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NBB Economic Review

2022 / #17

Are we entering an era of deglobalisation?

by K. Buysse and D. Essers



Are we entering an era of deglobalisation?

K. Buysse
D. Essers *

Introduction

"[The] Russian invasion of Ukraine has put an end to the globalization we have experienced over the last three decades."

Larry Fink, chief executive of BlackRock
Letter to shareholders, 24 March 2022

"Tension between the US and China was accelerated by the pandemic and now this invasion... [A]ll these trends are raising serious concerns about a decoupling world... [Globalisation faces] friction from nationalism, protectionism, nativism, chauvinism if you wish, or even sometimes xenophobia, and for me, it is not clear who is going to win."

José Manuel Barroso, non-executive chairman of Goldman Sachs International
Financial Times interview, 22 May 2022

There has been a lot of talk about "deglobalisation" in the last two years or so. This subject topped the agenda at the latest meeting of world leaders at the World Economic Forum in Davos. In earnings calls, mentions of "reshoring" and "nearshoring", i.e., bringing previously offshored activities and/or suppliers back (or closer to) home, are at an all-time high (Wiggins *et al.*, 2022), although some business leaders are quick to downplay the idea that globalisation is unravelling. Central bankers and Ministers of Finance have joined in the discussion, too. Christine Lagarde has spoken of the benefits of regionalisation, while US Treasury Secretary Janet Yellen has actively promoted "friendshoring", i.e., moving supply chains to trusted, politically aligned trading partners.

As always, though, talk is cheap. Given the severe strain on supply chains experienced during and after the COVID-19 crisis and other recent calamities, it is to be expected that firms and governments are looking into ways of making production and the sourcing of goods and inputs more resilient to shocks. But to what extent is active disengagement from international trade and global value chains part of the equation? Should we expect true deglobalisation to become a reality in the near future or is the era of deglobalisation already upon us?

This article first sets out broader, longer-term trends in international trade and global value chains (Section 1). Using sector and firm-level data, the impact of recent shocks, more particularly the pandemic and the war in

* The authors would like to thank Paul Butzen for his guidance and useful comments, as well as various staff members of the ECB, Banca d'Italia, the IMF, the World Bank, McKinsey & Company and Eurofound for sharing and/or assisting with data. This article has also benefited from work with ESCB colleagues in a workstream of the ECB's International Relations Committee (IRC).

Ukraine, is assessed (Section 2). Finally, three forces likely to play a key role in shaping future globalisation, namely digital (and other) technologies, the climate agenda and geopolitics, are discussed (Section 3).

We conclude that rapid deglobalisation does not seem to be in the cards for now, barring severe long-lasting geopolitical shocks. However, we do expect a reconfiguration of trade and global value chains, definitely involving more careful risk management and perhaps more regionalism and friendshoring.

1. Trends in trade and global value chains

1.1 From hyperglobalisation to slowbalisation

Globalisation has multiple dimensions, covering trade in goods and services, capital flows, technology transfers and the migration of people, and has a long history. This article focuses on the international exchange of goods in recent times and defines waves of globalisation as periods in which world exports grow more rapidly than GDP in current prices, resulting in a rising ratio of exports to GDP. Applying this definition, it is possible to identify two waves of globalisation in the industrial era. The first kicked off in the early 1800s with the invention of steam power (see Chart 1, left panel). This made it profitable to transport goods over longer distances by rail or ship, thereby removing the requirement to locate production facilities close to consumers. Baldwin (2016) has referred to this geographical separation of factories and consumer markets as globalisation's "first great unbundling".

The twin shocks of the Great Depression and the Second World War ignited protectionist responses in many countries, which led to a period of deglobalisation. The second wave of globalisation thus only took off around 1970, but it wasn't until the mid-eighties that the world economy entered an era of "hyperglobalisation", one in which trade integration has been more rapid than ever with participation by a wider range of countries (Subramanian and Kessler, 2013). The worldwide exports-to-GDP ratio peaked at a record high of 26 % around the time of the global financial crisis (GFC)¹, a turning point after which trade integration slowed to a snail's pace. "Slowbalisation" has become the term used to describe this new trend in the aftermath of the GFC (*The Economist*, 2019).

A distinctive feature of hyperglobalisation is the fragmentation of manufacturing across borders and the rise of global value chains (GVCs). According to Antràs (2020), a GVC consists of a series of stages involved in producing a product or service that is sold to consumers, with each stage adding value, and with at least two stages carried out in different countries. A GVC encompasses research and development, product design, manufacturing, distribution, transportation and marketing activities. This definition is consistent with various GVC configurations, including "spider" structures, in which multiple parts and components converge in an assembly plant, and "snake" structures, in which value is created sequentially. Baldwin (2016) has labelled this phenomenon, whereby technology no longer requires that successive stages of production be physically contiguous or proximate, the "second great unbundling".

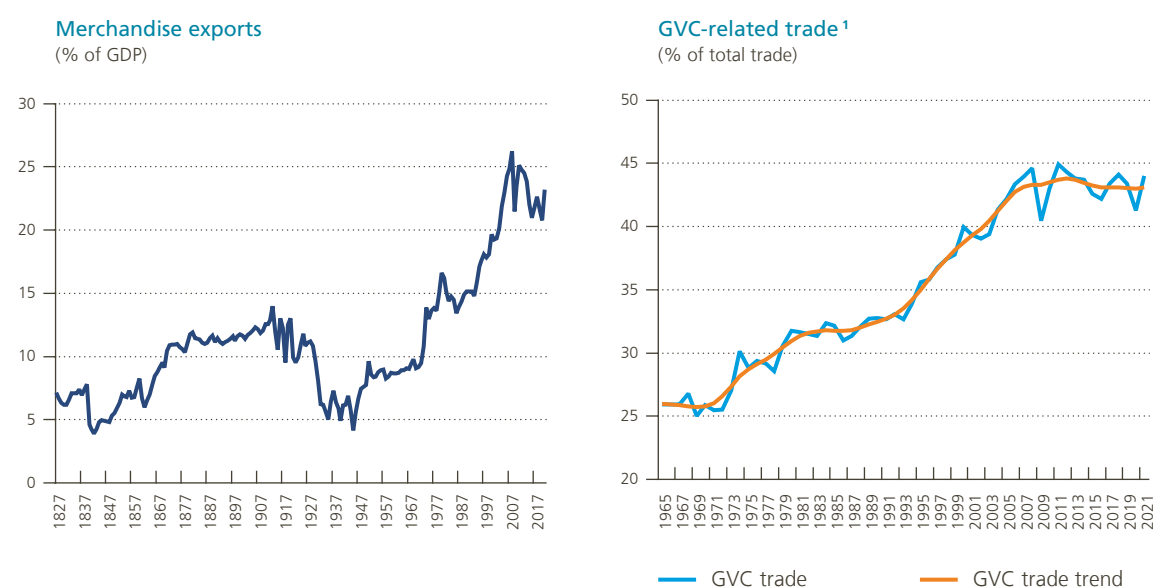
GVCs thus entail production processes in which components and intermediate goods cross borders multiple times. The gross value of each transaction between two entities located in different countries that form part of the same production chain is registered as an export (import) in international trade statistics. Use of the gross value instead of the added value of an intermediate good in each successive stage gives rise to substantial double counting. As a result, the expansion of GVCs artificially inflates gross exports, causing them to rise much faster than GDP which is calculated on a value-added basis.

¹ The time of the peak in trade globalisation varies slightly between major countries and regions. Using the trade-(exports + imports)-to-GDP ratio as an indicator, Baldwin (2022) found that the peak occurred in 2006 for China, 2011 for the US, and 2013 for India. There is no evidence of a peak in trade integration for the EU; trade merely stagnated in the aftermath of the GFC.

Borin and Mancini (2019) have developed a measure of the importance of GVC trade in total international trade. Using global input-output tables, they identify the share of a country's exports crossing at least two borders. Such exports encompass two broad types of GVC trade. On the one hand, GVC trade includes transactions in which a country's exports embody value added that it has previously imported from abroad. This type of GVC participation is often referred to as backward GVC participation. On the other hand, GVC trade also comprises transactions in which a country's exports are not fully absorbed in the importing country and instead are embodied in the importing country's exports to third countries. The latter form of GVC participation is often called forward GVC participation. Looking at the sum of forward and backward participation, the overall share of GVC trade in total world trade grew very significantly in the nineties and early 2000s, peaked in around 2008 at close to 45 %, and then slowly declined following the GFC¹ (see Chart 1, right panel).

Chart 1

From hyperglobalisation to slowbalisation: merchandise trade and GVC-related trade appear to have peaked



Sources: Federico and Tena-Junguito (2017), WTO, World Bank, ECB, WIOD, OECD (TiVA) and Borin *et al.* (2021).

1 Traded items that cross at least two international borders, i.e., that are re-exported at least once before being absorbed in final demand.

Multinational enterprises (MNEs) have played a key role in the development of GVCs. In fact, advanced-economy companies first began to relocate production stages from their domestic bases to other economies in the mid-eighties. MNEs established subsidiaries or joint ventures with local companies abroad through foreign direct investment (FDI). Following the commercial success of this approach, they started outsourcing production to independent firms, leading to multiple layers of suppliers with the head firm often having no information about the identity of distantly tiered companies (Igan *et al.*, 2022). A growing number of firms adopted this model, including, at a later stage, those in large emerging market economies. The motives for moving production abroad were no longer only to save costs (vertical integration) or gain market access (horizontal integration) but were extended to include access to technology and knowledge as well as regulatory arbitrage. Corporate decisions

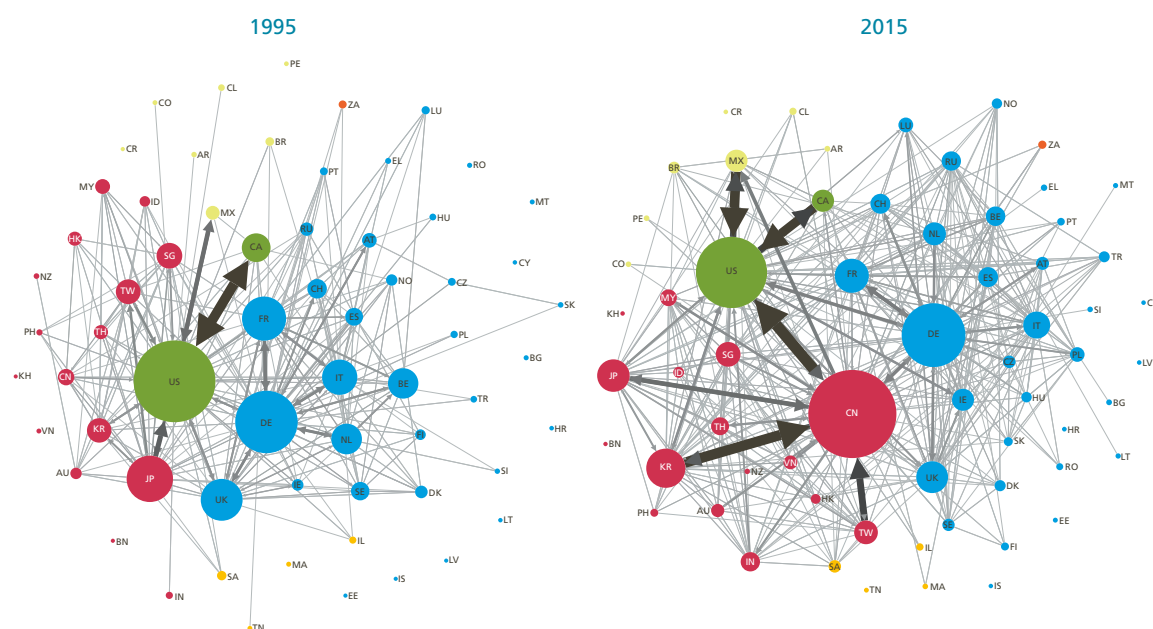
1 By contrast, using a volume indicator, namely the import intensity of production in constant prices, as a proxy for the importance of GVCs, the OECD (2022) concluded that GVCs stagnated after the GFC but found no evidence of a worldwide slowdown between 2011 and 2018. This difference with Borin and Mancini (2019) can be explained by the fluctuation of commodity prices since the GFC.

involve simultaneous choices, regarding location, mode of organisation, transportation routes and the number of suppliers (Antràs and Chor, 2022; see Section 2.3).

