



Global Value Chains: Efficiency and Risks in the Context of COVID-19

11 February 2021

The policy debate on whether the gains from international specialisation in global value chains (GVCs) outweigh the associated risks of transmission of shocks has intensified in the aftermath of the COVID-19 outbreak and the resulting disruptions in supply chains of some manufacturing and medical products. Questions are even being asked whether governments should use policy tools to “re-localise” GVCs. This policy brief first identifies key potential sources of exposure to shocks in GVCs. Second, it uses the OECD’s global trade model to shed light on the consequences of a stylised re-localisation policy scenario, in terms of both economic efficiency and stability. In this scenario, countries are less exposed to foreign shocks, but they are also less efficient and less able to cushion shocks through trade. Quantitatively, the latter effect tends to dominate. The economic case for policy-induced reshoring of GVCs is therefore weak. There is nevertheless scope for international co-operation and governments to join efforts with businesses to improve risk preparedness.



The COVID-19 crisis has revived discussions about the international fragmentation of production

Disruption in the supply chains of few essential goods and shortages of key medical products during the COVID-19 outbreak have highlighted the interconnectedness between countries through global value chains (GVCs) and renewed the debate on costs and benefits of globalisation. More specifically, recent discussions emphasise the risks and instability associated with the international fragmentation of production.

GVCs generate significant economic gains to both participating firms and countries that host GVC activities (e.g. OECD (2013^[1]). Specialisation and economies of scale bring productivity gains as well as lower production prices (Andrews, Gal and Witheridge, 2018^[2]). GVCs have also created new opportunities for smaller firms and participants from emerging-market economies and developing countries as they no longer have to master all the stages of complex production processes in order to participate in the global economy.

Although efficiency gains stemming from GVCs are well established, questions are being raised about whether the gains from deepening and expanding international specialisation in GVCs outweigh the associated risks and instability.¹ The risks associated with GVCs were initially revealed in the very first phase of the pandemic in early 2020, when the public health situation in the People's Republic of China (hereafter "China") resulted in lockdowns. Most global manufacturers have some operations in China and many businesses reported disruptions to production and trade from this important GVC partner. Shortages of supply of personal protective equipment (PPE) as well as key respiratory medical devices, such as ventilators, have raised greater concerns. Importantly though, the global shortage of medical devices stemmed from the unprecedented demand shock induced by the spread of the pandemic around the world, not from the supply side.

While it is sometimes difficult to distinguish between demand and supply disruptions, and the effects of the crisis continue to unfold, it seems that some of these disruptions have proven to be temporary. For example, Chinese exports of medical products are rebounding, and GVCs in the electronics or machinery industries have continued to operate during the COVID-19 crisis (although at a lower scale). GVCs in the food industry have also proven to be quite robust, with only some bottlenecks observed, and those mostly in the domestic part of value chains such as domestic processing and retail distribution.² In that respect, in several instances GVCs have helped countries alleviate demand pressures for essential supplies.³ The shortage in facemasks, for instance, was addressed by China ramping up its production to supply countries in need.

Even so, discussions about the propagation of economic shocks across different industries and geographical locations through GVCs, as well as the role GVCs can play in managing these shocks (OECD, 2020^[3]; McKinsey, 2020^[4])⁴ have been intensifying. The debate has evolved around the issue of

¹ As foreshadowed above, sustainability of international supply chains entails more than an ability to react to and recover from shocks and covers dimensions such as environmental and social impacts, which are perhaps more important, but are not covered in this analysis.

² See OECD (2020^[9]).

³ For example, several countries ramped up orders of foreign intermediate and final products as well as services to address the public health situation. Korea, for example, drew on GVCs to quickly step up production of medical test kits used during the pandemic (OECD, 2020^[3]).

⁴ Resilience and vulnerabilities of GVCs to unpredictable shocks were already debated in the aftermath of previous disruptions, particularly after Japan's Fukushima disaster and Thailand's floods in 2011 (McKinsey, 2020^[4]).



how to improve stability and resilience to shocks in GVCs while still capturing efficiency gains stemming from specialisation and comparative advantage. Some claim that more localised production would provide greater security of supply and lower uncertainty for consumers and businesses, thus calling for reshoring GVCs or at least rethinking their organisation. But reshoring also means greater reliance on own production, which limits the scope for cushioning shocks, particularly those that may originate domestically.

This policy brief builds on recent OECD analysis (Arriola et al., 2020^[5]) and aims at providing initial empirical evidence to inform and guide discussion on these complex questions. Potential sources of exposure and channels of propagation of shocks via the global production network are first identified. Second, illustrative economic model simulations are performed using the OECD's computable general equilibrium (CGE) trade model METRO to compare the level (efficiency) and the stability of key macroeconomic variables under two hypothetical policy regimes: "interconnected" and "localised" economies. This comparison shows that re-shoring policies would lower economic efficiency in all countries, but would also hamper diversification and limit the scope for absorbing shocks, hence making most countries' GDP even less stable. While this brief focusses on efficiency and stability, it does leave other important aspects of GVCs — most notably environmental sustainability and social issues — aside.

Key findings

- Multiple features of GVCs that matter for production efficiency also determine the exposure to shocks and the propagation of these shocks along the chain. A high reliance of sales on foreign demand and high dependence on foreign value-added in production govern, respectively, the exposure to foreign demand and supply shocks. High centrality of some "hubs" in GVC networks may magnify shock propagation, while these hubs are also key in driving the benefits from GVCs, especially knowledge spillovers. Concentration of suppliers or clients, may make some firms and supply chains vulnerable to shocks, although this is also often related to comparative advantage and specialisation.
- A counterfactual analysis based on the OECD's METRO model accounts for most of these characteristics and compares the *level* (efficiency) and *stability* of macroeconomic variables under two regimes: 'interconnected' and 'localised' economies. While the simulations are based on simplifying assumptions, these feature the main characteristics of supply chain disruptions during the COVID-19 pandemic and past attempts at using policies to re-localise GVCs, and allow comparisons across different countries, sectors and value chains.
- The localised regime, where economies are less interconnected via GVCs, has significantly lower levels of economic activity and lower incomes. Furthermore, the localised regime is also found to be more – not less – vulnerable to shocks, as shown by greater instability of key economic variables such as real GDP.
- The majority of countries are better off in the interconnected regime, both in terms of levels and stability of economic activity. Thus, the modelling results suggest that the economic case for reshoring GVCs is indeed weak, while pointing to benefits of using a range of government policies to make supply chains more resilient.

