B

The reshaping of global trade

This chapter shows that, despite difficulties in the global trade policy landscape, global trade flows have been resilient and continue to evolve in a direction that is more sustainable and inclusive. Narratives surrounding the benefits of globalization have turned more sceptical in the past decade. These narratives have started to reflect in global trade as the first policy-driven fractures appear in the system. Yet, the digital revolution continues to promote economic integration by facilitating trade in goods and, even more so, in services. There is still significant potential for trade to contribute further to the growth of the world economy, and to bring further benefits to developing economies via the expansion of global value chains. However, if the untapped potential of new trade flows is to be accessed, policies must remain outward-looking.

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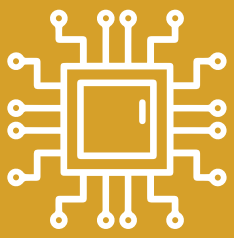
KEY POINTS

Geopolitical tensions and a series of crises have led to changing narratives surrounding trade and economic interdependence over the past decade. These trade-sceptic narratives have increasingly been translating into a more challenging global trade policy landscape, which is illustrated, among other things, by an increase in trade concerns and trade remedies notified to the WTO.

The change in trade policies has begun to affect trade flows. The tariff escalation between the United States and China has led to a slower growth in trade between the world's two largest economies. Moreover, since the onset of the war in Ukraine, data have been showing first signs of trade reorientation along geopolitical lines.



However, negative headlines are obscuring a more optimistic picture. Global trade flows have been resilient throughout past shocks. Trade costs keep falling as digital technologies facilitate international transactions and economies continue to sign integration agreements.

At the multi- and plurilateral levels, initiatives such as the WTO Trade Facilitation Agreement, the WTO Agreement on Fisheries Subsidies, and the joint initiatives on services domestic regulation, investment facilitation for development, and electronic commerce are addressing key issues facing international trade.

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1. A more fragmented and less predictable trade policy environment

Perceptions of the benefits of international trade and multilateral cooperation have been changing. A series of shocks in the space of 15 years — first, the global financial crisis of 2008-09, then the COVID-19 pandemic, and now the war in Ukraine — have led to the sense that rather than making countries economically stronger, globalization exposes them to excessive risks. Coupled with increasing geopolitical tensions, these perceptions have fuelled narratives arguing for localization of supply chains and trade policy strategies based on geopolitical concerns. In the public debate, terms such as "offshoring" and "outsourcing" have been replaced by "re-shoring", "near-shoring", "friend-shoring" and "decoupling".

This scepticism with regard to globalization and the multilateral trading system is linked to three major challenges confronting policymakers today: a change in the geopolitical landscape with implications for security, poverty and inequality, and the accelerating climate crisis. Trade is increasingly seen as part of the problem rather than part of the solution to these challenges. This is a perception that influences multilateral cooperation and global trade.

(a) Headwinds for trade policy cooperation

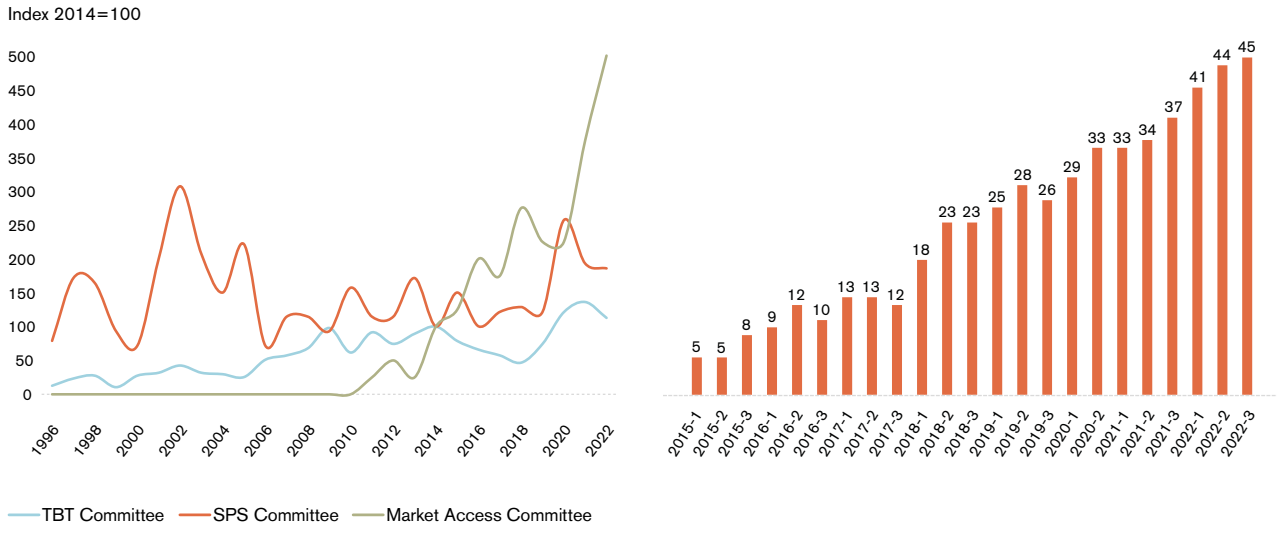
The 1990s and early 2000s were marked by multilateral and regional economic integration and trade cooperation. The expansion of the WTO created a predictable global trade environment. Anchored in the multilateral trading system, regional trade agreements (RTAs) deepened policy integration and further fuelled trade growth, not only between members but also with other trade partners (Lee et al., 2023). By 2015, more than 95 per cent of global goods trade was covered by WTO rules and more than 50 per cent flowed between RTA partners.[1]

However, scepticism with regard to international trade has become visible in global trade-policymaking since the mid-2010s. Examples include failures to advance multilateral and regional trade integration through the Trade in Services Agreement (TISA) and the Transatlantic Trade and Investment Partnership (TTIP), and the reversal of economic integration between the European Union and the United Kingdom. Instead of making further progress in multilateral and regional cooperation, large economies began to resort to unilateral trade policies. Trade tensions that began in 2018 between the world's largest trading partners saw a tit-for-tat escalation of import tariffs, culminating in the imposition by the United States of an average import duty of 19.3 per cent on imports from China, and the imposition by China of an average import duty of 21.1 per cent on imports from the United States (Bown, 2023).

Unilateral trade-related measures, such as quantitative restrictions (e.g., import prohibitions or export restrictions) and technical regulations, are generating an increasing number of trade concerns that are being raised by WTO members in different bodies. Based on the activity of WTO committees, there is a clear increase in the number of trade concerns raised by WTO members (see Figure B.1), and the nature of these concerns seems to be changing.

