challenges of progress in the WTO also mean that countries should seek to build bilateral and plurilateral cooperation and understanding on policy responses.
5. Provide for more explicit coordination and cooperation on policy interventions of mutual concern / impact ranging from export controls to domestic subsidies, such as providing a mechanism for information sharing with regard to both early warning systems on vulnerabilities, but also policy responses.
6. Identification of areas / industries of common interest where there may be scope for policy coherence and cooperation in particular in the face of a crisis.
7. Consider the role of international standards in fostering greater resilience, which for example may include a greater use of equivalence agreements and / or mutual recognition agreements.
8. Encourage policies leading to greater supply chain transparency, policies to support inventory management, diversified sourcing, risk management, and supply chain credit.

9. Cooperate on the impact of supply chain disruptions and the mitigation of those disruptions on SMEs who are likely to be most affected by disruptions, and least able to mitigate the effects.
10. Consider how the principles above can be incorporated into relevant FTA chapters in meaningful ways, for example with regard to public procurement, SMEs, sustainability, technical Barriers to Trade and sanitary and phytosanitary regulatory issues, mobility of workers, transport etc. In Free Trade Agreement deal with issues of sustainability and ethical concerns in separate chapters. Build-in dispute settlement so that agreed policies on these issues are enforceable.

## CONCLUSION

Over the last few years, developments and more have taught us that there are genuine reasons to be concerned about the possible vulnerability and sustainability of (some) supply chains. Add in geopolitical and ethical concerns and the complexity of the issue becomes rapidly apparent. This is in the context of an increasing (post Covid) appetite for government engagement in economic affairs, an increasing public concern regarding the impact of trade and globalisation on different groups in society, the increasing digitisation of processes involved in trade and supply chain management, and various trade conflicts which go beyond the popular focus on US-China issues. All this raises the risk that in response to public concerns, and in a desire to be seen to be taking 'action', governments will take an inappropriate 'pick and mix' approach to policies. This Briefing Paper has provided ten ways more coordination could be achieved. We need clear discussion of these issues, we will also require international cooperation, coordination and transparency. This is likely to be difficult but should be pursued multilaterally, plurilaterally, and also bilaterally such as in the context of free trade agreements. We also need to recognise the limitations of government intervention.



## ABOUT THE AUTHORS

**Michael Gasiorek** is Professor of Economics at the University of Sussex and Director of the UKTPO. His current research focuses on the way firms engage in trade and in value chains, and on the impact Brexit on the UK economy. He is also Managing Director of a University spinout company, InterAnalysis that offers support on trade policy and trade negotiations in particular for developing countries.

## FURTHER INFORMATION

The UK Trade Policy Observatory (UKTPO), a partnership between the University of Sussex and Chatham House, is an independent expert group that:

- 1) initiates, comments on and analyses trade policy proposals for the UK; and
- 2) trains British policy makers, negotiators and other interested parties through tailored training packages.

The UKTPO is committed to engaging with a wide variety of stakeholders to ensure that the UK's international trading environment is reconstructed in a manner that benefits all in Britain and is fair to Britain, the EU and the world. The Observatory offers a wide range of expertise and services to help support government departments, international organisations and businesses to strategise and develop new trade policies in the post-Brexit era.

For further information on this theme or the work of the UK Trade Observatory, please contact:

**Professor Michael Gasiorek**  
Director  
UK Trade Policy Observatory  
University of Sussex, Jubilee Building,  
Falmer, BN1 9SL  
Email: [uktpo@sussex.ac.uk](mailto:uktpo@sussex.ac.uk)

**Website:** <https://blogs.sussex.ac.uk/uktpo/>

 **Twitter:** @uk\_tpo

ISBN 978-1-912044-04-7

© UKTPO, University of Sussex, 2022

The author asserts his moral right to be identified as the author of this publication. Readers are encouraged to reproduce material from UKTPO for their own publications, as long as they are not being sold commercially. As copyright holder, UKTPO requests due acknowledgement. For online use, we ask readers to link to the original resource on the UKTPO website.