A key finding from the simulations is therefore that GVCs play an important role in cushioning economic shocks, hence warning against policies aiming at reshoring. But governments still have a role to play and practical policy options can be sketched to foster diversification and resilience in GVCs while keeping the benefits from specialisation and to ensure effective management and supply of essential goods.



Key policy recommendations

- Governments can work jointly with firms on improving risk preparedness by identifying the range of potential threats to essential activities, mapping the local and international players involved in some essential chains, collecting and sharing information on potential concentration and bottlenecks upstream, and by developing stress tests for essential supply chains.
- Other actions to help ensure supply include prioritising shipments of essential goods; allowing simplified procedures for essential activities, facilitating investment and operational permits and extending certification procedures to encourage production; and seeking upstream agreements with firms for the re-purposing of supply chains, when required.
- Calibrating stockpiles of essential goods, even on a regional basis, would reduce the need to arrange emergency refills and could bring greater resilience to negative supply shocks. However, given the costs and the cyclicity of these buffers, an appropriate balance between benefits and costs is required.
- Reducing unnecessary heterogeneity of norms and standards and associated regulations could support resilience by facilitating “substitutability” between inputs. At the border, governments can review transport, logistics and border process regulations to enable flexible responses to disruptions. They can promote the diffusion of digital technologies to improve information systems, risk management and trade facilitation, as well as international co-ordination on border health protocols and mutual recognition agreements.
- Public actions should explore how to best foster competition and diversification in GVCs while preserving benefits from specialisation. The policy challenge is complex because GVCs cross borders while relevant policies, such as for example competition policy, are typically formulated in national contexts.

Which features of GVCs can influence the exposure to risks?

Different sets of indicators and methodologies explored in Arriola et al. (2020^[5]) offer complementary insights into the sources of exposure to shocks in GVCs or the propagation mechanisms. Analysis of highly disaggregated trade data allows capturing potential bottlenecks due to high concentration of suppliers or clients at a very granular product level. To identify which part of value added is created in the exporting country and which part is imported from abroad, supplementary indicators from inter-country input-output tables show the origin and destination of international trade flows in value added. These statistical measures can be used to characterise some of the features of GVCs that matter for risk exposure and transmission of shocks.⁵ A general equilibrium modelling in turn adds a layer of economic mechanisms and embeds these complex trading relationships in a consistent analytical framework.

The degree of concentration can amplify or dampen international shocks

While competition based on comparative advantages (e.g. resource endowments and ownership of technology or know-how) determines countries’ specialisation and shapes the geographical structure of GVCs, the subsequent organisation of production in GVCs often ends up being very concentrated. A small

⁵ A similar approach has recently been employed by Government of Canada (2020^[11]) in its assessment of vulnerability of Canadian industries to disruptions in global supply chains.



number of firms that both import and export dominate GVCs.⁶ This concentration, if associated with anti-competitive behaviours, can potentially undermine the initial efficiency gains. More generally, concentration typically amplifies volatility.

Supply chains characterised by low diversity of suppliers or buyers can indeed increase the probability of disruption and can magnify the propagation of shocks. For example, for some parts of line telephone equipment, three-quarters of world supply is provided by three countries: China, Viet Nam and Korea. Downstream firms relying on these specific inputs have not much leeway to switch towards new supply sources in case of shortage, at least in the short term. Concentration of suppliers reduces the scope for diversifying away from a supplier facing disruptions. Likewise, on the demand side, reliance on too few customers may be a source of fragility for suppliers. In this case, a demand shock in a destination market cannot be buffered and may have large consequences on upstream firms serving this market. However, concentration is often also a manifestation of comparative advantage, specialisation and economies of scale, and it is not clear that it should be reversed, or what would be the wider implications of the policy tools and incentives used to do so.