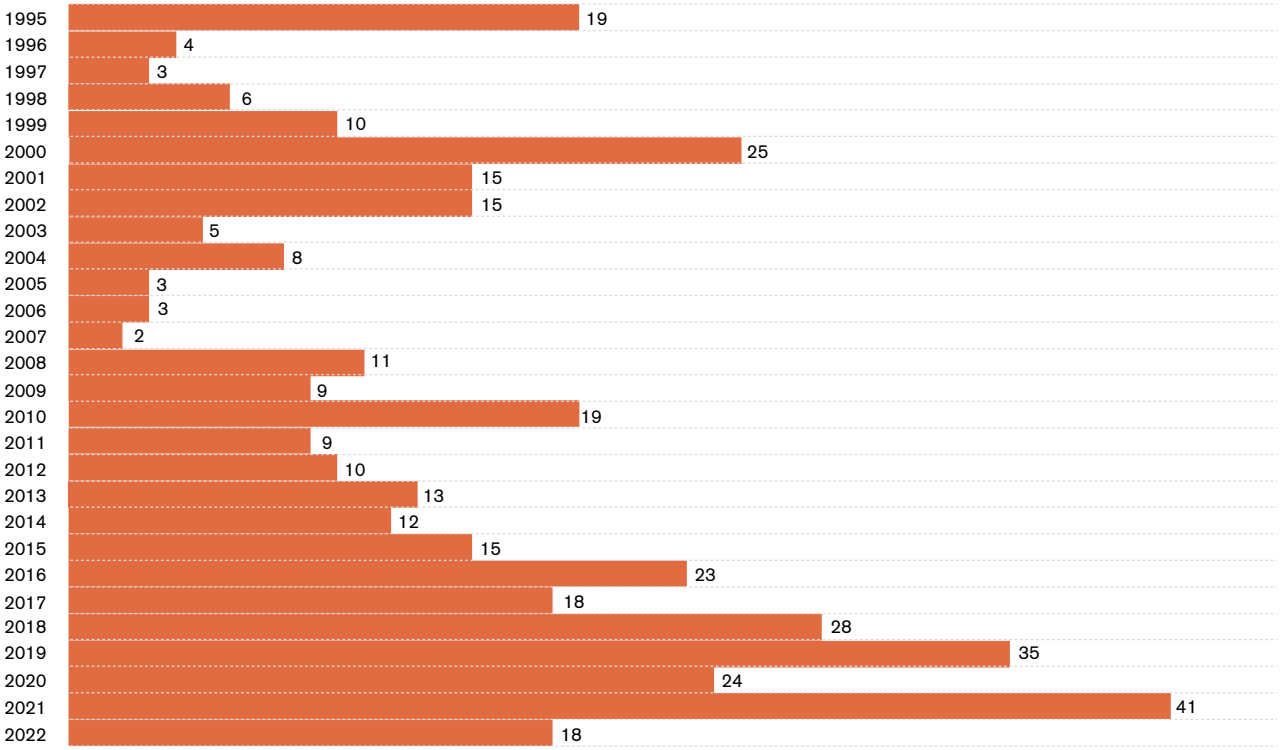
The number of trade concerns raised in the Committee on Sanitary and Phytosanitary (SPS) Measures has shown

Figure B.1: Trade concerns raised in the Market Access, SPS and TBT Committees, 1996-2022 (left), and the number of trade concerns raised in the Council for Trade in Goods by meeting, 2015-22 (right)



Source: WTO.
Note: The figure includes both new and repeatedly raised concerns.

Figure B.2: The number of newly imposed countervailing measures, 1995-2022



Source: WTO.

a sharp increase since 2020 while concerns raised at the Committee on Technical Barriers to Trade (TBT) have increased since 2019. Trade concerns raised at the Committee on Market Access display an exponential increase: they more than doubled from 2020 to 2022 and quadrupled from 2015 to 2022.

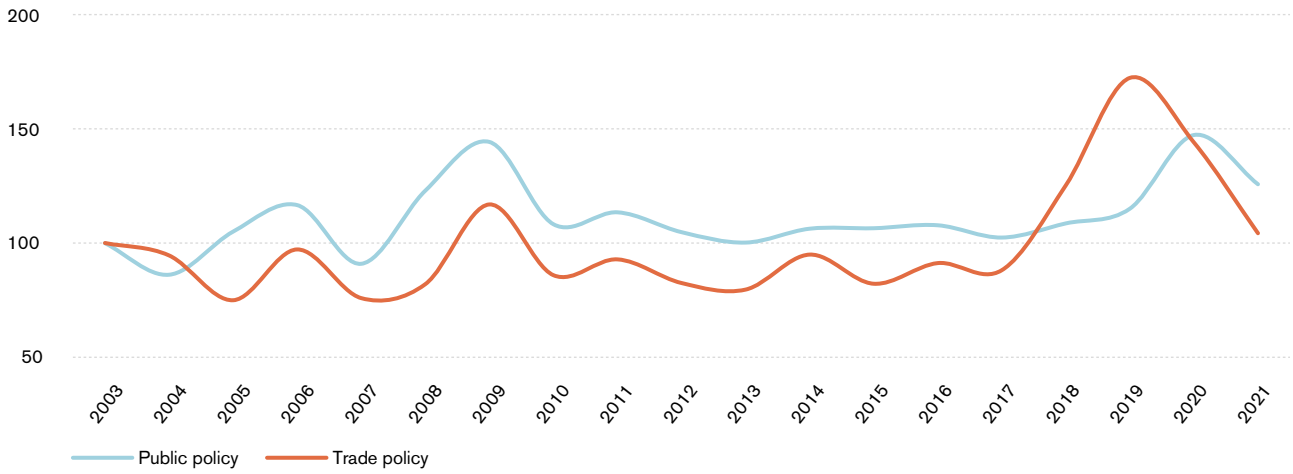
Some of the concerns are related to measures taken during the recent economic uncertainty exacerbated by the COVID-19 pandemic, the war in Ukraine and the food security crisis. Since the outbreak of the pandemic, 443 COVID-19-related measures have been introduced by WTO members and observers, about 44 per cent of them were trade-restrictive (WTO, 2022h). As of mid-October 2022, 79 per cent of the COVID-19-related trade restrictions were repealed. Their trade coverage remains nevertheless important at US$ 134.6 billion. WTO members have increasingly implemented new trade restrictions in the context of the war in Ukraine and the food security crisis. Out of the 96 export-restrictive measures on food, feed, and fertilizers introduced since the start of the war in late February 2022, 68 were still in place by the end of February 2023, covering roughly US$ 85 billion of trade (WTO, 2023b).