A GVC network can be visualised as an interconnected system of regional hubs and spokes. The hubs consist of the main manufacturing nations, at any given time. The spokes represent interconnections between countries established through their participation in the GVC. Chart 2 highlights important developments and geographic shifts in GVC networks over time by comparing the years 1995 and 2015. Interconnectedness between countries has intensified as more emerging market economies in Asia, Latin America and Europe have progressively become involved in regional supply chains. Whereas in 1995 the main hubs coincided with the G7, there were only three mega hubs in 2015. One of these was China, which rapidly emerged as the manufacturing hub of a very dynamic Asian network, overtaking the role previously played by Japan. Furthermore, Germany, as the main beneficiary of the integration of eastern European countries into the EU, became the single dominant player in Europe (Cigna *et al.*, 2022). Finally, the US retained its position as the hub for both North and South America. It is worth noting that there are also important interlinkages between regional GVCs.

Chart 2

Global value chains form complex networks¹ centred on regional hubs



Sources: ECB, OECD (TiVA) and Cigna *et al.* (2022).

¹ In each panel, the size of the node is proportional to the value of GVC trade intermediated by each country. The width of the links (edges) between nodes is proportional to the value of GVC trade between each country pair. The colours of the nodes are according to geographical region and the node labels are ISO alpha-2 country codes (see List of abbreviations).

The slowdown in GVC trade after the GFC has been attributed to a variety of factors. To start, the expansion of GVCs could have reached its natural limit. As discussed in the next section, certain structural developments are dampening the factors that boosted the development of GVCs since the mid-eighties. In addition, compositional shifts in production and demand have also played a role (IRC Trade Task Force, 2016). Geographic shifts in economic activity, from advanced economies to emerging markets with average lower participation in GVCs, have also reduced the overall level of GVC trade. As has been seen, China is a key player in GVCs, meaning economic developments and changes in policy orientation in China carry a lot of weight. In that regard, Chinese authorities have actively encouraged import substitution in strategically important sectors (Buysse *et al.*, 2018, Buysse and

Essers, 2019). As a result, China continues to expand its involvement in GVCs on the selling side while contracting it on the sourcing side (Baldwin, 2022). Finally, global demand also shifted away from the most import-intensive components of GDP and towards less import-intensive components, such as construction and services¹. In particular, weak investment in advanced economies for many years after the GFC and China's shift from an investment-led growth strategy towards more consumption-driven growth are noteworthy.

1.2 The cooling-off of globalisation

It is widely accepted that a confluence of three unique factors enabled the rise of GVCs (Baldwin, 2016; Antràs, 2021; Cigna *et al.*, 2022). In short, the international fragmentation of production would not have been feasible without (i) the ICT revolution and technological advances in the transport sector; (ii) the collapse of the “Iron Curtain” in eastern Europe, the start of a new era of “Opening Up and Reform” under Deng Xiaoping in China, and the process of economic liberalisation in India, all of which made available huge labour reserves for low-cost international production; and, finally, (iii) trade liberalisation, which culminated in the creation of the World Trade Organisation in the early nineties and a new wave of regional trade agreements that significantly lowered the cost of trade. As will be demonstrated below, most of these factors have now run out of steam, contributing to the cooling-off of globalisation.

The ICT revolution consisted of an exponential rise in computing power and computer memory capacity, which doubled approximately every 18 months between 1987 and 2007. Information transmission capacity grew even faster, doubling every six months (Baldwin, 2016). The development of the internet and the explosion in the number of users worldwide completed the ICT revolution. With the cost of long-distance information sharing falling dramatically, it became feasible to reorganise production processes and relationships among firms, their suppliers and customers on a global scale.

In addition to the ICT revolution, technological developments in transportation also rendered the international fragmentation of production more profitable. Air freight transport services took off after the Second World War, and technological advances propelled a sharp decline in costs² (Hummels, 2007). In addition, the creation of reliable air cargo services by companies such as DHL, UPS and Federal Express also played a role (Baldwin, 2016). Moreover, shipping costs have declined steadily since the mid-eighties. The container revolution, which produced significant efficiency gains, especially for the transportation of sea cargo, was the main driver (Hummels, 2007). That being said, it should be noted that volatile energy costs and growing port congestion in some countries seem to have led to greater volatility in shipping costs, possibly hampering the smooth functioning of GVCs (Cigna *et al.*, 2022; see also Section 2.1).

Around 1990, political developments led to a massive labour supply shock³, with huge wage differentials waiting to be exploited. For example, in the nineties, annual wages in Poland were only half the level in Germany, while Mexican and Chinese wage costs were 25 % and 3 %, respectively, of those in the US (Igan *et al.* 2022 estimates; own calculations)⁴. Manufacturing firms seized this opportunity to combine their advanced know-how with low-wage labour in factories set up abroad. China in particular attracted large amounts of FDI during the era of hyperglobalisation and became the world's manufacturing and assembly powerhouse. Steady economic convergence has since fuelled wage growth, most notably in eastern Europe and China, which no longer enjoy

1 Unlike trade in goods, trade in services has continued to grow, albeit from much lower levels.

2 Worldwide average revenue per tonne kilometre shipped by air decreased by 92 % between 1955 and 2004. Taking quality improvements into account, the sharpest drops occurred in the earlier years of this period (Hummels, 2007). Despite this sharp decline, air cargo remains much more expensive than sea cargo. The critical advantage of air freight is of course speed.

3 According to Antràs (2021), the selected Socialist countries which opened up after 1990 collectively accounted for 43.5 % of the world's population. The countries considered were China, India, Bangladesh, Vietnam, Poland, Romania, East Germany, Hungary, the Czech Republic, Bulgaria, Serbia and Slovakia.

4 For China, the average monthly wage of an urban worker was used, deflated by the average RMB/USD exchange rate. For the US, the weekly earnings of production and non-supervisory employees were used. The data were sourced from CEIC, the BIS and the US Bureau of Labor Statistics.

a demographic dividend. According to our estimates, China's annual wage compensation relative to the US has risen to 25 %. Some GVC activities have thus been moved from China to countries with lower labour costs, such as Vietnam and Bangladesh.

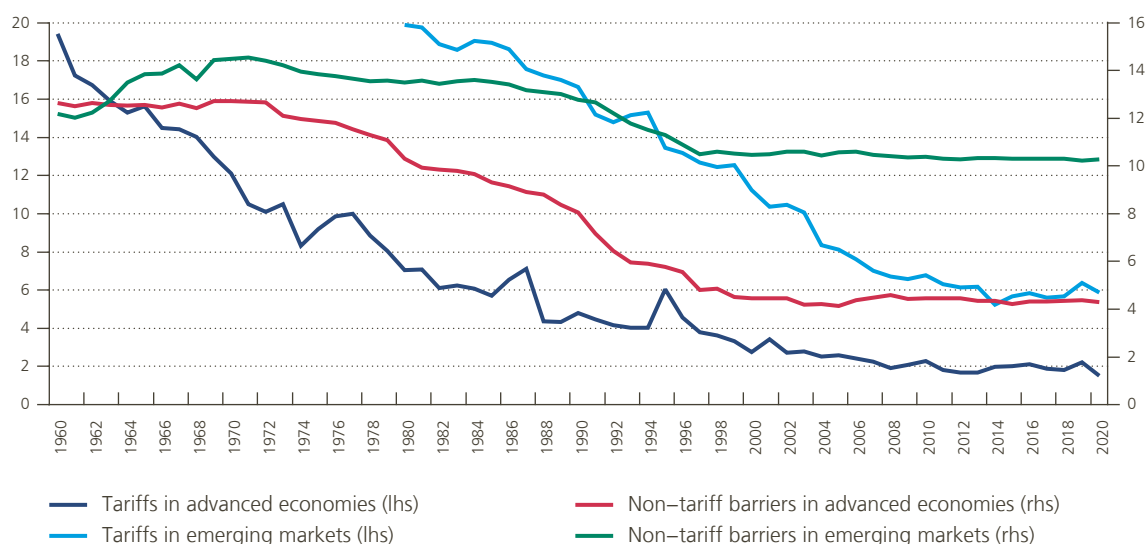
The world moved towards trade liberalisation after the end of the Second World War with the establishment of the General Agreement on Tariffs and Trade (GATT) in 1948. Focused on eliminating import restrictions and reducing tariffs on most manufactured goods, the GATT was successful in bringing about significant tariff reductions through successive trade rounds, especially in advanced economies as it allowed developing countries to maintain higher tariffs (see Chart 3, top panel), and in expanding membership (see Chart 3, middle panel). Later GATT rounds also aimed at reducing non-tariff barriers to trade, and the number of trade restrictions declined, again mainly in advanced economies (see Chart 3, top panel). The Uruguay trade round culminated in the creation of the World Trade Organisation (WTO) with a more ambitious mandate covering trade in services, agriculture, product health and safety standards, trade-related aspects of intellectual property rights and investments as well as a trade dispute settlement mechanism (Rodrik, 2011). WTO membership continued to expand with the entry of formerly Communist countries in eastern Europe during the nineties and, most importantly, China in 2001. Trade liberalisation was also a central building block of European integration.