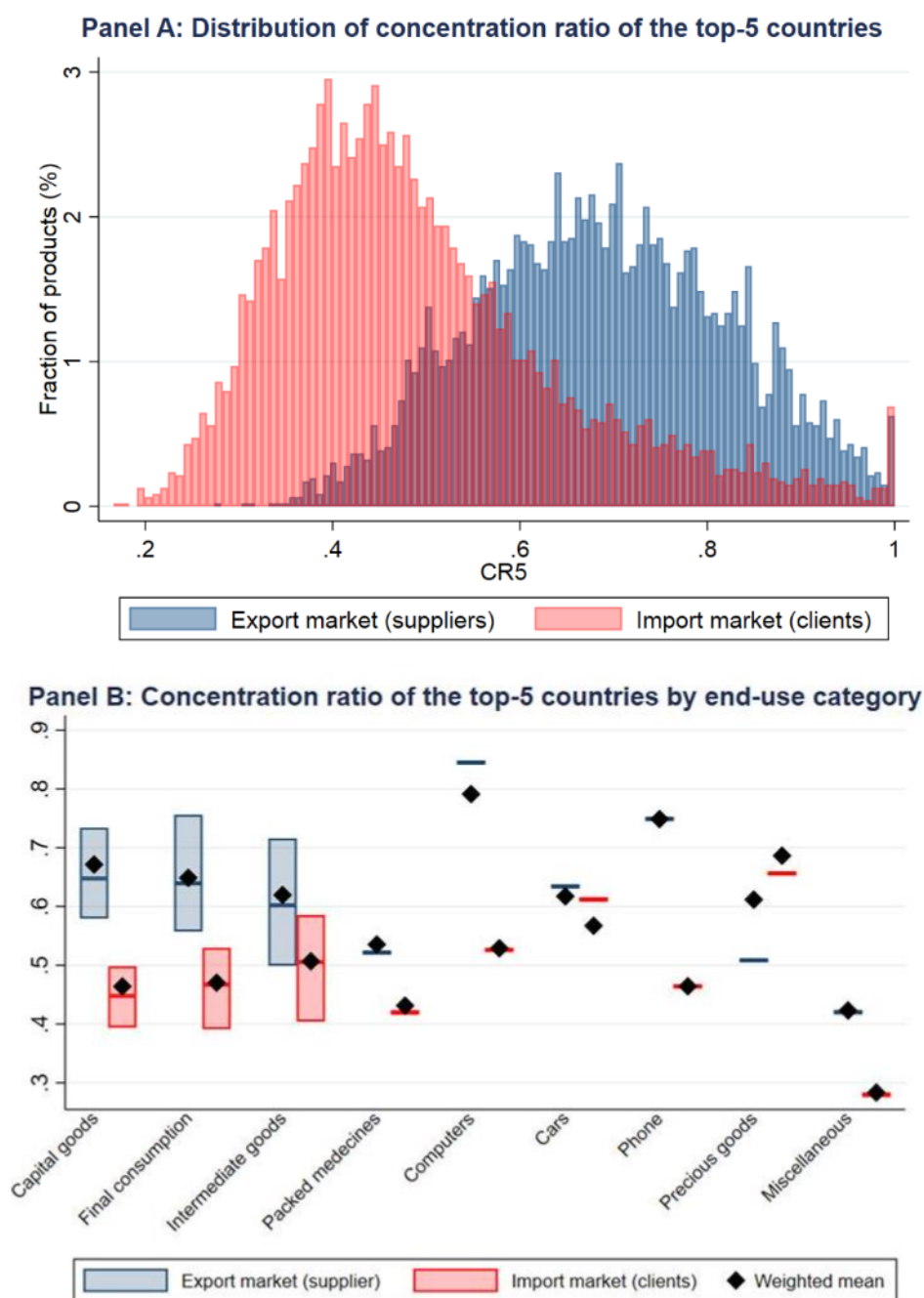
In many markets, exports tend to be concentrated in a few supplying countries (Figure 1, Panel A). Import destinations, in contrast, tend to be more diversified. For a commonly used measure of concentration – the cumulative share of the top-5 biggest countries (CR5) in the world market – the distribution of export concentration across products is tilted to the right compared to the concentration of imports. This means that the supply side is quite concentrated, with a few countries specialising in producing and selling abroad, but the supply ultimately serves final demand in a diversified range of countries.

Focusing on product groups shows that computer and phones exhibit by far the highest degree of concentration in the global export market (Figure 1, Panel B). On average, 79% of the market share of computer-related products is accounted for by five countries only and the top-five countries account for 75% of world exports of phones. In general, the difference in concentration of exports compared to imports is smaller for intermediate goods, highlighting that an important characteristic of GVCs is that relatively few GVC hubs rely on multiple source countries. This is also supported by the finding that supply of intermediate goods is less concentrated than supply of final goods, pointing out that possible bottlenecks may occur more downstream of the value chain, while a broader range of intermediate suppliers can be drawn upon in case of a disruption.

⁶According to the World Development Report (World Bank, 2020^[10]), “the concentration of trade in a few importing–exporting firms is extreme. Two-way traders account for about 15% of all trading firms on average in the sample of countries, and yet they capture almost 80% of total trade”.



Figure 1. Exports are concentrated on fewer countries than imports



Note: Using bilateral exports and imports flows from the BACI database, indicators of concentration have been constructed for 2018, at the 6-digit level of the Harmonised system (HS) classification. For each of the 4726 products traded internationally, an exporting country is defined as a supplier and an importing country is a customer. The concentration ratio of the top five supplier-countries (CR5) gives the cumulative market share accounted for by the 5 biggest countries to total world exports (for a given HS6-product). In Panel A, the distribution reports this statistics for 4726 HS6 products. "Fraction of products" represent the percentage of traded products with a given concentration measure. By construction, the sum of these fractions over all bins is equal to 100%. In Panel B, boxplots represent the value of the weighted first quartile, median and third quartile of CR5 across products belonging to each end-use category. The diamonds indicate the weighted mean.

Source: BACI 2020 version and OECD calculations. For details on the database construction, see Gaulier and Zignago (2010_[5]), "BACI: International Trade Database at the Product-Level. The 1994-2007 Version".



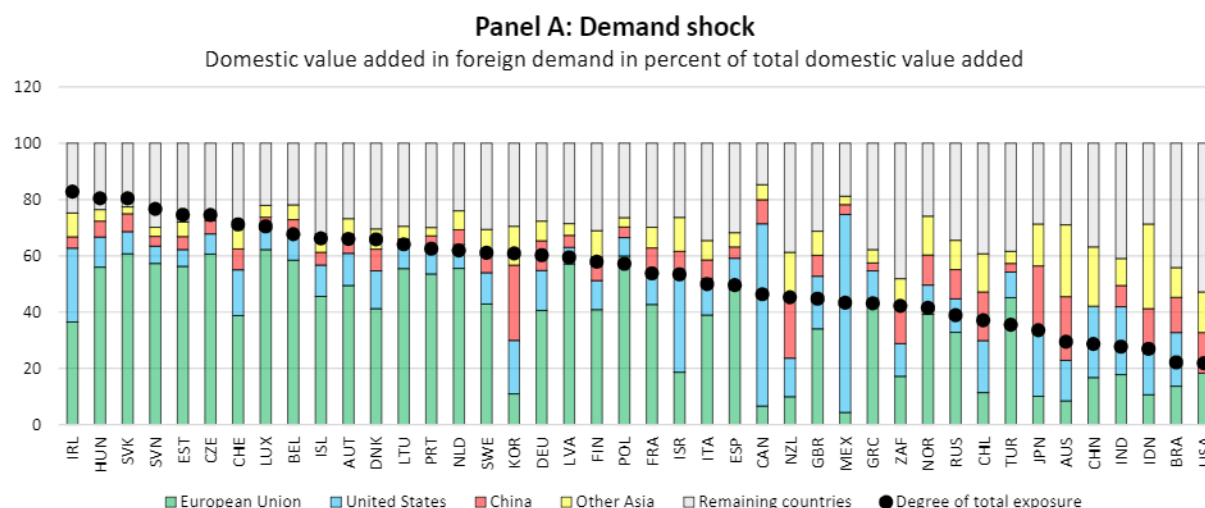
Countries are exposed differently to foreign supply and demand shocks in GVCs