Consistent with the pattern observed in technical committees, there has been a ninefold increase in the number of trade concerns raised at the Council for Trade in Goods between 2015 and 2022. Some of these are concerns that were not solved in the specific (technical) committees and were therefore elevated to this more political body. Among the recent trade concerns, some are related to unilateral environmental measures like Indonesia's export restrictions on raw materials, China's export restrictions on gallium and germanium, the European Union's Carbon Border Adjustment Mechanism (CBAM) and other EU Green Deal measures, or the US Inflation Reduction Act (IRA). Other concerns are related to increased political tensions, including unilateral trade measures which had been allegedly used for economic coercion.

Finally, government responses to the economic collapse following the global financial crisis of 2008-09 and the rise of new industrial strategies have led to an increasing use of subsidies (WTO, 2020a). Subsidies can distort international trade by boosting the competitiveness of domestic producers relative to their competitors from abroad, and these distortions may manifest themselves as an erosion of market access commitments in the domestic economy or as an increase in exports that displaces other producers in foreign markets.

The WTO allows and regulates the use of countervailing measures, which are typically border taxes, to protect markets against subsidized imports. In the absence of comprehensive subsidy statistics, the growing number of

Figure B.3: Trade policy uncertainty index, 2003-21



Source: WTO calculations based on Hassan et al. (2019).
Notes: Hassan et al. (2019) derive the uncertainty index from quarterly earnings calls of publicly listed companies headquartered in 43 economies. Using tools from computational linguistics, they quantify the share of each earnings call devoted to discussing risk in general, risks associated with politics, and risks associated with particular political topics, such as healthcare and trade policy.

countervailing measures imposed by WTO members in the past decade corroborates the increased use of subsidies with a potentially trade-distortive effect (see Figure B.2).

The use of unilateral trade policies threatens to result in a downward spiral of tit-for-tat responses and a more fragmented world, dominated by regional trade blocs (see Chapter A). Such a development is likely difficult to reverse: once in place, trade policy changes alter the political economy balance between import-competing and export-oriented interest groups, making it difficult to turn back. For example, the tariffs imposed in 2018 and 2019 by the United States on imports from China and the retaliatory tariffs imposed on US imports by China are still in place even though several economic studies have shown their detrimental effect on social welfare (e.g., Amiti et al., 2020; Fajgelbaum et al., 2020; Cavallo et al., 2021).

(b) A less predictable trade environment

Besides the increased use of restrictive trade policies, the current policy environment is also characterized by high levels of uncertainty. The urgency of achieving a sustainable economy, maintaining peace and security, and reducing poverty and inequality mobilized many governments to employ all available public policy tools to address these global challenges, sometimes with unclear implications for the rules-based trading system and thus generating trade policy uncertainty. This matters because trade policy uncertainty acts as a barrier to trade by reducing the incentives to incur the costs of entering new markets and to invest in adopting imported intermediate inputs (Handley and Limão, 2022).

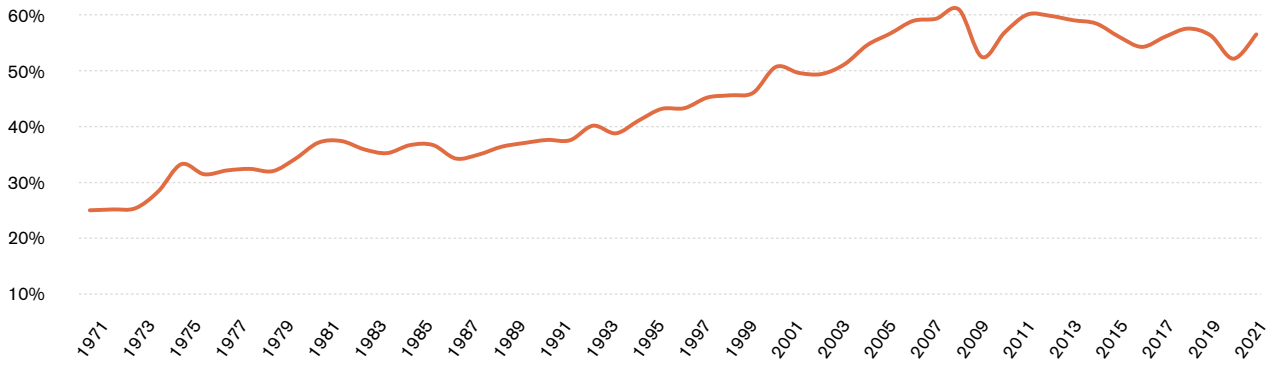
Figure B.3 shows the evolution of policy uncertainty perception by large companies, gauged from their quarterly earnings conference calls with investors and analysts, and focuses on global trade policy uncertainty, comparing it to global public policy uncertainty which comprises all areas of public policy (Hassan et al., 2019).

For most of the period from 2003 to 2021, trade policy uncertainty evolved in tandem with public policy uncertainty, but in 2018 the two indicators diverged markedly. Trade policy uncertainty climbed sharply in 2018 and 2019, while overall policy uncertainty peaked only in 2020, the year of the outbreak of the COVID-19 pandemic. In 2021, both trade-related and overall policy uncertainty abated, but remained above their 2017 levels.

2. Trade policy headwinds and uncertainty start to affect trade flows

Scepticism about further progress of globalization has been part of public discussions since the shock of the global financial crisis. Discussions about the stagnation, or even decline, of the role played by international trade in the global economy pointed towards the rise in new industrial strategies, limits to global supply chains expansion as well as rising geopolitical tensions. Headwinds for trade policy cooperation and increased trade policy uncertainty brought about by recent shocks can further reshape global trade. Trade strategies to re-shore manufacturing production would lead to an

Figure B.4: Global trade as a share of GDP, 1970-2021



Source: World Bank.

overall decline in the importance of trade in the global economy. Other strategies such as bringing production closer to large markets (near-shoring) or strengthening production networks with like-minded countries (friend-shoring) would lead to fragmentation of the global economy along regional and geopolitical lines.