Trade liberalisation, in particular tariff reductions, is an important driver of GVC growth. When production is fragmented internationally, some inputs may cross borders several times before being incorporated into final products. When tariffs are imposed at each border crossing, a snowball effect occurs, resulting in a much higher cumulative tariff at the final stage of production. The higher the tariff, the more costly the snowball effect on GVCs. Joining an international production network, to become more competitive in certain industries, opened up new opportunities for developing economies, but due to the chilling effect of high tariffs, these countries unilaterally started to slash tariffs beginning in the nineties (see Chart 3, top panel).

Chart 3

The pace of trade liberalisation has slowed while protectionist policies are on the rise

Tariff and non-tariff barriers¹ in advanced and emerging market economies
(% for tariffs, index for non-tariff barriers)

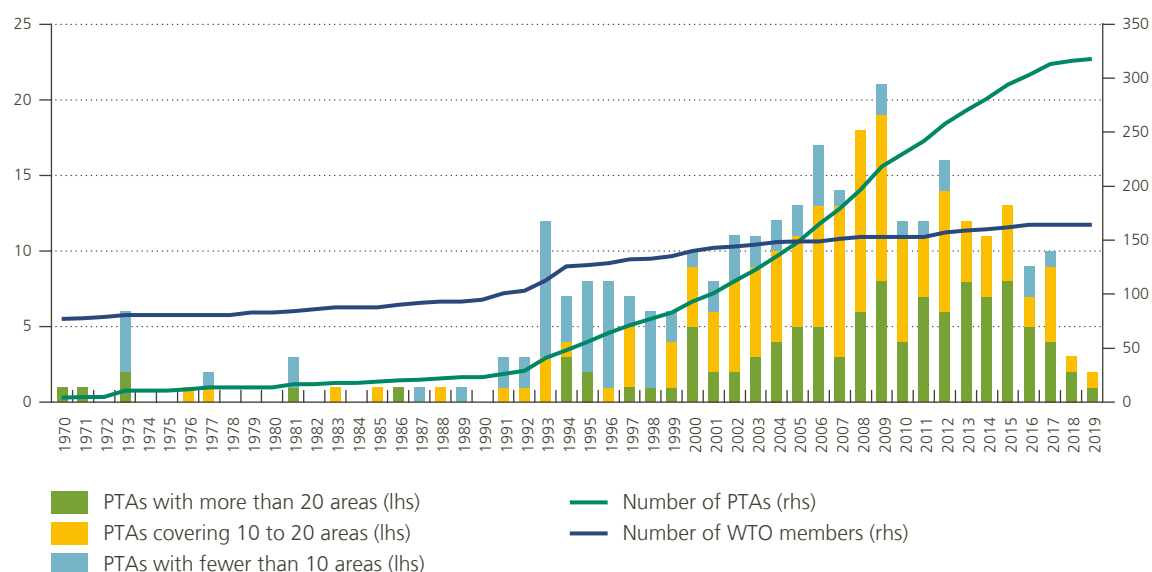


¹ This measure is defined as the sum of binary variables related to: (i) exchange measures, (ii) arrangements for payments and receipts, (iii) imports and import payments, (iv) exports and export proceeds, and (v) payments and proceeds from invisibles and current transfers; excluding taxes and tariffs. Each category is further broken down into sub-categories (see Estefania-Flores *et al.*, 2022).

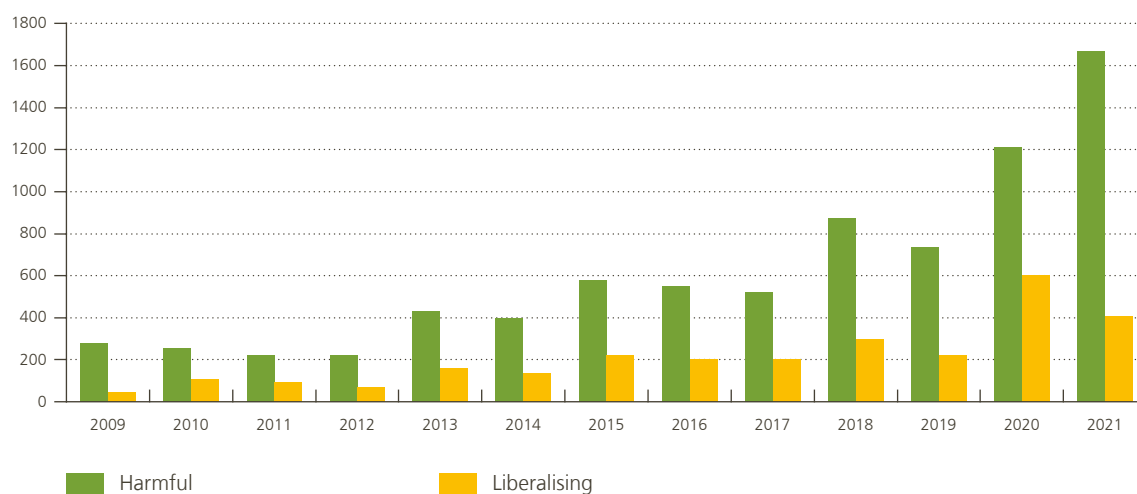
Chart 3 (continued)

The pace of trade liberalisation has slowed while protectionist policies are on the rise

Number of WTO members, PTAs, and policy areas covered in PTAs



New trade measures implemented by G20 countries
(goods trade only)



Sources: World Bank (World Development Indicators, Deep Trade Agreements database), WTO, Furceri *et al.* (2018), Estefania-Flores *et al.* (2022) and Global Trade Alert.

Another development supporting the expansion of GVCs was the proliferation of bilateral and regional preferential trade agreements (PTAs), which enabled more tariff-cutting and often included provisions that went well beyond traditional trade policy (Ruta, 2017). More specifically, the past two decades have seen a shift towards deeper PTAs, covering a rising number of policy areas (see Chart 3, middle panel). The inclusion of new policy areas in PTAs did not happen by chance. As shown by Mattoo *et al.* (2020a, 2020b), trade agreements covering only a few policy areas generally focus on traditional trade policy, such as tariff liberalisation or customs. Agreements with a broader scope (10 to 20 policy areas), on the other hand, tend

to include trade-related regulatory issues covered by WTO rules but often go beyond what WTO members have committed to. Examples of frequently covered policy areas include anti-dumping, countervailing measures, trade in services, subsidies, the movement of capital, public procurement and technical barriers to trade. Provisions on competition policy, which does not fall under the scope of the WTO, are also frequently seen. Finally, PTAs with more than 20 provisions¹ often cover policy areas that are more indirectly related to trade, such as labour, the environment, intellectual property rights, investment and the movement of people. These agreements are referred to in the literature as “deep trade agreements”. The creation of the European single market and subsequent EU enlargement treaties are prime examples of very deep trade agreements. The rise of bilateral and regional PTAs contributed to further trade liberalisation, often benefitting third parties² as well.

The number of bilateral and regional PTAs skyrocketed in the nineties and early 2000s (see Chart 3, middle panel) and added a second pillar to the system of world trade governance, with the WTO continuing to act as the first pillar. However, in recent years, the pace at which new PTAs are concluded has declined. The increasing number of policy areas covered by deep trade agreements and the heightened political sensitivity of certain provisions³ have made it harder to conclude such agreements. Nevertheless, important new regional trade agreements continue to see the light of day, albeit often only after many years of negotiations. The most notable examples are the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP), concluded in 2018, and the Regional Comprehensive Economic Partnership (RCEP), an Asian-Pacific free trade agreement concluded in 2020. Moreover, political support for mega-regional trade deals dwindled under the Trump administration with the introduction of a new trade policy in 2017. The administration suspended negotiations between the EU and the US on the Transatlantic Trade and Investment Partnership (TTIP) and withdrew from the CPTPP negotiations, which were ultimately finalised without US participation. There are no signs that the Biden administration intends to revisit these decisions.

Fernandes *et al.* (2021) fear that PTAs may become a driver of fragmentation in a post-COVID-19 world characterised by enduring trade tensions, occasional conflicts and uncertainty regarding the future of multilateral trade rules and their enforcement. More specifically, if a particular country wishes to resort to protectionist measures, the countries with which it has signed PTAs are likely to be shielded and the impact borne by non-signatories. This could even lower the threshold for hostile actions, which in turn increases policy uncertainty for firms. Political tensions can also increase costs and pose a dilemma for MNEs from smaller countries that have signed separate PTAs with rival factions to protect their business interests. One vulnerability in the current trade governance system is the absence of a deeper agreement between the world’s biggest economies, namely the US, China and the EU.

While most visible in the US, discontent with trade has been rife for some time. A 2018 survey by the Pew Research Center found that while people in advanced economies overwhelmingly supported trade in principle, they were sceptical that it increased their prosperity (Stokes, 2018). In fact, only a minority believed that trade resulted in increased employment (47 %), higher wages (31 %) or lower prices (28 %). Economists have long identified labour-saving technologies instead of trade as the main driver of job losses, downward wage pressures, and ultimately income inequality (World Bank, 2020; Sandbu, 2020). In other words, even without offshoring through GVCs, many manufacturing jobs for low-skilled workers would have been lost. In addition, it is widely felt that the people losing from trade or technology have been insufficiently compensated for their losses while the emergence of a winner-takes-all model has concentrated income growth in the top one percent.

1 Horn *et al.* (2010) have identified up to 52 policy areas covered by at least one agreement.

2 PTAs include several policy areas that are non-discriminatory in nature and can thus reduce trade costs for members and non-members alike. Indeed, rules that increase competition, limit domestic subsidies and regulate state-owned enterprises on members’ markets are found to increase exports of non-members (Fernandez *et al.*, 2021).

3 To ensure that member countries comply with the provisions of the agreement, PTAs often contain a dispute resolution mechanism. Some of these mechanisms allow investors in member countries to make claims against the governments of other member countries. This can raise political opposition on the ground that it gives too much power to MNEs, as illustrated by Wallonia’s opposition to the signing of the EU-Canada trade deal (CETA).

The backlash against globalisation has tempted governments to resort more often to protectionist measures. The new protectionist measures taken by G20 nations far outnumber the corresponding liberalising measures, with this number rising every year (see Chart 3, lower panel). Government subsidies to manufacturers of import-competing goods and export incentives have become more prevalent since the GFC (Evenett, 2020), especially in China, resulting in rising tensions with trade partners (Buysse and Essers, 2019). Many countries (including the US, the EU, Australia and Canada) have applied trade remedies in the form of antidumping and countervailing duties or safeguards, mainly – but not only – on China. Bown (2022a) estimates that the share of G20 imports covered by trade remedies reached a record high of 2.7 % in 2019. The protectionist tide rose further under the Trump administration, which in 2018 slapped new (temporary) tariffs on solar panels and washing machines in order to give the domestic industry time to adjust to foreign competition and raised tariffs on steel and aluminium imports on national security grounds (Cordemans *et al.*, 2018). Over the course of 2018 and 2019, the US and China engaged in a full-fledged trade war, with multiple rounds of escalating tariffs on the other's imports. By the end of 2019, at least 66 % of total Chinese exports to the US and 58 % of US exports to China were subject to punitive tariffs (and they remained so at the time of writing) (Bown, 2022b). Finally, the outbreak of the pandemic in 2020 prompted many governments to resort to (mostly temporary) export curbs on medical commodities, including personal protective gear, medical equipment (such as ventilators) and medicines (Evenett, 2020). This led to a new peak in protectionist measures.