While the concentration measures computed on the basis of detailed trade data can point to exposure to shocks and bottlenecks at a fairly granular level, they are based on gross trade figures and do not account for the key GVC characteristic: only a part of value is added by the exporter — the rest comes from other GVC participants which are often located abroad. Typically, a relatively higher share of foreign value-added from foreign input providers (so-called “backward” GVC linkages) can indicate a higher exposure to foreign supply shocks affecting vendors of raw materials and intermediates. Conversely, a higher reliance of exports of a given country on demand from foreign countries (so called “forward” GVC linkages) can mean higher exposure to demand shocks coming from final consumers or distributive services abroad.

Connectedness to global markets enables smaller economies to reach a bigger customer base, but they are also more exposed to demand shocks in GVCs than large economies. This is particularly the case for manufacturers in Central and East European countries that provide inputs into the European automotive industry, or for Irish firms supplying the global information technology sector. These economies export between 60% and 80% of the total amount of value added produced domestically (Figure 2, Panel A).

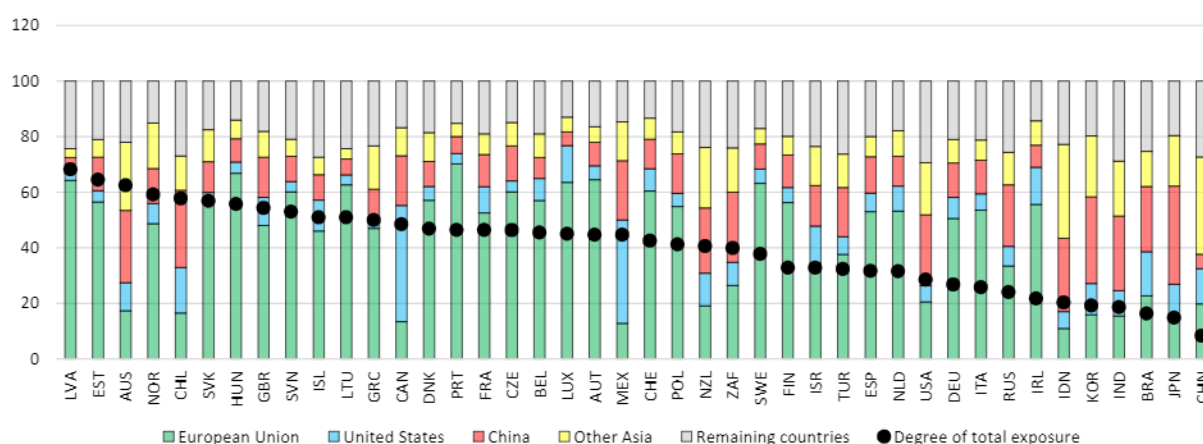
The exposure to foreign supply shocks also tends to be larger for smaller countries where production depends on foreign inputs to a larger extent (Figure 2, Panel B). The European Union, the United States, in China, and other Asian countries provide high portions of foreign inputs used in manufacturing across the world. Still, key suppliers of foreign inputs to manufacturing (potential sources of shocks) are distributed relatively more evenly than suppliers to the business services sector where intermediate services tend to be sourced mainly from Europe and the United States, thus reliance on Asia is lower.

Figure 2. Small economies are most exposed to shocks to the manufacturing sector



Panel B: Supply shock

Foreign value added in domestic production as percentage of total foreign value added



Note: the degree of exposure to a demand shock is computed as a share of domestic value added in foreign final demand in total domestic value added in 2015. It includes exports of final goods or services directly reaching foreign markets, but also intermediates reaching foreign final consumers only indirectly. The degree of exposure to a supply shock is computed as a share of foreign value added in gross output of the sector. Other Asia includes Japan, Korea, India and ASEAN countries.

Source: OECD TiVA database and OECD calculations.

Some countries and industries are very central in the GVC network

Moving from a country to a global perspective, some countries and industries might have more systemic implications because of their position in the global production network. Measures of centrality (Criscuolo and Timmis, 2018^[7]) capture this influence in the GVC network. Countries or industries are central when they are highly connected with other major hubs, conversely they are peripheral when they reveal weaker trade linkages. Thanks to their pivotal position across global production networks, central hubs become particularly influential suppliers or customers in GVCs and therefore they can play a key role in both upstream and downstream transmission of shocks.