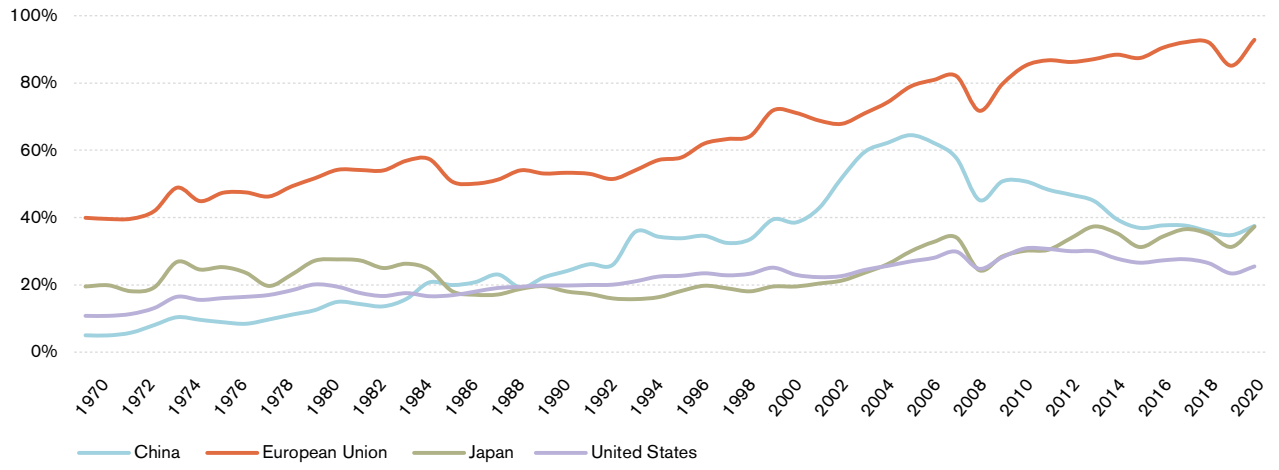
(a) Compositional changes in the global economy reduce the importance of global trade in GDP

One of the key pieces of evidence supporting the de-globalization (or "slowbalization") narrative is the trend in global trade as a share of GDP, and specifically its evolution following the global financial crisis of 2008-09 (see Figure B.4). The share of global trade in GDP is a widely used metric for measuring trade openness. It gauges the importance of international trade, measured by the value of imports plus exports, in relation to the overall economy, measured by GDP.

Figure B.4 shows that the relative importance of global trade increased from 25 per cent in 1970 to a peak of 61 per cent in 2007. The global financial crisis interrupted this steady increase, resulting in a decline of almost 9 percentage points in 2009. In 2010, there was a significant recovery, yet in the aftermath of the crisis the share was characterized by a decline. Consequently, in 2019, just before the outbreak of the COVID-19 pandemic, the share was at a level lower than that attained in 2003.

A closer look at the evolution of the share of trade in GDP for the world's largest economies (China, the European Union, Japan and the United States) suggests that the global financial crisis was not a watershed moment for global trade (see Figure B.5). China's trade share of GDP peaked and then sharply decreased before 2009. The trade share of GDP and the United States peaked in 2011, while for Japan, the peak occurred in 2014, and the European Union has not peaked yet.[2] The fact

Figure B.5: Trade as a share of GDP in selected economies, 1970-2021



Source: World Bank.

that the peak in the global ratio coincides with the global financial crisis is more coincidental than a true feature of the data (Baldwin, 2022). The crisis was clearly a turning point in the global economy, but it was not the sole culprit of the declining importance of trade in global GDP.

The literature on the subject shows that many different factors contributed to the stagnating share of global trade in GDP. Multiple institutions and several studies have highlighted the various factors that contributed to this phenomenon (IMF, 2016; Cabrillac et al., 2016; Lewis and Monarch, 2016; Constantinescu et al., 2020). There is consensus that the slowdown of trade growth is likely to represent a "new normal" rather than a temporary phenomenon (Hoekman, 2015). The shift towards services as the main source of income, the limits to the expansion of global value chains (GVCs) (see Box B.1), the development of a domestic supplier base in China, a slowdown in trade liberalization, the diminishing impact of cost reductions from technology breakthroughs, the tightening of financial conditions with implications for foreign direct investment and trade credit, and government support for domestic industries are all cited as contributing factors.

These factors fall into three main categories. The first category comprises factors that change the openness of

Box B.1: The expansion of global value chains and the measurement of international trade

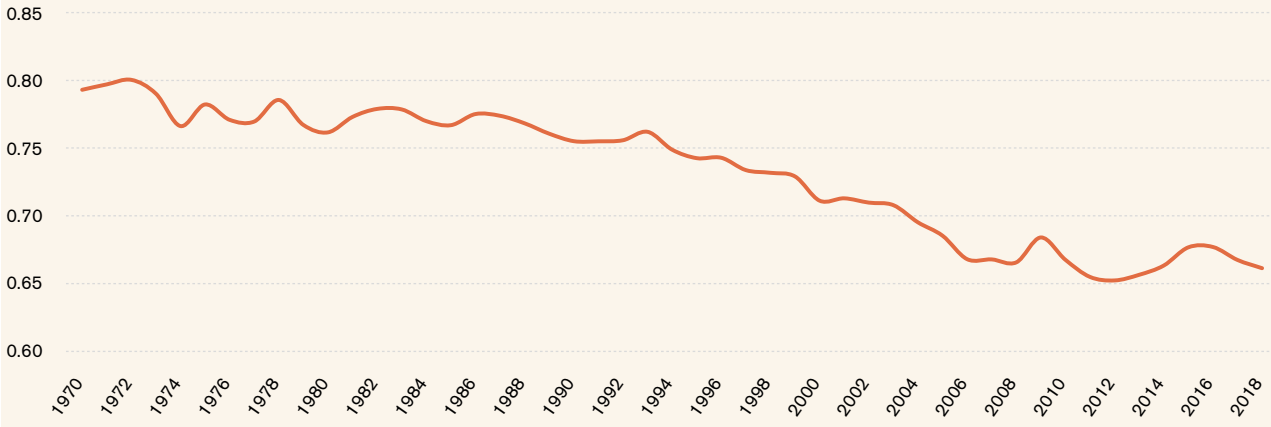
From the 1980s, technological advances began to reduce transportation and communication costs dramatically. These developments enabled the unbundling of production, i.e., the possibility of outsourcing some stages of production and of splitting different production stages geographically. Combined with ambitious trade policy liberalization and the integration of the former East and West blocs into a single global economy, technological advances have given rise to a complex structure of cross-border value chains that benefit from the specialization based on comparative advantage of any given economy in the value chain (World Bank, 2020). Consequently, global trade, and trade in intermediate inputs especially, boomed.

The expansion of global value chains leads to multiple counting of value-added, as intermediate inputs cross borders several times before reaching the final consumer. Thus, gross trade statistics have become less and less comparable to value-added measures such as GDP.

International input-output tables allow the calculation of value-added trade which measures international transactions in a manner consistent with commonly used value-added representations of production and preferences, making it explicitly comparable to GDP (Johnson and Noguera, 2017). The comparison of value-added exports to gross exports offers a measure of global value chains evolution – as GVCs expand, intermediate inputs cross borders more frequently and the ratio of value-added trade to gross trade diminishes.

Figure B.6 illustrates the expansion of GVCs in the 1990s and early 2000s, as well as the stagnation of this process in the 2010s.