2. Recent shocks: COVID-19 and the war in Ukraine

2.1 The relative resilience of GVCs during the pandemic and new shocks in 2022

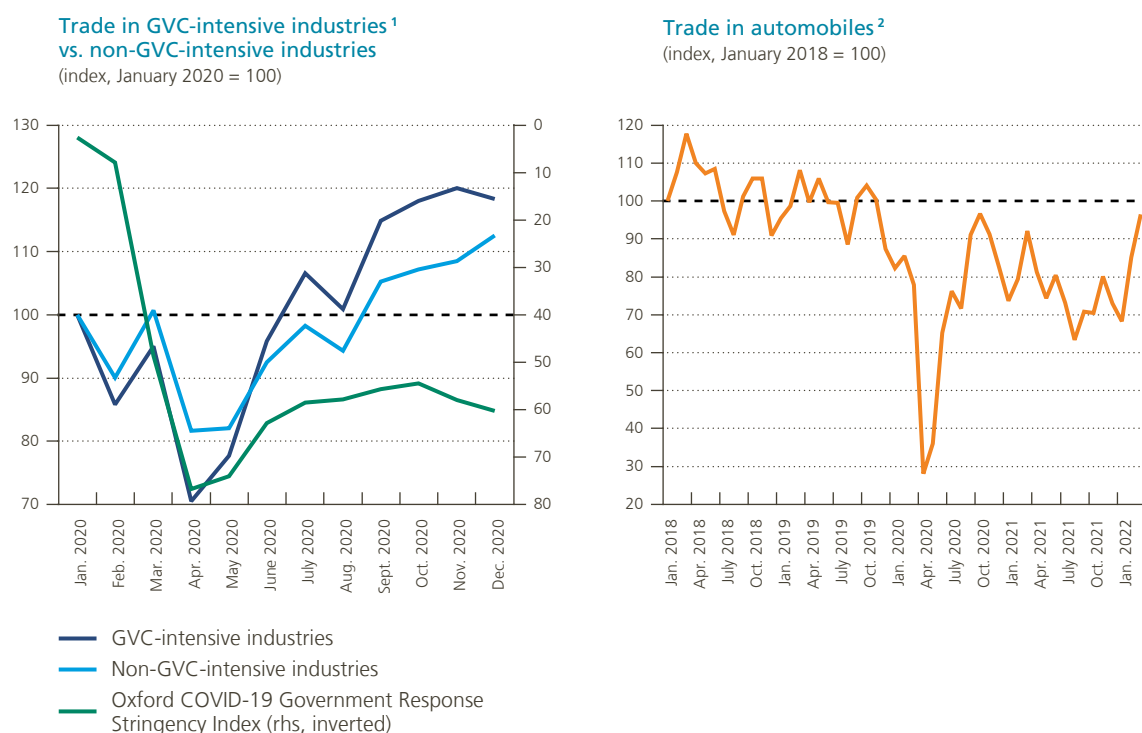
When the COVID-19 pandemic hit, global trade initially collapsed. Trade in goods dropped by around 12 % (in volume terms) while trade in services fell approximately 21 % between the last quarter of 2019 and the second quarter of 2020. Whereas trade in services – in particular the travel and tourism component – subsequently remained sluggish, trade in goods experienced a rapid, V-shaped rebound, attaining pre-pandemic (late-2019) levels by the fall of 2021. This quick turnaround was in stark contrast with the more protracted recoveries of trade in the aftermath of previous worldwide recessions, including the GFC (Mohammad *et al.*, 2022).

Trade in goods in industries known to be heavily reliant on GVCs was more volatile during the pandemic, with a larger initial drop early on but also a sharper recovery, compared to trade in non-GVC-intensive goods (see Chart 4, left panel). IMF analysis finds that lockdowns and other containment policies by trading partners had significant spillover effects on imports, especially in GVC-intensive industries (Mohammad *et al.*, 2022; see also Berthou and Stumpner, 2022; Espitia *et al.*, 2022). However, most of these spillovers dissipated swiftly as GVCs adapted to asynchronous lockdowns, as evidenced by the sizeable yet temporary shifts in trade market share between regions, and companies gained experience operating under mobility restrictions (including by resorting to teleworking where feasible). Evidence based on granular data from French customs indicates that at the start of the pandemic, firms adjusted their trade activities predominantly along the intensive rather than the extensive margin (i.e., trading smaller volumes or fewer product varieties with the same countries instead of halting trade with those countries altogether) and that those trading more upstream goods, using robots in their production process and with larger inventories were better able to withstand COVID-19-related shocks to trade (Brussevich *et al.*, 2022).

Notwithstanding the resilience displayed by most GVCs during the early phase of the pandemic, some industries characterised by particularly complex and geographically dispersed supply chains faced longer-lasting disruptions. One notable example is the automotive sector. Trade in cars and their components suffered a particularly steep drop at the start of the pandemic (by more than 70 % between November 2019 and April 2020) followed by an initially fast-paced but later waning recovery (see Chart 4, right panel). The early breakdown in trade (and sales) was mostly the result of closures of automotive plants and car dealerships and consumer postponement of big-ticket purchases. In 2021, the recovery was hampered by a critical shortage of semiconductor chips

Chart 4

GVC-intensive trade displayed relative resilience during the pandemic, with some exceptions



Sources: Mohommad *et al.* (2022), Trade Data Monitor, UN Comtrade and Hale *et al.* (2021).

1 Trade in finished and intermediate goods in the automotive, electronics, textile and garment, and medical goods industries, based on a selection of six-digit Harmonised System (HS) codes.

2 Trade in passenger vehicles and associated manufactured intermediate goods, based on a selection of six-digit HS codes.

for automotive use and an increase in lead times throughout the automotive supply chain (Dutt *et al.*, 2021). Chip manufacturers could not keep up with the rapid release of pent-up demand for cars, as part of their capacity had been diverted to the production of chips for the consumer electronics sector, boosted by the pandemic (Boranova *et al.*, 2022)¹.

Furthermore, despite the relatively strong adaptability exhibited by GVCs, global supply chain pressures reached unprecedented levels during the pandemic and have been extraordinary volatile ever since (see Chart 5)². At the outset of the pandemic, supply chain pressures quickly mounted to record highs due to the first round of lockdowns, starting in China. Following a significant easing in the summer and autumn of 2020, pressures accelerated again with a new wave of infections in the winter of 2020, reaching new heights by the end of 2021. Along with an unexpectedly strong economic rebound, supply bottlenecks intensified again as the rotation of demand away from services towards goods proved more persistent than anticipated, while port infrastructure remained clogged and labour shortages emerged, including in the manufacturing and transport

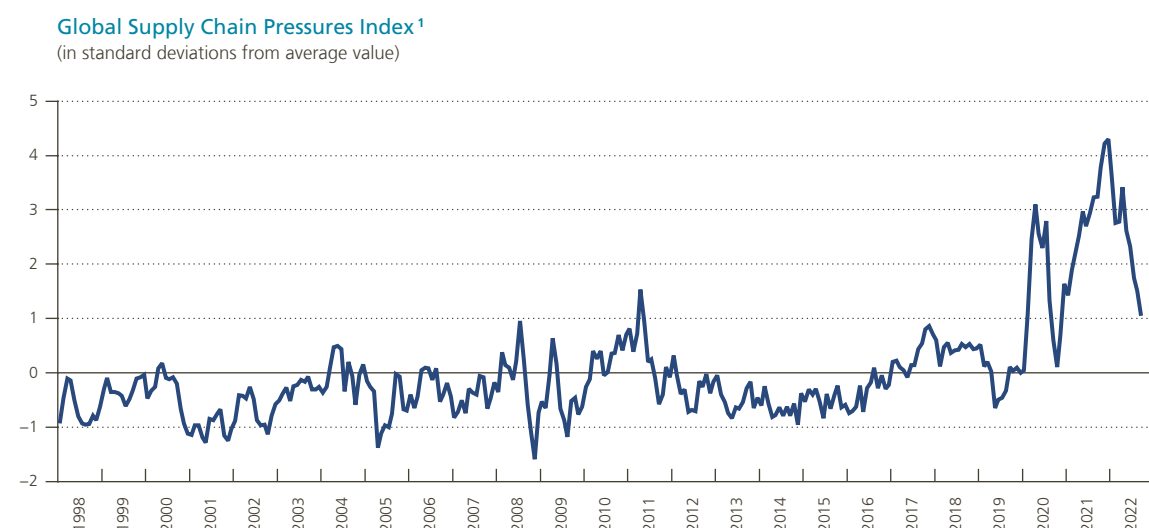
1 Other factors constraining chip production included a fire in a Japanese factory, weather events in the US and Taiwan (the world's dominant manufacturer of advanced chips) and strategic stockpiling in the context of technology tensions between the US and China (see Buyse and Essers, 2022). In addition, chip supply is highly inelastic (due to the amount of time and money needed to set up new factories) and the automotive sector could not replace the older-generation chips needed to meet safety standards with the newer chips that were in greater supply at the time. Moreover, modern cars require a great number of (often purpose-specific) chips – up to 3000 or more per vehicle (Igan *et al.*, 2022, online annex).

2 COVID-19-related surges in the Global Supply Chain Pressures Index (GSCPI) dwarfed previous jumps such as those following the 2008-2009 GFC (at which time demand-side factors played a more important role), the 2011 Tohoku earthquake and tsunami in Japan, the 2011 flooding in Thailand and the flare-up of US-China trade tensions in 2017-2018 (Benigno *et al.*, 2022; Chart 5).

sectors (Celasun *et al.*, 2022; Komaromi *et al.*, 2022). These record-level supply chain pressures have contributed significantly to the observed increase in inflation in advanced economies (Igan *et al.*, 2022; di Giovanni *et al.*, 2022).

Chart 5

In 2022, global supply chains remained under pressure, reinforced by new Chinese lockdowns and the war in Ukraine



Sources: Federal Reserve Bank of New York and Benigno *et al.* (2022).

1 The GSCPI combines global transportation costs (shipping and air freight) with supply chain-related components of PMI surveys for the manufacturing sector (delivery times, backlogs and purchased stocks) in the US, the euro area, the UK, Japan, China, South Korea and Taiwan by means of principal component analysis. Demand effects are purged from the underlying series through regression on the "new orders" and "inputs purchased" components of the surveys.