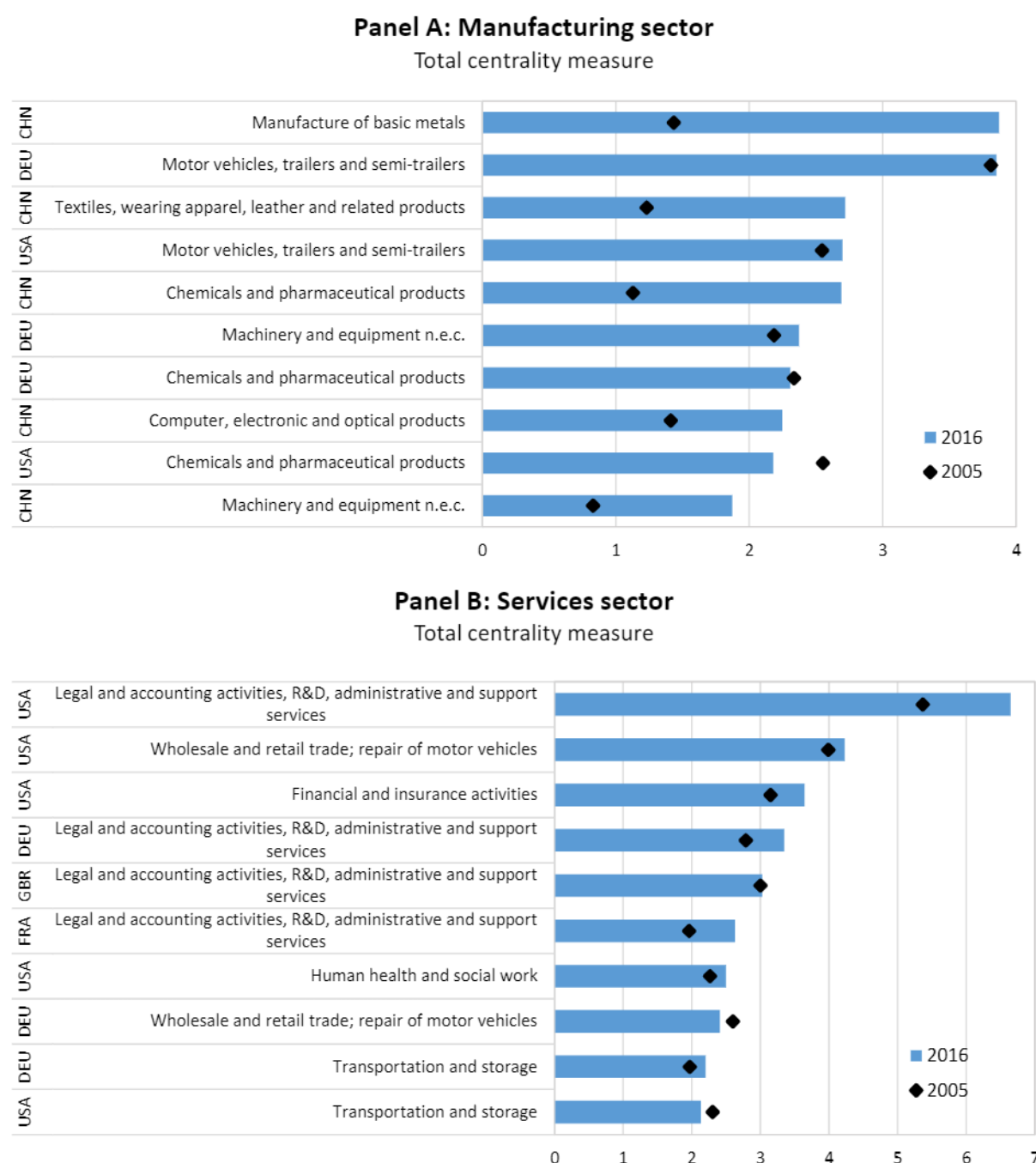
Since the mid-2000s, the centrality of China as the main manufacturing hub in several sectors has grown significantly, both as a source and as a destination of value added.⁷ In some industries China displays the highest degree of centrality for the year 2016 (the latest year with data) and the largest increase in the centrality metrics since mid-2000s (Figure 3, Panel A). Computers and electronics manufacturing has also undergone profound changes, with the core of the network shifting from the United States and Korea towards China, which currently is both the most central buyer and supplier of inputs in the whole industry. The German and US motor vehicle industries remain two of the most central manufacturing hubs globally.

In the service sector, the centrality metrics for 2016 confirm the central position of high-income economies, such as the United States, the United Kingdom, Germany and France as key hubs (Figure 3, Panel B). The United States, in particular, is the most central provider of business services, including financial and insurance services, legal and accounting activities, wholesale and retail trade, and R&D. The most sizeable changes in the structure of networks are represented by the rise of the French R&D and business support industry and the decline of the UK financial and insurance sector.

⁷ Since mid-2000s, the centrality indicator of China in the manufacturing of basic metals, pharmaceutical and textiles products, machinery and equipment has more than doubled.



Figure 3. Top ten most centrals hubs



Note: Total centrality is computed as average of forward and backward centrality. Forward centrality metrics capture the importance of a country or a sector as a seller of value added in intermediates for the production of exports of a specific partner while backward metrics measure the importance of a country as a buyer of value added in intermediates for the production of its own exports. The manufacturing sector excludes construction while the service sector excludes electricity, gas, and water supply services. The "Rest of the world" has been excluded from the chart as it represents an aggregate of several heterogeneous countries whose distinct trade flows are not disentangled.

Source: OECD (2018) Inter-Country Input-Output (ICIO) database (<http://www.oecd.org/sti/ind/inter-country-input-output-tables.htm>) and OECD calculations.



Costs and benefits of GVCs in the face of shocks: Insights from the OECD global trade model

Concentration, exposure to foreign shocks or centrality on their own do not determine the impact of shocks or the ability of firms to manage them, but they illustrate the different situations of countries and industries, and the possible channels of propagation. The impact of GVC reshoring on economic stability ultimately depends on all these characteristics as well as the degree of substitutability across inputs. The OECD's computable general equilibrium (CGE) trade model METRO⁸ incorporates many of the interdependencies discussed above as well as various commonly used elasticity estimates in a consistent quantitative framework and allows numerical simulations to quantify efficiency and stability gains (or losses) caused by a re-localisation. While the simulations are based on stylised scenarios — making any numerical results only illustrative — the scenario assumptions feature the main characteristics of supply chain disruptions during the COVID-19 pandemic and past attempts at using policies to re-localise GVCs, and allow broad comparisons across different countries, sectors and value chains.