Figure B.6: Ratio of value-added exports to gross exports, 1970-2018



Source: WTO calculations based on Woltjer et al. (2021) and the Organization for Economic Cooperation and Development (OECD) Inter-Country Input-Output tables 2021 edition.
Note: Value-added exports are the sum of domestic value added that is exported and absorbed abroad. Data for 1970-2000 come from the World Input Output Database (WIOD), data for 1995-2018 come from OECD. Gross exports are total exports of goods and services. Based on data for 25 economies.

each sector and economy, such as reductions in trade costs driven by technology advancements or trade liberalization. It also includes the economy's position in GVCs. For instance, economies positioned at the assembly stage of GVCs display very high openness because they import most of the intermediate inputs necessary to produce final products for exports. As the economy grows, it can diversify and develop its own supplier base, capturing a larger part of supply chain activities. This can reduce the reliance on imported intermediate inputs, which then appears as reduced openness.

The second category reflects the rise of GVCs. It comprises changes in the organization of production that amplify the impact of changes in openness on the share of trade in GDP. Specifically, it captures the degree to which production can be unbundled into multiple stages and tasks, which can be performed by potentially geographically dispersed suppliers. An unbundled global economy can better specialize based on comparative advantage and, thus, provides more scope for trade, both domestic and international. This results in a double counting related to back-and-forth trade in intermediate inputs (see Box B.1) and a cumulation of trade costs along the value chain (Yi, 2003). Consequently, changes in trade costs have a larger effect on the share of trade in GDP.

The final category comprises compositional changes in the global economy: shifts of global economic activity between sectors and between regions with different levels of openness. The shift in global activity from manufacturing towards the service sector is one of them. Since the service sector is relatively less open than the manufacturing sector (see Section B.3(b)) this compositional change leads to a lower trade share in GDP. Shifts in economic activity between economies with different levels of openness also fall in this category. For example, when the integration of an economy into the global trading system propels its openness to a relatively high level and, at the same time, leads to its growing importance in the global economy, the latter is a compositional shift that will also contribute to a higher share of global trade in GDP.

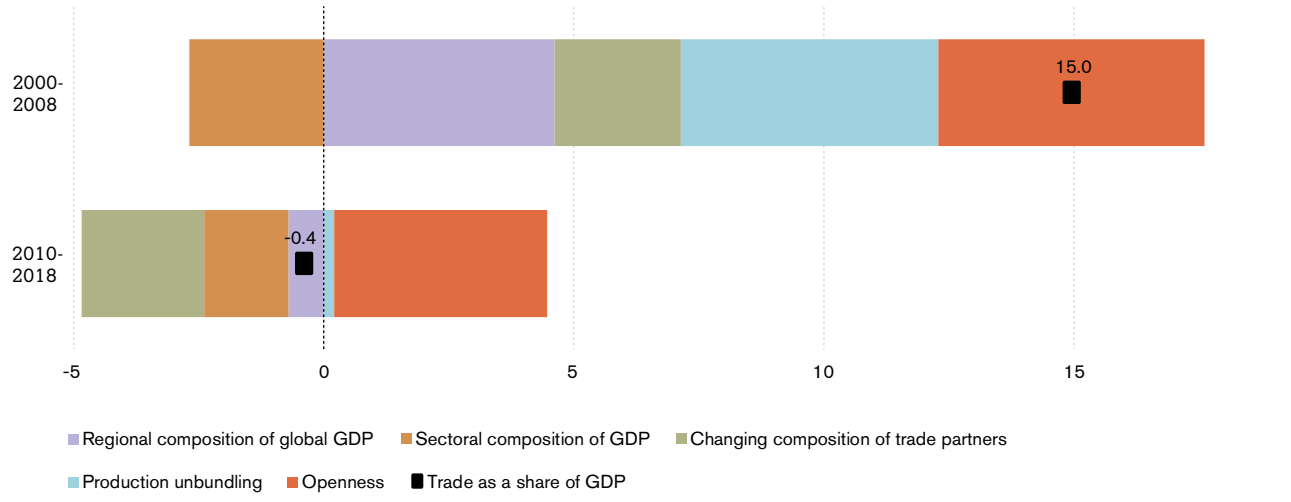
WTO Secretariat estimates suggest that compositional changes, rather than an end of trade liberalization, are the main factor behind the slowdown in global trade as a share of GDP. Figure B.7 shows changes in the share and their decomposition for two periods. In the years preceding the global financial crisis (2000-08), trade as a share of GDP grew rapidly by 15 percentage points. In the years following the crisis (2010-18), on the other hand, the share stagnated.

In the period before the crisis, both increasing openness and shifts in economic activity towards economies with high openness propelled the trade share. These changes were further magnified by rapid production unbundling reflected in the expansion of GVCs. The only factor that pulled the trade share down in this period was the shift in production and consumption towards the services sector.

The decomposition results changed dramatically in the period after the crisis. While increasing openness continued to push the trade share upwards, shifts towards economies and sectors with lower openness pulled in the opposite direction. Moreover, production unbundling ran out of steam. As a result, global trade as a share of GDP stagnated.

This decomposition illustrates how reductions in global trade costs in the early 2000s (see Section B.3(b)) were supercharged by production unbundling, and fast GDP growth in highly open economies. While the two latter forces waned after the global financial crisis, reductions in trade costs continued to support trade growth.

Figure B.7: Growth decomposition of global trade as a share of GDP, 2000-08 and 2010-18



Source: WTO Secretariat calculations using the OECD Inter-Country Input-Output tables 2021 edition.

(b) Geopolitical tensions have led to first signs of global trade fragmentation

The trade tensions between China and the United States – the two largest economies in the world – have changed their trade patterns. Import tariffs have shifted US sourcing from China to other partners, especially in advanced technology products (see Box B.2). Empirical analysis of monthly goods trade flows data from January 2016 to December 2022 confirms a slowdown in trade between the two economies. The analysis shows that despite reaching record highs recently, since July 2018 bilateral trade in goods between China and the United States grew on average much more slowly than the trade of each economy with other partners (Blanga-Gubbay and Rubínová, 2023).

On a broader scale, there are the first signs of trade reorientation along geopolitical lines, indicating a shift towards friend-shoring. Empirical analysis shows that since the onset of the war in Ukraine, international trade has become more sensitive to geopolitical distance, defined as dissimilarity in voting in the United Nations (UN) General Assembly. As a result, goods trade flows between hypothetical geopolitical "blocs"[3] have grown 4-6 per cent more slowly than trade within these blocs (Blanga-Gubbay and Rubínová, 2023). Figure B.9 illustrates this finding, showing a divergence since early 2022.