Whereas, overall, global supply chain pressures have eased from their absolute highs, they remained at historically elevated levels in 2022. This can be attributed in part to fresh shocks, most notably renewed lockdowns of some of China's major cities since March 2022, linked to the country's zero-COVID-19 policy, and the Russian invasion of Ukraine at the end of February. As China responded to outbreaks of new COVID-19 cases in Shanghai and elsewhere with massive testing campaigns and strict quarantines, the number of vessels waiting outside Chinese ports built up rapidly, several key airports suspended operations and inland trucking capacity shrank, causing backlogs for domestic and foreign firms located in China's hinterland as well as for electronic and textile manufacturing hubs in Vietnam and Cambodia reliant on Chinese inputs (Interos, 2022).

Moreover, Russia, which is economically several times smaller than China but with a high forward GVC participation rate as an exporter of energy and other raw materials, has the potential to unsettle various, more upstream industries (Winkler *et al.*, 2022), especially given the limited substitutability of Russian (energy) inputs in the short run (Borin *et al.*, 2022a). At the time of writing, analysis of the latest marine freight data, pipeline gas flows and customs data from Russia's trading partners indicated that, since the start of the war in Ukraine, Russian oil and gas exports to the EU have decreased significantly, with a partial diversion of flows to Asia; seaborne exports of agricultural commodities from Russia have been very volatile while those from Ukraine had completely stopped before the set-up of a safe passage for grains; and Russian imports have dropped substantially due to sanctions (Attinasi *et al.*, 2022). However, the longer-term supply chain and GVC-related effects of the war, of the associated trade and financial sanctions on Russia, and of Russia's retaliatory actions remain to be seen. According to Münchau (2022), Europe could see a wave of de-industrialisation rather than

reshoring due to the war-induced energy crisis. The sharp rise in energy costs could price domestic European production out of the market, to the benefit of imports.

2.2 Supply chain strategies in the data

Given the supply chain problems firms experienced during and after the COVID-19 crisis and other recent events, it is unsurprising that they are looking into ways of reorganising their activities so as to make them more resilient to future shocks. Systemic data on how firms have historically chosen to organise their supply chains and how these practices have changed in response to shocks are, however, hard to come by. One notable data collection effort is that carried out by Eurofound (the European Foundation for the Improvement of Living and Working Conditions), which has been monitoring large-scale corporate restructuring events – including those involving offshoring – since 2002 (with broader coverage from 2004-2005 onwards), as well as large-scale reshoring events between 2014 and 2018, through the screening of a broad selection of national media sources by its European Restructuring Monitor and European Reshoring Monitor¹. While Eurofound's data may be indicative rather than fully representative of recent offshoring and reshoring behaviour by European firms, some interesting observations can be made.

First, offshoring represents only a small portion of corporate restructuring events. Eurofound identified more than ten times more internal restructurings (implying job cuts) and business expansions (implying job creation) than incidents of offshoring. The total offshoring sample consisted of 888 incidents by EU27 and UK companies over 2004-2021 (see Chart 6, left panel). There appears to be a declining trend, as offshoring dropped markedly after the GFC. The pre-crisis wave was boosted by offshoring to new EU member states, especially the eastern European countries that joined the EU in 2004 (these countries also feature prominently in offshoring to multiple locations). Offshoring to Asia, predominantly China and India, constitutes only a modest share of total cases and has become even rarer since the GFC.

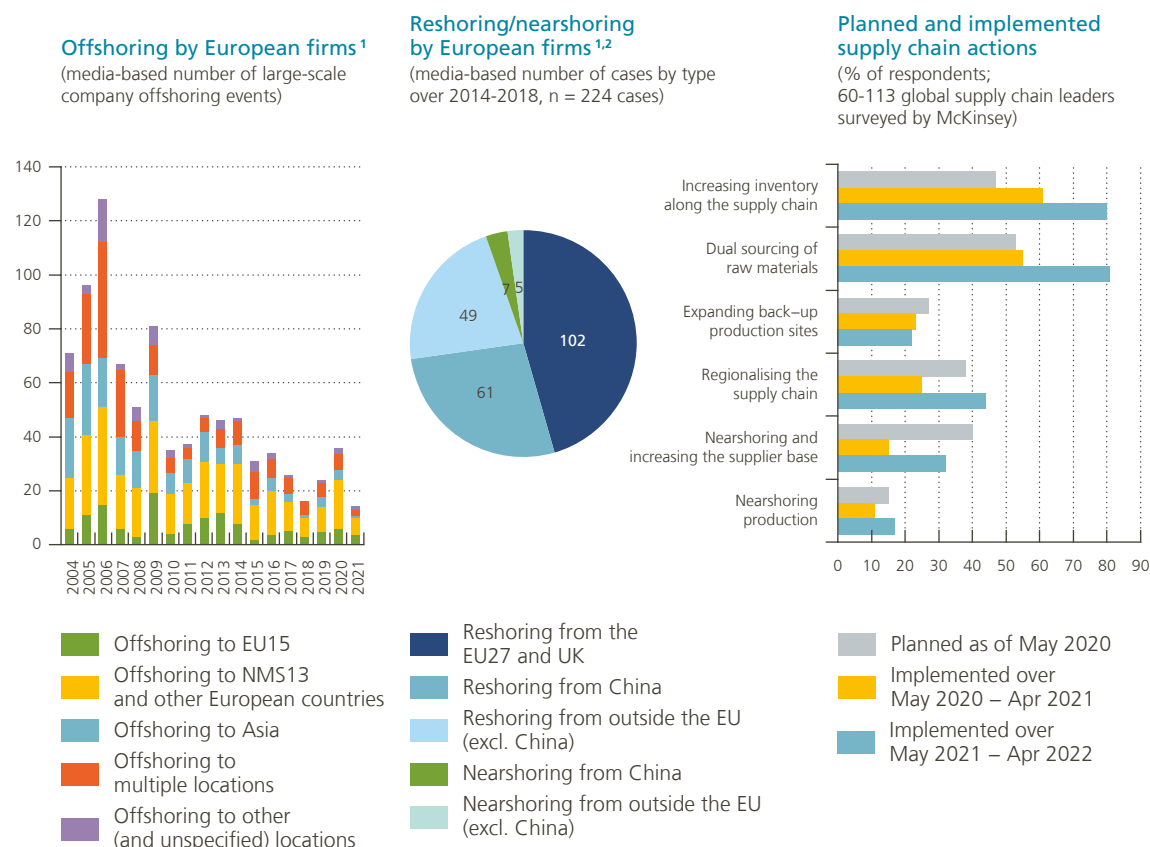
Reshoring does not appear to have been particularly common in recent years. Eurofound's European Reshoring Monitor identifies just 224 cases of reshoring (or more exceptionally nearshoring) by EU27 and UK companies in the period 2014-2018, most in the manufacturing sector (see Chart 6, middle panel). Nearly half of these cases involved reshoring from other European countries, while just under 30% concerned China, and about 20% other non-EU countries (mostly India and other Asian economies). Eurofound (2019) also collected data on the reasons for reshoring. The most frequently cited reasons include a broader reorganisation of corporate activities, the desire to reduce delivery times and increase proximity to consumers, issues regarding quality control and branding (such as textile companies hoping to benefit from the "Made in" effect), and the automation of production processes.

More recent firm-level survey evidence does not suggest a new wave of reshoring in response to the latest round of global shocks, at least not for the time being. For example, between the spring of 2020 and the spring of 2022, McKinsey conducted a three-round survey of 60 to 113 senior supply chain executives with large MNEs active in various industries and countries (see Chart 6, right panel). The first survey round, carried out in May 2020, when the COVID-19 crisis was in full swing, revealed that an overwhelming majority (more than 90%) of companies surveyed planned to increase the resilience of their supply chains (Alicke *et al.*, 2020). A significant share of respondents (about 40%) were considering bold steps to boost resilience, such as the regionalisation of supply chains and/or the nearshoring of their supplier base, in addition to holding larger inventories and/or adopting a dual sourcing strategy for raw material inputs. However, the second survey round revealed a

¹ "Large scale" is defined as involving at least 100 job losses or 100 job gains. See Eurofound's (2013, 2019) publications for more information on database construction. For the US, data on reshoring are collected in a similar (news-based) fashion by the Reshoring Initiative, a lobbying group whose mission is "to bring good, well-paying manufacturing jobs back to the United States by assisting companies to more accurately assess their total cost of offshoring, and shift collective thinking from 'offshoring is cheaper' to 'local reduces the total cost of ownership'" (see <https://reshorennow.org>). The Reshoring Initiative (2022) projects that 2022 will see a record high of nearly 350,000 "reshored" jobs, defined very broadly as positions that were previously held abroad, new positions in US companies that take market share away from foreign companies (thereby reducing US imports), and positions created by FDI in the US.

Chart 6

Firms are trying to boost supply chain resilience, but reshoring is often not the preferred option



Sources: Eurofound and McKinsey.

1 Years refer to when the planned offshoring or reshoring/nearshoring was announced.

2 Nearshoring is defined here as bringing company activities back from outside the EU27 or UK to another EU country (other than the home country).

gap between plans and actions: a much smaller share of companies put the planned regionalisation (25 %) or supplier nearshoring strategy (15 %) into practice between May 2020 and April 2021. Conversely, strategies to increase inventories and engage in dual sourcing were more likely to have been adopted by April 2021 than originally planned (Alicke *et al.*, 2021). The third survey round, covering May 2021 to April 2022, revealed a notable increase in the implementation of regionalisation and supplier nearshoring strategies, more in line with May 2020 plans, even though inventory building and dual sourcing continued to be much more common (Alicke *et al.*, 2022). Nearshoring or reshoring own production facilities remained the exception. Similar surveys – usually involving a much larger sample of firms but without the panel aspect of the McKinsey questionnaire – confirm that companies tended to confront the supply chain vulnerabilities exposed by the COVID-19 crisis by making changes to inventory management and supplier diversification rather than through extensive nearshoring or reshoring (see e.g., Dib and Oulid Azouz, 2020; Ferguson *et al.*, 2022)¹.

¹ This finding is further supported by country-specific firm-level surveys, including for Germany (Aksoy *et al.*, 2022; DIHK, 2022), Italy (Di Stefano *et al.*, 2022), Sweden (Nordström *et al.*, 2021) and Belgium (Coppens *et al.*, 2021). See Di Stefano (2021) for an overview of such studies. One exception is a survey conducted by ABB (2022), a Swedish-Swiss MNE active in electrical equipment and robotics, among 375 US firms in May-June 2022. 37 % of the surveyed US companies indicated they plan to reshore production, while another 33 % were looking to nearshore.

Of course, the foregoing empirical evidence does not necessarily imply that nearshoring and reshoring will remain relatively marginal phenomena in the future, especially in view of the ongoing war in Ukraine and the sanctions imposed on Russia. Increased geopolitical tensions may well alter firms' calculations with respect to strategies such as "friendshoring" (see Sections 2.3 and 3.3). Indeed, while it is again too early to grasp the longer-term implications of the war, the sanctions and Russia's retaliation on how companies organise their supply chains, most firms with activities in Russia appear to be taking steps to reduce their exposure, albeit to varying degrees (see Box).