Comparing “interconnected” versus “localised” regimes

To do that, two stylised versions of the global economy (regimes) are explored. The *interconnected* regime represents production fragmentation in GVCs, much as is seen today, accounting also for the effects identified to-date of the demand and supply changes during the COVID-19 crisis. The *localised* regime reflects a situation where, on top of the effects of the COVID-19 crisis, incentives to source inputs from abroad are reduced through two mechanisms. First, there is a global rise in import tariffs on all traded products to 25% in all regions.⁹ Second, this is combined with national value-added subsidies equivalent to 1% of GDP directed to labour and capital in domestic non-services sectors in each country in order to mimic rescue subsidies that favour local production.¹⁰ In addition, it is also assumed in the *localised* regime that firms are more constrained in switching between different sources of inputs, making international supply chains more “rigid”.¹¹

The simulated policy assumptions in the *localised* regime create strong incentives to increase domestic production and rely less on international trade. National value-added subsidies combined with import tariffs increase prices of imported products relative to domestic ones and make producers in all countries and in all sectors less reliant on foreign inputs for their production and exports than in the *interconnected* regime. The two regimes can then be compared along two dimensions: their efficiency (mean levels of economic

⁸ The METRO model is a multi-country, multi-sector computable general equilibrium (CGE) model that traces international interdependencies in a theoretically and empirically consistent framework, and incorporates several features of GVC participation such as trade of intermediate and final products and trade in value added (TiVA). More information can be found at <https://www.oecd.org/trade/topics/metro-trade-model/>

⁹ The imposition of a 25% import tariff is a stylised scenario which approximately moves import tariffs back to the level seen in advanced countries in the immediate years following the Second World War.

¹⁰ The scale of subsidies investigated in the model approximates the estimated size of post-COVID-19 responses. Nevertheless, the modelled subsidies do not reflect some important features of these responses, such as their temporary nature or the fact that they are in most cases designed to support existing production rather than capacity expansion.

¹¹ This is designed to reflect key implications of a situation where some of the value added subsidies would be conditioned on sourcing domestically or where lower fragmentation of production in GVCs resulting from re-localisation policies would make substitution in them more difficult. Similar assumptions have been made in the context of modelling the transmission effects of the COVID-19 pandemic on GVCs in recent studies, and the literature on historical estimates of trade elasticities suggests that these have increased over time during the era of GVC expansion (for more details, see Arriola et al. (2020^[5])).



activity) and their relative stability (deviations in levels of economic activity from the mean in response to shocks).

Localisation of GVCs would add further GDP losses to the economic slowdown caused by the pandemic

First, the analysis explores effects of shifting towards the localised regime on key economic variables such as trade, production and real GDP, i.e. the overall cost of making the supply chains more 'local' or the 'efficiency' side of the purported efficiency/stability trade-off. The results show that the localised regime, where economies are less interconnected via GVCs, has significantly lower levels of economic activity and lower incomes in all economies. This suggests that greater localisation of value chains would add further GDP losses to the economic slowdown caused by the pandemic.

The shift to the localised regime is estimated to decrease global real GDP by more than 5% relative to the interconnected regime (Table 1). Reductions in economic activity are significant across all regions and countries, and in some of them the percentage cuts reach double digits. This underscores the gains in output and jobs around the world from international specialisation that have been realised over the past decades, including through reductions in barriers to trade. Import and export demand fall in real terms proportionally more than real GDP and domestic production, with the result that, in the localised regime, exports and imports come to account for smaller shares of GDP.

Table 1. Both the global economy and all national economies would be smaller in a localised regime

Country	Real GDP % change	Domestic production % change	Import demand % change	Export demand % change
Argentina	-2.9	-3.2	-13.5	-8.3
Australia and New Zealand	-8.8	-8.6	-21.7	-19.6
Brazil	-2.5	-2.5	-16	-15.2
Canada	-13.1	-15.1	-25	-30
China	-2.6	-2.4	-23.4	-18.4
France	-5.1	-5.6	-9.9	-12.5
Germany	-5.1	-5.4	-11.4	-9.6
United Kingdom	-12.2	-13.4	-24.4	-33
Italy	-3.2	-3.5	-9.6	-9
European Union (24)	-4.2	-4.4	-7.9	-7.4
Indonesia	-3.2	-3.8	-21.3	-18.6
India	-1.1	-0.7	-11.4	-14.8
Japan	-3.9	-4.8	-20.4	-21.8
Korea	-7.4	-9.1	-24.1	-22.5
Mexico	-5.9	-8.2	-23.1	-26.8
Russia	-3.4	-2.9	-22.1	-11.2
South Africa	-6.9	-6.8	-22.2	-20.7
Turkey	-5.2	-7	-16.7	-29.5
United States	-6.9	-7.1	-20	-28.3
Latin America	-5.5	-6	-22.8	-21.8
South East Asia	-10.8	-15.2	-28.1	-28.8
Rest of the world	-6.3	-7.5	-20.2	-17.2
World	-5.5	-5.9	-18.1	-17.8

Note: The table shows simulated values of the different variables in the *localised* regime as a per cent of the corresponding values in the *interconnected* regime. See main text for the construction of the two regimes. South East Asia includes Brunei Darussalam, Cambodia, Malaysia, Philippines, Singapore, Thailand and Viet Nam. Latin America includes Chile, Colombia, Peru and Costa Rica.

Source: OECD METRO database and simulations.



Would localisation of GVCs result in more stability in the face of supply chain shocks?

To explore how the *interconnected* and the *localised* regimes compare in terms of the propagation of, or insulation from, shocks, a stylised set of ‘supply chain’ shocks is explored, based on a 10% increase in costs of bilateral exports and imports between a given region and all other countries. Since countries experiencing the shocks are both sources and destinations of intermediate and final products, the set of shocks mimics the kind of disruptions experienced during lockdowns to contain the COVID-19 pandemic, when transport, labour and logistics disruptions affected both exports and imports of different products to a similar extent.

The shocks are *country-specific*, as was the case with COVID-19, where supplies across many industries were initially disrupted in China and subsequently in other countries. The shocks are *sector-generic* – that is, they are applied equally across all sectors to capture the fact that sectors source from a range of different industries (e.g. car producers do not just source from other firms in the car industry, but also from other sectors). The chosen shock characterisation is stylised, and other more specific types of shocks could be usefully studied in the future, but it features the main characteristics of supply-chain disruptions during the COVID-19 pandemic.

In this context, the stability of an economic variable, such as real GDP, is calculated for each country as the absolute value of an average percentage deviation from the initial base level of this variable (i.e. from the base level in either the *interconnected*, or the *localised*, regime) across all country-specific shocks, including the one originating in the domestic economy.