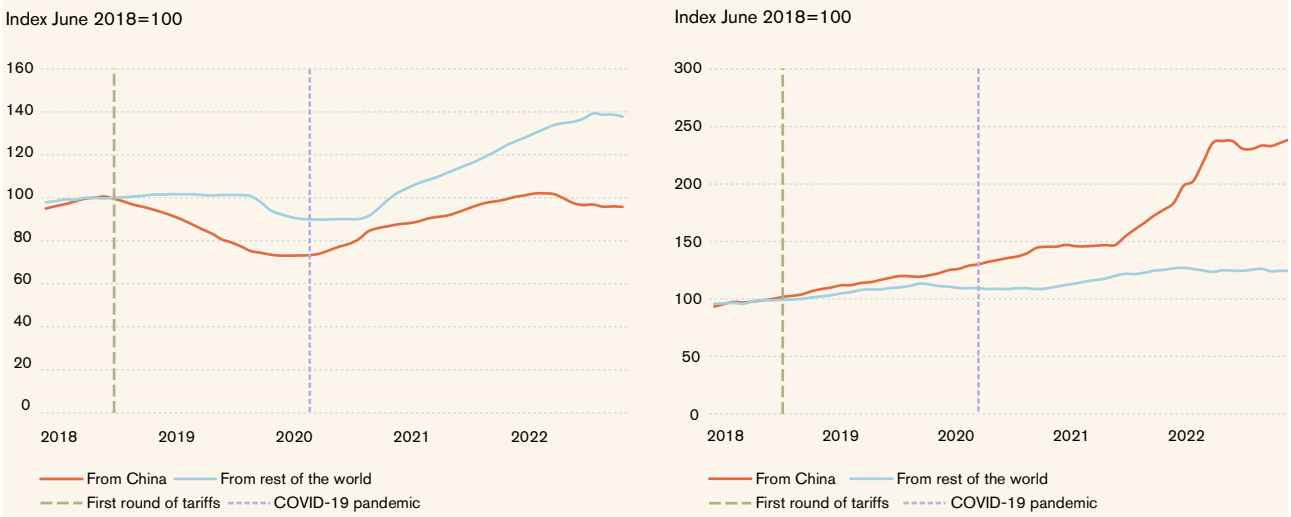
Analysis of foreign direct investment (FDI) offers a similar conclusion. FDI flowing to and from emerging and developing economies is substantially lower for more geopolitically distant partners (IMF, 2023). Moreover, this sensitivity to geopolitical distance increased in 2018-21 compared with the period 2009-18. It is also stronger in strategic sectors. FDI, global supply chains and international trade flows are tightly connected. Fragmentation in FDI along geopolitical lines could therefore be a sign that similar developments may occur in global trade flows in the future.

Box B.2: The impact of China-United States trade tensions

In 2018, the trade tensions between China and the United States saw a tit-for-tat escalation of import tariffs, resulting in the United States imposing an average import duty of 19.3 per cent on imports from China, and China imposing an average import duty of 21.1 per cent on US imports. More than 66 per cent of Chinese exports to the United States and 58 per cent of US exports to China are covered by these additional tariffs (Bown, 2023). Most of these measures were raised as trade concerns in the Council for Trade in Goods. Despite these tensions, bilateral trade flows between the two economies reached a record high of US$ 690.6 billion in 2022, with China's exports to the United States having almost returned to 2018 levels, while US exports to China reached an all-time high.

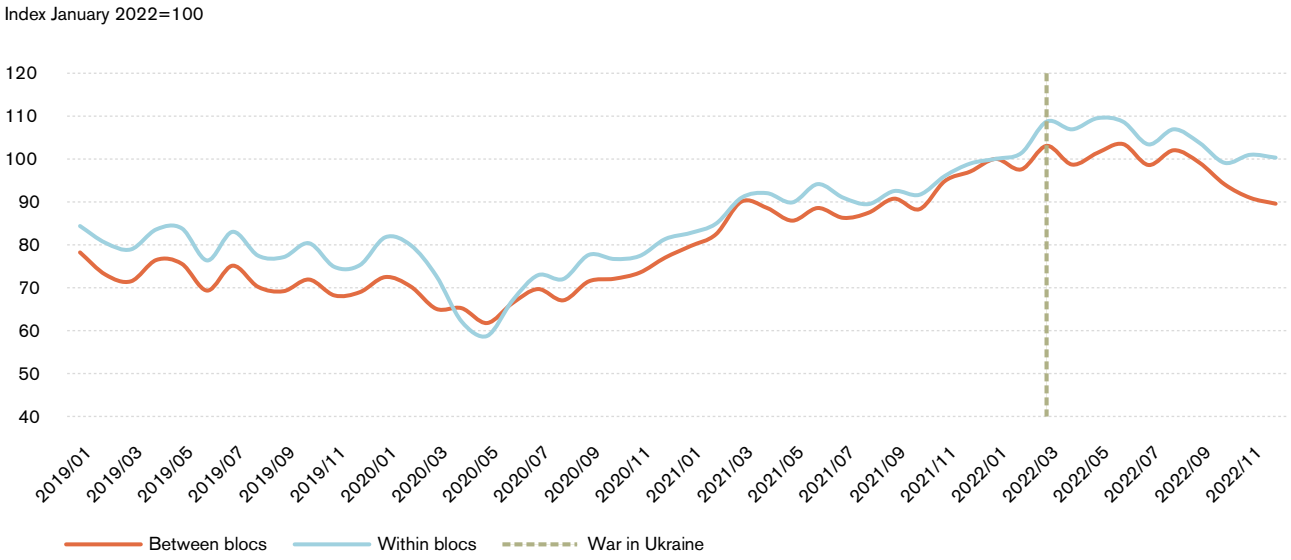
Data on US imports disaggregated by products, and a comparison of imports from China and imports from the rest of the world, provide a more nuanced picture. While US imports from China are thriving in products not affected by import tariffs, imports hit by the highest tariff, 25 per cent, are lagging behind imports from the rest of the world (see Figure B.8). The trade slowdown is even stronger in product categories such as active pharmaceutical ingredients, machinery and equipment for green energy generation, semiconductors and telecommunications equipment (Freund et al., 2023).

Figure B.8: US imports of products affected by 25 per cent import tariffs (left), and products not affected by tariffs (right)



Source: WTO Secretariat calculations based on Trade Data Monitor and Bown (2022).

Figure B.9: Trade within and between hypothetical geopolitical blocs, January 2019 to December 2022



Source: WTO Secretariat calculations based on Trade Data Monitor.
Note: Seasonally adjusted series.