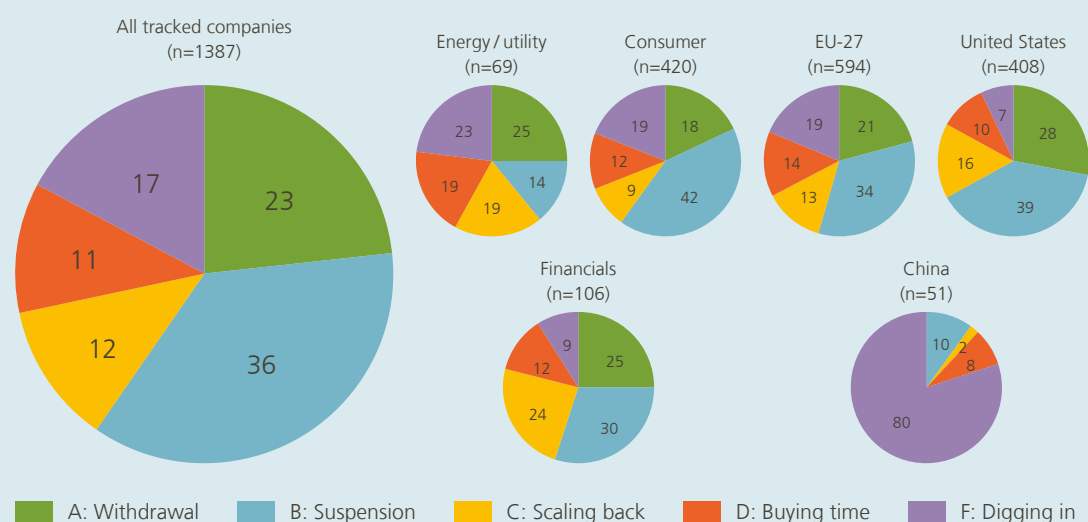
BOX

Initial responses by firms to the war in Ukraine

Since Russia invaded Ukraine in February 2022, researchers at the Yale School of Management have been tracking the (intended) responses of nearly 1 400 foreign companies with activities in Russia in real time, using a combination of public and non-public sources, and classifying these responses on a letter grade scale where (A) means "withdrawal" (companies totally halting their Russian activities and/or completely exiting Russia), (B) is "suspension" (temporarily curtailing all or most operations in Russia while keeping their options open), (C) is "scaling back" (reducing certain significant operations but continuing others), (D) is "buying time" (postponing new investments and/or developments, while continuing substantive business), and (F) is "digging in" (continuing business as usual in Russia).

Responses by firms to the war and sanctions have been heterogenous

Announced actions by companies with operations in Russia, by industry and nationality of firm ownership¹
(% of tracked companies, as of 17 October 2022)



Source: Yale Chief Executive Leadership Initiative.

¹ See Sonnenfeld et al. (2022a) for more information on database construction and <https://www.yalerussianbusinessretreat.com> for firm-specific details.

As of 17 October 2022, no fewer than 1 149 or 83 % of tracked firms had publicly announced that they had or would be voluntarily curtailing their activities in Russia, at least to some degree (beyond the bare minimum required by the sanctions on Russia) (see the chart above). Yale researchers calculated that, in aggregate, Russian revenue and the value of Russian investments by these 1000+ firms totalled more than USD 600 billion, which corresponds to approximately 40 % of Russian GDP, and that they employ well over one million Russian staff. While it will take several years before the full impact is felt, this immense business retreat will undoubtedly deeply transform the Russian economy (Sonnenfeld *et al.*, 2022a). The implications for retreating foreign companies are more uncertain and depend on, amongst other factors, their original exposure in Russia (typically rather small for large MNEs). If anything, the financial markets have rewarded firms withdrawing from Russia relative to those that have decided to stay (Sonnenfeld *et al.*, 2022b).

While, overall, a majority of firms have opted for either complete withdrawal or suspension, the responses have been quite heterogenous when looked at in more detail. Aggregating individual firm grades by industry or by nationality of firm ownership (represented by the location of headquarters) reveals notable variation. For example, as shown in the chart, (asset-heavy, less mobile) energy and utility companies appear to have been less inclined to take drastic actions, with higher shares of F and D grades, than those producing consumer goods or operating in the financial sector (the latter being heavily subject to international sanctions). Moreover, while most European and US firms reacted strongly to the invasion, about 80 % of the 51 tracked Chinese firms appear to be sticking to business as usual in Russia. Notwithstanding the foregoing, some of China's largest banks, as well as the Asian Infrastructure Investment Bank and the BRICS's New Development Bank, have suspended Russian access to their services (Sonnenfeld *et al.*, 2022a).

2.3 Explaining the “stickiness” of GVCs and strategic trade-offs

Let us now take one step back and shed some light on why we are not (yet) seeing large-scale deglobalisation, under the form of massive near- or reshoring of supply chains, in the data.

One of the main reasons GVCs have proven to be relatively “sticky” is that several fixed costs associated with organising and participating in a GVC are sunk, i.e., once made, they cannot be recovered. These costs pertain not only to setting up production facilities abroad. Above all, more so than in traditional trade transactions involving raw materials or other homogenous inputs, contracting within a GVC is often relational in nature (Gereffi *et al.*, 2005; Antràs, 2020, 2021). A key source of sunk costs is thus the establishment and maintenance of relations with suitable foreign suppliers of various inputs and with buyers of the firm's products. These relationships depend heavily on mutual trust built up through repeated interaction over many years (especially in places that are more distant and/or where strong legal safeguards are missing) and may require substantial relationship-specific investments, such as the purchase of specialised equipment or the customisation of products, which are not (easily) transferable. Typically, firms participating in a GVC exchange both tangible goods as well as intangibles, such as technology, intellectual property, standards and credit, with other GVC members. Switching to new suppliers or buyers is hence costly and time consuming, as is dismantling existing production facilities and moving to new production sites. As a result, when MNEs expect shocks to be temporary, they may prefer to adjust production and sourcing/sales volumes between existing suppliers and sites (adjustments at the intensive margin) rather than breaking ties or relocating their activities (changes at the

extensive margin). High uncertainties may also induce firms to adopt a wait-and-see stance, with respect to both investment in new offshoring opportunities and divestment from previously offshored activities.

Firms face multiple trade-offs in their strategic decisions around GVC participation, between cost efficiency and supply chain resilience¹ and with respect to their exposure to foreign versus local shocks. They first weigh the rewards they reap from cost savings linked to, for example, increased specialisation, economies of scale, lower wages and lean inventory management, against the risks of supply chain disruption (Baldwin and Freeman, 2022). Indeed, a firm that relies on a single cheap foreign supplier or a “just in time” business model may be more profitable in good times but more vulnerable to negative shocks than one with a more diversified supplier base and higher inventory levels.

Second, all other factors being equal, a firm’s integration into a GVC increases its exposure to various foreign supply and demand shocks which are transmitted, and sometimes even amplified, through supply chains². Disruptions in upstream production nodes tend to travel to downstream producers, especially if the initial shock hits inputs on which many downstream firms depend and/or that cannot easily be substituted (Igan *et al.*, 2022). Moreover, there are times when small shocks to final demand generate progressively larger swings upstream in the supply chain, such as when precautionary increases in input orders and stocks by downstream firms collectively create bottlenecks and lead to overproduction by upstream firms, a phenomenon known as the “bullwhip effect” (Wang and Disney, 2016).

At the same time, however, GVC integration shields firms from shocks to local inputs and domestic demand. In this regard, Borin *et al.* (2022b) show that while a higher level of GVC participation (at the country-sector level) corresponds to greater elasticity of output to global demand shocks originating further downstream in the supply chain, it is also associated with lower output elasticity vis-à-vis demand shocks coming from the domestic market or direct trade partners. In addition, Borin *et al.* (2022b) find that for more than 90 % of country-sector pairs worldwide, the output volatility linked to GVC-related demand shocks is trumped by the volatility of direct demand shocks. Thanks to more diversified exposure to the various destinations of final consumption, economies that are more integrated into GVCs tend to be better able to smooth out the impact of idiosyncratic shocks³.

Nearshoring (which encompasses the regionalisation of supply chains) and “friendshoring” (moving supply chains to politically allied countries, possibly located outside the home region) represent intermediate configurations between the two extremes of maximum offshoring and full reshoring. Nearshoring and friendshoring strategies offer better protection against shocks in more geographically and/or geopolitically distant countries but provide fewer diversification benefits, since countries that are closer to each other tend to be exposed to similar (more correlated) shocks, and may not fully exploit potential cost savings. In addition, political alliances may shift over time, meaning some friendships may be fair weather ones (Wolf, 2022).

There are several alternatives to reshoring, nearshoring and friendshoring which could potentially boost supply chain resilience in the face of shocks (as indicated by the survey results discussed in Section 2.2; see also Lund *et al.*, 2020). According to Mohammad *et al.* (2022), from a purely economic point of view at least, there is still ample room for (broad-based) diversification of intermediate inputs away from domestic suppliers. Increasing the substitutability of inputs – either by making production technologies more flexible or by standardising inputs internationally – is also helpful. Furthermore, to increase the security of supply, firms could build more redundancies into their supply chains, including by maintaining spare production capacity at multiple sites, multiple-supplier sourcing of the same inputs, and/or holding larger inventories (sometimes referred to as “just

1 Narrowly defined, “resilience” refers to the ability of firms and their supply chains to recover from internal or external disruptions in a timely and cost-effective manner. It is sometimes distinguished from “robustness”, or the ability to maintain supply chain functionality despite disruptions (Miroudot, 2020; Baldwin and Freeman, 2022). Here we use resilience in a broader sense, encompassing the notion of robustness.

2 See e.g., Di Stefano (2021) for a review of the relevant literature.

3 See Arriola *et al.* (2020) and Bonadio *et al.* (2021) for model simulations of how a less interconnected, more localised world economy would fare under a variety of shocks. The model results suggest that a greater localisation of value chains would increase vulnerability to shocks for most countries and would have resulted in greater output losses at the height of the COVID-19 pandemic.

in case” rather than “just in time” strategies). However, these solutions can be (overly) costly (Miroudot, 2020) and may only be available to larger MNEs.

Ultimately, a firm's preferred degree of GVC integration and mix of strategies to mitigate supply chain risks will depend on many factors, including the industry, product and type of firm. For example, relocation makes less economic sense in GVCs that are highly capital- or knowledge-intensive or that are tied to geology and natural resources (Lund *et al.*, 2020).