Localised supply chains are found to be more – not less – vulnerable to shocks for most countries

The results of the simulations show that contrary to some of the claims in the general debate on risks in GVCs, in the *localised* regime, shocks do not result in a significant increase in the stability of GDP, production and consumption relative to the *interconnected* regime. On average, the stability of real GDP, real production and real consumption declines (Table 2). This is because the *localised* regime offers generally less flexibility for adjustment in the face of shocks. Domestic markets need to shoulder most of the adjustment pressures and domestic prices and quantities have to adjust relatively more, which leads to less stable consumption for most countries in the *localised* regime, more so than real GDP and production. Put differently, trade helps smooth shocks to supply of globally consumed products. In the *interconnected* regime, domestic shocks account for about half of the variation in real GDP due to shocks, illustrating that domestic shocks may be at least as important as a source of instability as foreign shocks. However, in the *interconnected economies* regime, part of the adjustment is carried by international markets and benefits from diversification of supplies (i.e. the ability to switch towards suppliers of intermediate products which have not been affected by a spike in trade costs).

Table 2. Shocks result in an overall drop in the stability of key economic variables in the localised regime

Average percentage deviations from regime’s base across all shocks

	Interconnected	Localised
Real GDP	0.63%	1.03%
Real production	0.66%	1.30%
Real consumption	1.77%	2.70%

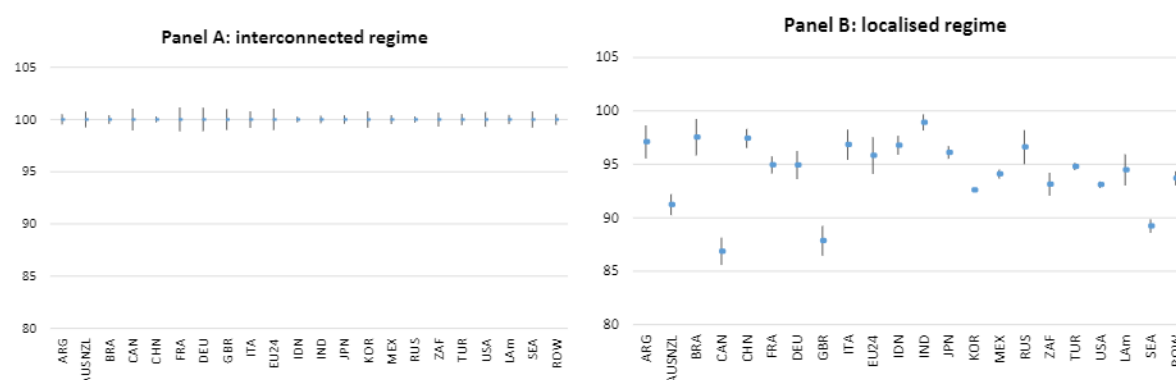
Note: This table reports the average of absolute values of percentage deviations from regime’s base across all shocks, countries and sectors (as % of base value). Using the absolute values captures the symmetry of the trade cost shocks, which in principle can be either negative or positive.

Source: OECD METRO database and simulations.



However, these averages mask a certain heterogeneity across specific countries (Figure 4). For 16 out of 22 countries or regions included in the model, real GDP stability falls when all shocks are considered. Countries affected the most negatively tend to be located upstream in GVCs. Countries such as the Russian Federation, Argentina, Brazil and other Latin American countries lose more than one percentage point in terms of real GDP stability in the *localised* regime when all shocks are considered. They tend to provide inputs into production for other countries and the concentration of their economies and trade patterns around natural resources and agriculture results in less adjustment domestically because of a less diversified economy that relies on less mobile factors of production.

Figure 4. In the *localised* regime, shocks also result in lower levels and lower stability of real GDP for most countries



Note: All changes in variables are relative to the level of the interconnected regime base scenario which is set to equal 100. Blue dots show the base in the given regime relative to the interconnected base, and whiskers show average deviations for negative and positive trade cost shocks. Source: OECD METRO database and simulations.

Selected downstream GVC participating countries could gain marginally in terms of stability in the localised regime...

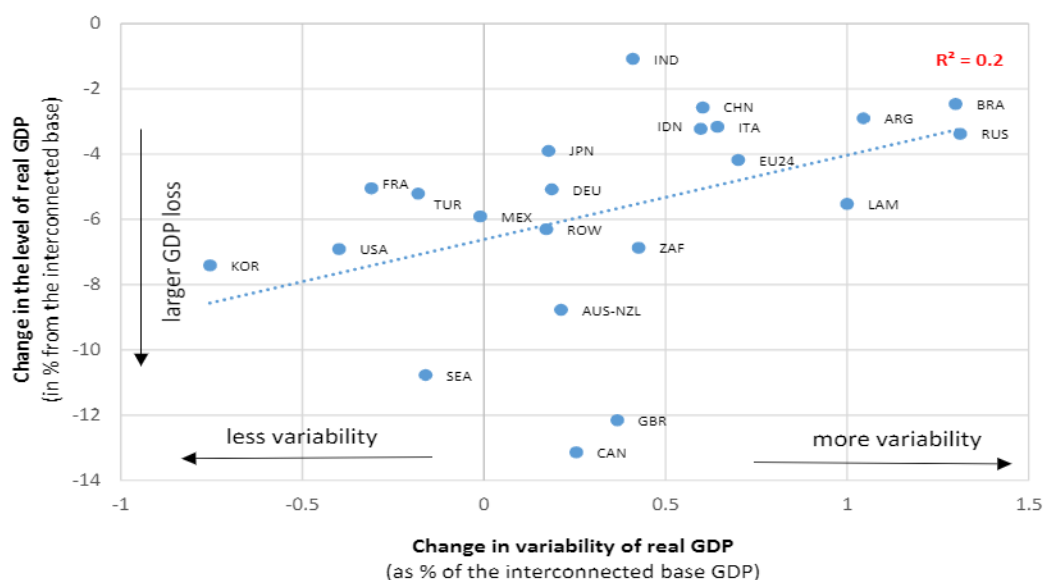
While the stylised design of the exercise makes the quantitative estimates only exploratory, in the six economies that gain marginally in terms of real GDP stability in the *localised* regime, this comes at the cost of a much lower level of economic activity. This group includes France, Korea, Mexico, Turkey, the United States, and the region of Southeast Asia. For example, stability is estimated to improve the most in Korea as this country 'saves' three-quarters of a percentage point of variation in real GDP in the *localised* regime. Still, Korea would experience significant reduction in the level of real GDP (by 7.4%) from shifting to the *localised* regime. The other five countries typically gain about one-fifth of a percentage point in terms of real GDP stability, which can also be seen as small compared to the costs of switching to the *localised* regime, which in all cases exceed 5% of real GDP.