(c) Concentration of global trade

According to one argument in favour of near-shoring and friend-shoring, global production of some goods has become too concentrated. On the one hand, consolidation of production in sectors with scale economies reduces overall production costs and consumer prices. On the other hand, if only a few suppliers exist for certain products, it is difficult to switch to alternative suppliers in times of need and this increases the vulnerability of the global economy in sectors in which entering the market and increasing production require time.

WTO economists estimate that the number of products exported by an average of only four economies, so-called "bottleneck products", has increased from 14 per cent to 20 per cent of all traded goods between 2000 and 2021.[4] At the same time, the share of those products in total trade has more than doubled from 9 per cent to 19 per cent (see Figure B.10). China is by far the most significant source of potential bottleneck products, providing more than 36 per cent of these products, although this did constitute a decline from a peak of close to 40 per cent in 2017. The second most significant supplier, the United States, accounts for barely 6 per cent of potential bottleneck products.

In terms of industries, electrical equipment accounts for the highest proportion of the export value of potential bottleneck products. Its share more than doubled between 2000 and 2021, from 20 per cent to 47 per cent, respectively. This increase was driven mostly by mobile phones and semiconductors. The second most important category is fuels, accounting for 10 per cent.

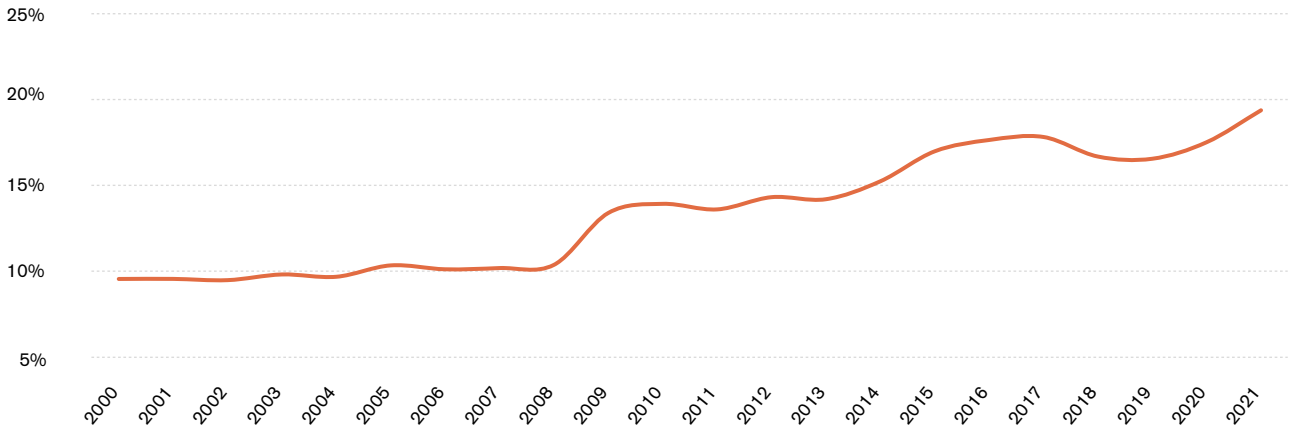
Empirical analysis confirms that crises affect potential bottleneck products more than non-bottleneck products. For example, during the global financial crisis of 2008-09, trade in bottleneck products dropped more severely than in other goods. This is in line with recent findings that, since the outbreak of the war in Ukraine, trade volumes have decreased most in goods with few alternative suppliers (WTO, 2023a). Importantly, however, only few potential bottlenecks currently feature in the list of critical supply chain products proposed by the US Department of Commerce. So, while shocks can severely impact the availability of these goods, this concerns only a few products considered essential according to this relatively broad list (Majune and Stolzenburg, 2023).

3. In other areas, trade and trade policy continue to make progress

Trade continues to grow and evolve according to the needs of the global economy, being a source of resilience and turning more sustainable and inclusive. While the sections above highlight important strains to the multilateral trading system, this section highlights that there are positive developments everywhere, even if they are less prominent.

Trade was critical in delivering medical goods and vaccines where they were most needed during the COVID-19 crisis, and grains to food importers since the start of the war in Ukraine. Trade integration has not stopped, but rather shifted regional focus. The digital revolution has boosted trade in digitally delivered and intermediate services. It has also enhanced

Figure B.10: Share of potential bottleneck products in global exports, 2000-21



Source: WTO Secretariat calculations based on UN Comtrade data.

the role of services in GVCs. Despite the slowdown in GVC growth, many developing economies were able to make headway into trade. Most GVC newcomers have followed the traditional pathway of entering the global production network as assemblers of manufactured products, although some developing economies have taken advantage of the digital revolution to become suppliers of remote services.

(a) Trade has been resilient throughout past shocks

The past years have been a continuous stress test for the world trading system, which has shown its resilience again and again. Starting in 2018, the trade tensions between China and the United States have led to a sharp increase in trade costs between the two largest economies. Despite this shock to the system, trade continued to grow. Merchandise trade expanded by 3.0 per cent, above the 2.6 per cent average rate since 2008. Section B.2 has outlined the negative impact of the tariffs on bilateral trade between the US and China, but this did not lead to lower trade overall. Rather, the trading system proved to be flexible as new trading relationships appeared and other economies filled in the gaps in supply and demand (Fajgelbaum et al., 2023).

The health and economic crisis caused by the COVID-19 pandemic added another shock to the world trading system, delivering unprecedented disruptions to global supply chains and increasing trade tensions among countries. However, the trading system has again proved itself more resilient than many expected, as trade flows bounced back to pre-pandemic levels less than a year after the first wave of lockdowns.