However, governments may wish to intervene when they believe that firms' GVC-related choices and the overall market outcome differ from the social optimum (Baldwin and Freeman, 2022). Government policy intervention can indeed be warranted when individual firms' decisions fail to internalise particular macro-level risks, especially in strategically important sectors such as food, energy and medical supplies. Some externalities may originate from a lack of information about supply chain networks and could hence be addressed by creating more risk awareness and, where needed, government support for improved monitoring, information sharing and stress-testing¹. Other forms of socially excessive risk-taking by firms may require further government nudges or more drastic intervention, such as import or export controls on very specific products from/to specific (unreliable) partners. Firms, in turn, will take into account expected societal trends and government policies in their deliberations of how to position themselves in GVCs. This brings us to the factors liable to shape globalisation going forward.

3. Future drivers of and deterrents to globalisation

While it is impossible to predict the future path and shape of globalisation, we can identify at least three key forces that are likely to play an influential role: digital (and other) technologies, the climate agenda and geopolitics².

3.1 Digital (and other) technologies

The emergence and spread of a wide range of new digital industrial technologies including the Internet of Things, digital platforms, automation, artificial intelligence, robotics and 3D printing will reshape the role of GVCs. Their impact will most likely cut both ways and differ across countries and sectors.

On the one hand, the digital economy and digital platforms could boost trade and GVCs. Digital collaborative and work-from-home platforms lower the entry barriers for people and firms into particular GVCs via a substantial reduction in search and communication costs, especially in the services sector. E-commerce marketplaces and similar platforms offer new forms of value creation by enabling consumers to transmit their preferences directly to producers. The opening of such platforms has been found to boost GVC-related trade since it gives consumers access to a wider range of products to choose from (Baldwin *et al.*, 2021). In addition, the development of e-payment systems allows for easier and more secure money transfers. Finally, digital ledger technology may have a significant effect on GVCs, making tracking and tracing easier and facilitating better verification (Antràs, 2021).

¹ To illustrate how complex and difficult to monitor supply chains can be, according to data collected by Lund *et al.* (2020), General Motors had 856 publicly disclosed direct (tier-1) suppliers but more than 18 000 indirect (tier-2 and lower) suppliers. Even within the same industry, companies can have very heterogeneous supply chain structures, depending on their exact product range. For example, Dell and Lenovo had more than 7 000 and 6 200 disclosed tier-1 and tier-2 suppliers, respectively, of which fewer than 2 300 were in common. 45 % of global supply chain leaders surveyed by McKinsey in March-April 2022 indicated they either have no visibility into their upstream supply chain or can see only as far as their tier-1 suppliers (Alicke *et al.*, 2022).

² These three factors are amongst those most cited in other studies on the future of globalisation; see e.g., Antràs (2021), Betti *et al.* (2021) and Baldwin and Freeman (2022).

On the other hand, the deployment of industrial robots and other forms of automation may provide an alternative to offshoring as they have the potential to boost productivity and capacity utilisation in advanced economies, making labour arbitrage with emerging market and developing countries less appealing. An emerging strand of empirical research on the impact of new technologies on GVCs offers a more nuanced picture. De Backer *et al.* (2018) find that the rise in robotics had a negative impact on the offshoring activities of firms in advanced economies between 2010 and 2014 but had not yet triggered substantial reshoring. Using data from the 2015 European manufacturing survey of a sample of German, Austrian and Swiss firms, Dachs *et al.* (2019) find a positive association between their constructed index of technological readiness and reshoring. From the angle of an emerging market economy, Faber (2020) notes that exposure to US robots had significantly lowered Mexican employment in the period from 2000 to 2015, with similar reductions in export values and the number of export-producing plants, corroborating the reshoring hypothesis. Many activities offshored from the US to Mexico focus on assembly, where robots have a comparative advantage (Wang, 2022). However, some recent research reaches the opposite conclusion, finding that automation in advanced economies has increased offshoring to low-income countries by Spanish firms (Stapleton and Webb, 2020) and that the adoption of robots by US firms has had a strong positive effect on imports of intermediate goods (Wang, 2022). In these cases it is argued that automation by firms in developed countries tends to decrease their costs, enhances productivity and thereby increases demand for intermediate inputs, many of which continue to be sourced from less-developed economies.

The impact of 3D printing (or additive manufacturing) on GVCs is very similar to that of automation. 3D printing is a technology that complements the product design process and facilitates customisation in advanced economies. The trade-reducing effects of 3D printing are obvious, but there is also a positive effect on input demand given that 3D printers do not print goods out of thin air. In addition, consumer goods produced by 3D printing are cheaper, raising the demand for these same goods and thus spurring trade flows in the short run (Antràs, 2021). This is consistent with the findings of Freund *et al.* (2022), showing that the dramatic shift in the production of hearing aids to 3D printing led to a roughly 60 % increase in international trade in hearing aids.

To the extent new (labour-saving) technologies turn out to be disruptive, they may further increase popular backlash against globalisation and encourage protectionist policy responses by governments. New digital technologies will also necessitate appropriate responses to the increased threat of cyberattacks and privacy concerns. Rules for the digital economy and the handling of sensitive data may lead to the formation of blocs defined by common digital standards, values and governance strategies. In addition, the tendency of platforms to concentrate market power in the hands of a few dominant players raises challenges for competition policy, consumer protection and taxation.

3.2 The climate agenda

Second, globalisation will no doubt be influenced by the growing importance of policies aimed at mitigating climate change and transitioning to a greener economy. While the climate agenda tends to be viewed as a deterrent to globalisation overall, it could have effects that favour trade and GVCs¹.

The logistics associated with trade and GVCs account for a non-negligible share of total greenhouse gas emissions, with rough estimates in the range of 6 % to 8 % of total emissions before the pandemic (Ritchie *et al.*, 2020; SLOCAT, 2021). GVCs in particular may raise concerns, due to their typical back-and-forth transport of goods (World Bank, 2020). Therefore, shorter, more regionalised supply chains may be favoured for environmental reasons, despite the fact that road transport (rather than the inter-continental shipping of goods or air cargo) accounts for most trade-related emissions. Companies may be more inclined to shorten their supply chains if policies linked to the climate transition are accompanied by sustained higher transport costs. Of course,

¹ Climate change itself will also affect trade and GVCs. To the extent weather events disrupt key supply routes (for instance, a drought that hampers inland shipping), climate change favours shorter supply chains and more localised production. Conversely, in view of climate change-related shocks to harvests, food security would be better served by the existence of multiple import sources.

the impact will depend on how prices for renewable energy evolve and the extent to which renewable energy sources can be used to decarbonise international freight transport.

More significant for the future of globalisation, however, will be how the climate agenda interacts with the location of production. By combining inter-country input-output tables with industry-level statistics on CO₂ emissions from fuel combustion, the OECD (2021) has been able to distinguish between emissions based on production and those embodied in final domestic demand (consumption), the difference being net exports/imports of emissions. Perhaps unsurprisingly, advanced (OECD) economies as a whole are net importers of embodied carbon, while (non-OECD) emerging market economies are net exporters. This disparity is mostly due to differences in specialisation, as advanced economies produce and export less carbon-intensive (more high-tech) goods and import more carbon-intensive (industrial) goods from emerging markets.

It is also possible that in order to dodge environmental regulations, the most polluting firms base or relocate (a portion of) their activities in or to places where such regulations are absent or laxly enforced. Empirical evidence of such “carbon leakage” is so far relatively limited (for a review, see Misch and Wingender, 2021), but this could become a bigger problem for global climate targets if some (mostly advanced) countries start to implement more stringent carbon pricing and other climate mitigation policies sooner than others (World Bank, 2020). With this in mind, the European Commission has proposed a carbon border adjustment mechanism (CBAM), which would require importers of selected products (initially only cement, iron and steel, aluminium, fertilisers and electricity) to pay a carbon price equivalent to the amount they would have paid had the goods been produced under the EU’s domestic emissions trading system (ETS) rules (EC, 2021). In principle, this should lessen incentives for European firms to offshore emission-intensive activities¹.

One area in which the climate agenda could possibly boost trade and GVCs is that of novel industries and “green goods” linked to the climate transition. The supply chains for solar energy, wind energy and electric vehicles have grown rapidly in size and become increasingly complex and geographically fragmented (World Bank, 2020). The numerous raw materials, components, specialist technologies and services (installation, recycling, etc.) required over the lifecycle of products such as solar panels and wind turbines provide opportunities for firms worldwide and for the formation of new networks.

That being said, governments will likely try to attract new high-growth activities or at least to keep these activities away from non-allied countries. For example, in order to be eligible for the expanded tax credits for electric vehicles under the recently passed US Inflation Reduction Act (IRA), the vehicles must be assembled in North America and the battery components and critical minerals they contain cannot be sourced from “foreign entities of concern”, including China and Russia. Over time, an increasing percentage of critical minerals should come from countries that have a trade agreement in place with the US or from North America-based recycling (US Congress, 2022). The IRA also includes a set of tax credits and other subsidies for renewable energy and clean electricity production in the US, topped up if local content requirements with respect to steel, iron and components used in the facilities are met. Such policies combine climate mitigation with our third factor, geopolitics.

3.3 Geopolitics

Arguably most importantly, the future of globalisation will be driven by geopolitics. Recent years have seen a marked increase in the role played by geopolitical considerations in economic policymaking. Growing unease with globalisation and multilateralism in general and rising protectionism (see Section 1.2) have produced events such as the US-China trade war and Brexit, and have been compounded by the consequences of the pandemic

¹ The European Parliament has made a counterproposal which would extend the scope of the CBAM to additional products (organic chemicals, plastics, hydrogen and ammonia) and indirect emissions deriving from the electricity used by manufacturers. Other countries, including the US, the UK and Canada, are also exploring carbon border taxes.

and the Russian invasion of Ukraine (see Section 2). In view of this multitude of shocks, governments around the world no longer take for granted the ability of a globalised economy to secure a reliable supply of key goods and services. Moreover, some countries appear to be leveraging the dominant positions of their firms, in particular GVCs, to attain geopolitical goals, such as isolating countries they consider to pose national security threats, or boosting national competitiveness.

Both the US and the EU have launched detailed reviews of supply chain resilience in areas they consider to be strategically important and/or foundational for the economy of the future: semiconductors and advanced computing, batteries, critical raw materials and pharmaceutical ingredients. In these areas, new legislation is being passed and other policy initiatives are taken aimed at decreasing (supply chain-related) dependencies, often with express or implied references to China (see Buysse and Essers, 2022; Capital Economics, 2022). Governments are using a combination of carrots and sticks to try to steer companies' supply-chain location choices. For example, in the same vein as the local content requirements and tax credits for renewable energy and electric vehicles in the IRA (see Section 3.2), another piece of US legislation, the CHIPS ("Creating Helpful Incentives to Produce Semiconductors") Act, foresees USD 39 billion in subsidies for US-based chip manufacturers, dependent on not building advanced chip facilities in "countries of concern", again including China. The Biden administration has also progressively expanded and intensified controls on semiconductor exports incorporating US technology to Chinese firms, building on restrictions on exports to Huawei initiated under the Trump administration. The latest round of controls, launched in October 2022, constrain sales of high-end computing chips with potential military applications, and target chokepoints in China's semiconductor industry, with restrictions on chip design software, manufacturing equipment and even the activities of US citizens that could contribute to the production of advanced logic and memory chips (Goujon *et al.*, 2022). The controls also compel non-US firms in the semiconductor value chain to match the new US restrictions on China and not to transact with sanctioned Chinese entities, or risk being sanctioned themselves.