The situation of these economies in terms of stability gains in the *localised* regime can be explained partially by the fact that these are some of the most open and GVC-integrated economies in the *interconnected* regime, and that they tend to be located downstream in GVCs. On the one hand, they are still more open in the *localised* regime than many other economies, meaning that adjustments in international markets still help them better adjust to shocks. On the other hand, these economies also experience the largest reductions in trade (and thus sourcing of intermediates from abroad) as well as in incomes when shifting to the *localised* regime (Figure 5). Thus, the countries that could gain on stability in the *localised* regime pay the highest cost in terms of the level of real GDP when switching to the *localised* regime.



Figure 5. Those countries that could have lower GDP variation in the localised regime would pay the highest cost in terms of the level of real GDP when switching to the *localised* regime

Efficiency and stability effects of shifting to the localised regime



Note: for details of methodology used see Arriola et al. (2020^[5]).

Source: OECD METRO database and simulations.

But this would come at a high efficiency cost

In a way, these results indicate the existence of a trade-off between efficiency and exposure to shocks in GVCs for a limited number of countries. But already in this stylised analysis this trade-off does not suggest straightforward incentives for re-localisation. First, the trade-off is relatively steep: several percentage points of GDP would have to be sacrificed in a shift to a *localised* regime in order to increase its stability by a fraction of a percentage point, in the face of relatively significant trade cost shocks. Second, countries relying the most on GVCs for foreign inputs into their production, while gaining potentially the most in terms of insulation from shocks in the *localised* regime, would have to sacrifice higher portions of incomes to gain such security. Third, and related to the above points, countries located upstream in GVCs would lose out relatively more from switching to the *localised* regime both in terms of level of income and of its stability.

Policy implications: The economic case for localising GVCs is limited, but governments can play an important role in preventing some of their negative effects

The analysis of trade concentration and exposure to shocks in GVCs shows that some industries exhibit high concentration of exports or imports. This implies that there may be fewer options to substitute between suppliers or buyers in case of a disruption. Relying on few suppliers when they are also concentrated geographically heightens supply shock risks. But re-configuring the supplier base is costly, and even more so when assets are specific: when there is high and specific knowledge capital involved or when the supply is linked to a natural resource base (e.g. mining). Labour-intensive activities are more easily re-



configured.¹² Measures of GVC integration suggest also that some countries and industries may be exposed to demand and supply shocks more than others. This is the case of small open economies that tend to rely more on foreign inputs and ship larger portions of their production to foreign markets. Large economies, such as the United States, Germany and China, on the other hand, tend to play central roles in GVCs both as providers and demanders of inputs and final products, suggesting that shocks occurring in these economies may have more systemic implications.

The modelling results, while based on stylised assumptions and providing only tentative empirical results, suggest nevertheless that the economic case for a significantly reshoring of GVCs is weak. In fact, the results suggest that GVCs, on top of generating efficiency gains, play an important role in cushioning economic shocks. While a small number of downstream GVC participating countries could gain marginally in terms of stability from localising GVCs, they are some of the main GVC beneficiaries and the costs of localisation would also be particularly high for them. This points to possible risks associated with using government policy to significantly alter the geography of GVCs. But it does not mean that policy-induced changes in location of GVC activities cannot bring about benefits in any specific circumstances or that governments have no role in helping to prevent any negative effects that may in some circumstances be associated with international supply chains.

While firms and governments may have different assessment on some aspects of supply-chain management and different tools to address them, some risks are shared and are most efficiently addressed in a co-ordinated fashion. For example, governments can work jointly with firms on improving risk preparedness by identifying the range of potential threats to essential activities, mapping the local and international players involved in some essential logistic chains, collecting and sharing information on potential concentration and bottlenecks upstream, or by developing stress tests for essential supply chains (including non-discriminatory criteria for robustness of supply chains for essential goods subject to government procurement).

Other actions to help ensure supply include prioritising shipments of essential goods; allowing simplified procedures for essential activities, facilitating investment and operational permits and extending certification procedures to encourage production; and seeking upstream agreements with firms for the re-purposing of supply chains, when required. OECD (2020^[8]) develops more extensively the possible actions for facilitating trade in the context of COVID-19.

Actions can also be taken to calibrate optimally stockpiles of essential goods, including on a regional basis. Stockpiles reduce instances of flying in emergency refills and bring greater resilience to negative supply shocks. But these buffers are costly and can magnify cyclicalities, and the choice of products can also be difficult. The current crisis saw pressures on face masks, but the next might be quite different. The optimal balance between benefits and costs needs to be found.

Generally, public actions should explore how to best foster competition and diversification in GVCs while preserving benefits from specialisation. The policy challenge is complex and goes beyond conventional competition policy domain since GVCs cross borders while competition policies are typically formulated in national contexts.

At the border, governments can review transport, logistics and border process regulations to enable flexible responses to disruptions. They can promote the diffusion of digital technologies to improve information systems, risk management and trade facilitation (e.g. by ensuring that border processes are transparent and accessible to traders and require less physical contact, and that formalities can be expedited online). Reducing unnecessary heterogeneity of technical standards that underlie regulations and non-tariff measures can facilitate easier substitution between alternative suppliers. More broadly, governments can

¹² Although this may entail social costs which should also be taken into account.



promote international co-ordination on border health protocols and mutual recognition agreements, and create a predictable regulatory, trade, and investment policy environment that alleviates uncertainty in times of health and economic crises.¹³

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¹³ For further information on policy options to build more resilient production network, see OECD (2020_[3]).



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