The EU has its own "open strategic autonomy" (OSA) agenda, a growing set of regulatory, structural and fiscal policies that seek to address economic vulnerabilities arising from geopolitical considerations. The OSA agenda encompasses, amongst many other initiatives, a common EU framework for FDI screening, an EU industrial strategy, a revised trade policy, new rules on foreign subsidies, and a European Chips Act. One of the principal aims of the latter is to achieve production within the EU of at least 20 % of the world's cutting-edge and energy-efficient semiconductors, through public and private investment of at least EUR 43 billion in R&D, chip design and manufacturing capacity (Buysse and Essers, 2022).

For its part, China, too, has been taking steps to increase self-sufficiency and even pursue global leadership in strategic sectors. In Chinese master plans such as Made in China 2025, "strategic" is more broadly defined than in the US or Europe, covering not only semiconductors and critical raw materials but also sectors such as aerospace and aviation, industrial robots, shipping and rail transport, agricultural machinery and medical devices (Buysse and Essers, 2019). Increased trade and technology tensions, primarily with the US, have caused China to double down on its ambitions to become more economically and technologically independent from the West and stimulate domestic innovation. Such ambitions have been accompanied by large public investment by state-linked funds and other support for local corporate champions and new start-ups in the semiconductor business and elsewhere (Buysse and Essers, 2022). Still, as per China's "dual circulation" strategy, Chinese leaders are careful to leave the door open to inward FDI and high-tech imports for which domestic alternatives do not (yet) exist.

While full decoupling would be unworkable in a GVC as complex and internationally interwoven as that for semiconductors, recent policies such as those mentioned above are already having a visible impact on the location of supply chains. Taiwan's TSMC, the world's leading producer of advanced processor chips, and South Korea's Samsung and SK Hynix, the frontrunners in memory chip production, appear to be redirecting investment in new facilities from their home markets and China to the US and Japan. Meanwhile, inspired by rising Chinese wage costs, operational risks from new lockdowns and rising geopolitical tensions, Apple is gradually shifting the assembly of its devices away from China, mostly to Vietnam and India, and may eventually operate different supply

chains for the iPhones it sells in China, incorporating chips produced by China's homegrown companies (which have recently caused security concerns with the US Senate), and those it sells elsewhere (*The Economist*, 2022; Miller, 2022). US attempts to coordinate policies on supply chain security, R&D and subsidies in the semiconductor sector with political allies such as Taiwan, Japan and South Korea through the "Chip 4" initiative have however come up against diverging views on China and unresolved tensions between Japan and South Korea (Davies *et al.*, 2022). This example highlights some of the difficulties underlying friendshoring efforts.

A more geopolitically fragmented world increases uncertainty, which inevitably weighs on future FDI and decisions to offshore. A study of European FDI in China finds that it has recently grown much more concentrated, in terms of the companies investing (German firms top the bill) and the targeted sectors (automotives stand out) (Kratz *et al.*, 2022). Aside from a handful of large firms which are continuing to invest in their Chinese operations, many other businesses present in China are withholding new investment, and virtually no European newcomers have entered in the last few years. Kratz *et al.* (2022) suggest that this evolution is only partly related to China's zero-COVID-19 policy and that smaller European firms have become more reluctant to accept the growing (economic, operational and political) risks of investing in China, including due to growing scepticism in European corporate boardrooms. Even European firms well established in China are increasingly localising and ringfencing their supply chains, staff and data flows, a practice referred to as "in China for China".

All in all, it seems likely that geopolitical considerations, especially relating to Russia and China, will lead to further shifts in certain GVCs, such as those for energy, critical raw materials, semiconductors and other high-tech products. Hence, we may see a "fracturing" of parts of the world economy along geopolitical lines, into US- and China-aligned blocs (Capital Economics, 2022). However, this would not necessarily result in genuine deglobalisation, as some links (between blocs) would be severed while others (within blocs) would be strengthened, i.e., a reconfiguration rather than a rollback of globalisation. Outside the most strategic sectors, the lion's share of trade and GVCs between the two blocs would remain intact. Capital Economics (2022) projects that the overall macroeconomic impacts of such a partial fracturing scenario would be rather modest for the US-aligned bloc, given its far larger economic size and state of technological advancement, although disengaging from certain existing trade and GVC relations could be costly in the short- to mid-term. The impacts would be more severe for China and its allies (see also Cerdeiro *et al.*, 2022).

There are of course severe downside risks. It is possible to conceive of harmful scenarios, whereby the fracturing of trade and GVCs extends to a much broader set of sectors or the world economy splinters into smaller – regional or even national – blocs (see Capital Economics, 2022). In the latter case, achieving a secure supply of key goods and services would become even harder. A particularly grim (but not unthinkable) tail risk is of geopolitical tensions between blocs escalating into direct military confrontation. This would most likely lead to a complete breakdown in economic relations between the warring parties and their allies, ushering in an era of rapid deglobalisation, with severe negative consequences across the board.

Conclusion

"It is still too early to say how [things] will play out, but one can already see the emergence of three distinct shifts in global trade. These are the shifts from dependence to diversification, from efficiency to security, and from globalisation to regionalisation."

Christine Lagarde, ECB president
Keynote speech at the Peterson Institute for International Economics, 22 April 2022

Our answer to the question at the beginning of this article, as to whether we are entering an era of deglobalisation, would be a qualified no.

Even before the COVID-19 crisis, globalisation had been levelling off. Several of the factors driving the spectacular rise of GVCs since the mid-eighties have run out of steam, including the ICT revolution and transportation advances, wage differentials between advanced and emerging economies and the general appetite for trade liberalisation. It would appear more appropriate to describe this shift away from hyperglobalisation as slowbalisation rather than deglobalisation.

Somewhat against the odds, trade within GVCs displayed relative resilience overall during the pandemic, although supply chain pressures surged to record levels, especially in certain industries, and remained high in the face of new shocks in 2022. To confront their supply chain vulnerabilities, firms have so far resorted primarily to changes in inventory management and supplier diversification rather than to extensive reshoring or nearshoring strategies. A key explanation for the stickiness of GVCs is the sunk cost nature of investments in production facilities abroad and the establishment and maintenance of relations with foreign suppliers and customers, which makes switching to new locations, suppliers and/or buyers in response to (temporary) shocks less attractive. In response to the war in Ukraine and the associated sanctions on Russia, however, Western firms have been reducing or even completely ceasing their Russian activities. It remains to be seen to what extent the war will alter their longer-term strategic decisions around GVC participation.

More generally, we argue that the future of globalisation will be shaped by at least three key forces: digital (and other) technologies, the climate agenda and, arguably most importantly, geopolitics. The first two forces could have ambiguous effects when it comes to the direction of globalisation, challenging it in some areas (e.g., robotisation and higher transportation costs) while opening up new opportunities in others (e.g., digital platforms and new GVCs for green goods). However, the growing importance of geopolitical considerations for policymakers – including with regard to strategic sectors/products, national security and national competitiveness – will undoubtedly adversely affect trade, in particular value chains involving countries like Russia or China for products such as energy, critical raw materials and semiconductors. Nonetheless, rapid deglobalisation does not seem to be in the cards for now, barring severe, long-lasting geopolitical shocks such as a direct military confrontation between major economic blocs.

All in all, globalisation is not dead or even dying (Wolf, 2022). But we do expect to see a reconfiguration of trade and GVCs, definitely involving more careful risk management and perhaps also more regionalism and friendshoring.

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Conventional signs

%	per cent
e.g.	<i>exempli gratia</i> (for example)
EUR	euro
<i>et al.</i>	<i>et alia</i> (and others)
etc.	<i>et cetera</i>
i.e.	<i>id est</i> (that is)
RMB	renminbi
USD	US dollar
vs	versus

List of abbreviations

Countries or regions

BE	Belgium
AT	Austria
CY	Cyprus
DE	Germany
EE	Estonia
EL	Greece
ES	Spain
FI	Finland
FR	France
IE	Ireland
IT	Italy
LT	Lithuania
LU	Luxembourg
LV	Latvia
MT	Malta
NL	Netherlands
PT	Portugal
SI	Slovenia
SK	Slovakia
BG	Bulgaria
CZ	Czech Republic
DK	Denmark
HR	Croatia
HU	Hungary
PL	Poland
RO	Romania
SE	Sweden
EU15	European Union of 15 Member States (prior to the 2004 enlargement)
EU(27)	European Union (of 27 Member States)
NMS13	13 New Member States (that joined the EU in 2004, 2007 and 2013)
AR	Argentina
AU	Australia
BN	Brunei Darussalam
BR	Brazil
CA	Canada

CH	Switzerland
CL	Chile
CN	China
CO	Colombia
CR	Costa Rica
HK	Hong Kong
ID	Indonesia
IL	Israel
IN	India
IS	Iceland
JP	Japan
KH	Cambodia
KR	South Korea
MA	Morocco
MX	Mexico
MY	Malaysia
NO	Norway
NZ	New Zealand
PE	Peru
PH	Philippines
RU	Russia
SA	Saudi Arabia
SG	Singapore
TH	Thailand
TN	Tunisia
TR	Turkey
TW	Taiwan
UK	United Kingdom
US	United States
VN	Vietnam
ZA	South Africa

Abbreviations

BIS	Bank of International Settlements
BRICS	Brazil, Russia, India, China, South Africa
CBAM	Carbon border adjustment mechanism
CETA	EU-Canada Comprehensive Economic and Trade Agreement
CPTPP	Comprehensive and Progressive Agreement for Trans-Pacific Partnership
ECB	European Central Bank
FDI	Foreign direct investment
G7	Group of Seven
G20	Group of Twenty
GATT	General Agreement on Tariffs and Trade
GDP	Gross domestic product

GFC	Global financial crisis
GSCPI	Global Supply Chain Pressure Index
GVC	Global value chain
IMF	International Monetary Fund
IRA	Inflation Reduction Act
ISO	International Organization for Standardization
MNE	Multinational enterprise
OECD	Organisation for Economic Cooperation and Development
OSA	Open strategic autonomy
PTA	Preferential trade agreement
R&D	Research and development
RCEP	Regional Comprehensive Economic Partnership
TiVA	Trade in value added
TSMC	Taiwan Semiconductor Manufacturing Company
TTIP	Transatlantic Trade and Investment Partnership
UPS	United Parcel Service
WIOD	World Input-Output Database
WTO	World Trade Organisation

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