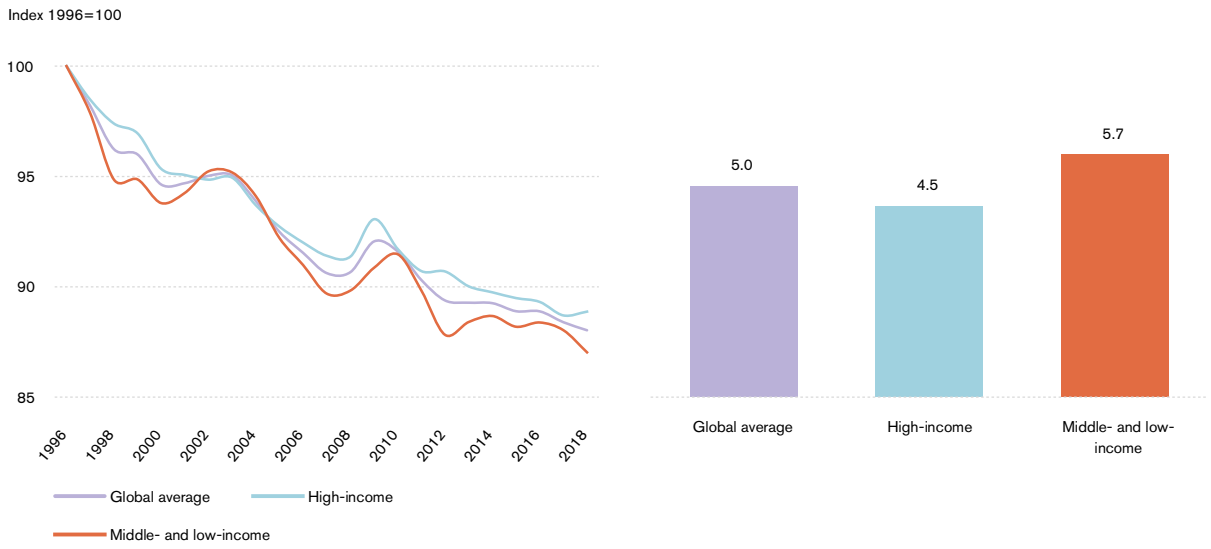
Even during the severe contraction in international trade flows in 2020, international supply chains became vital to ramping up production and distribution of medical supplies, including vaccines. In 2020, trade in medical goods rose by 16 per cent, trade in personal protective equipment grew by nearly 50 per cent, and trade in face masks by 80 per cent (WTO, 2022i). Specialized inputs to produce COVID-19 vaccines were traded back and forth along tightly knit supply chains that often criss-cross 12 or more international borders. Trade, backed by the stability and predictability created by the WTO, helped bring all those products to where they were needed.

Global trade has also held up well in the face of the war in Ukraine. Analysis conducted one year after the onset of the war showed that the worst predictions, sharply higher food prices and supply shortages, did not materialize thanks to the openness of the multilateral trading system and the cooperation governments have committed to at the WTO (WTO, 2023a). Despite the devastation, trade in products significantly affected by the war and trade by the most exposed countries were remarkably resilient. Trading partners found alternative sources to fill in the gaps for most products affected by the conflict, such as wheat, maize, sunflower products, fertilizer, fuels and palladium. The relative restraint in the imposition of export restrictions by WTO members may have played a key role in keeping price increases in check. WTO Secretariat staff simulations highlighted that in the case of cascading export restrictions on food, prices for wheat could have increased by up to 85 per cent in some low-income regions compared with the actual increase of 17 per cent.

(b) Long-run reductions in global trade costs continue to support trade growth

On the basis of the WTO Trade Cost Index,[5] Figure B.11 shows that global trade costs declined by 12 per cent between 1996 and 2018. The decline in transportation, communication, and transaction costs, as well as in trade

Figure B.11: Evolution of trade costs 1996-2018 (left) and the level of trade costs in 2018 (right), by income group



Source: Source: WTO Trade Cost Index based on the OECD Inter-Country Input-Output tables 2021 edition.
Note: The Trade Cost Index indicates how many times higher international trade costs are relative to domestic trade costs. It can also be interpreted as ad valorem equivalent: global trade costs in 2018 (5.0) correspond to an ad valorem equivalent of 400 per cent. Bilateral sector-specific trade costs are aggregated to economy level using theory-consistent weights. Simple averages are used to aggregate trade costs to the global level. Income groups are based on the World Bank classification in 2018.

policy barriers fuelled the fast expansion of global trade until the late 2000s. This decline in trade costs slowed after 2012, especially in middle- and low-income economies.

Trade costs saw a particularly precipitous decline between 1996 and 2018 in Southeast Asia and in Eastern Europe. They declined by more than 25 per cent in Cambodia, Bulgaria, India, Myanmar, Poland, Romania and Viet Nam. However, despite the narrowing gap, trade costs in developing economies remain almost 30 per cent higher than in high-income economies.

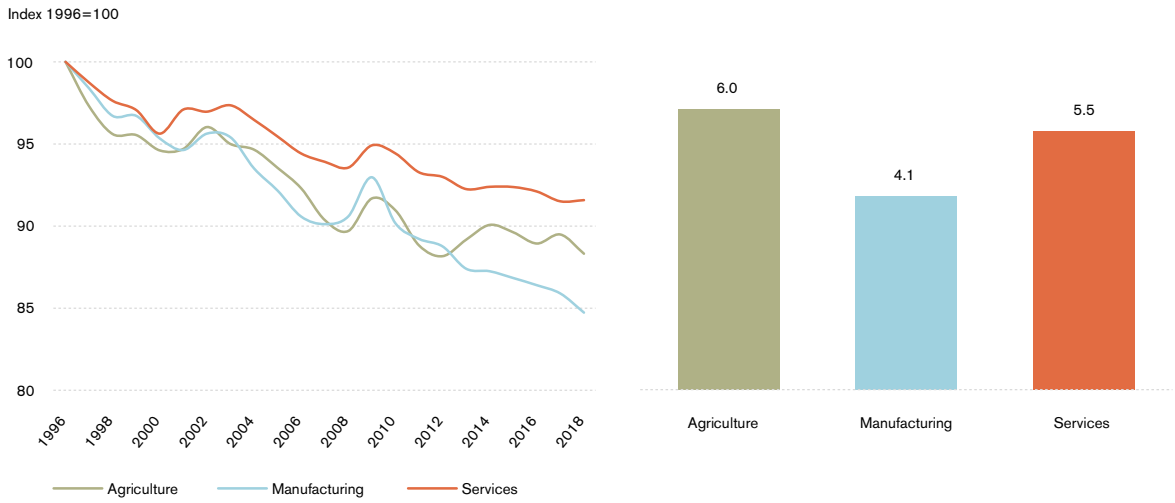
The cost of trading manufactured products declined the most between 1996 and 2018, dropping by 15 per cent (see Figure B.12). Trade costs in agricultural products followed a similar trend up until 2012, but have effectively stagnated over the past decade. Therefore, trade costs in agriculture remain high, almost 50 per cent higher than trade costs in manufacturing in 2018.

Trade costs in services also remain high. However, their average value conceals large variations within the services sector. Transportation and distribution services face relatively low trade costs, similar to those in manufacturing. Trade costs in digitally delivered services are higher, but still below those in agriculture. While digital delivery avoids transportation costs associated with delivering goods, many other costs remain, including the costs of finding foreign providers, establishing trust across different institutional systems, the need for face-to-face communication, as well as the cost of regulatory barriers. Finally, large domestic sectors such as education, health and hospitality services remain relatively little traded across borders.

As detailed in Section B.1, the evolution of trade costs after 2018 has been subject to increasing geopolitical frictions as well as the COVID-19 pandemic, which brought about increases in trade costs through the imposition of temporary trade barriers, higher transport and travel costs, and increased uncertainty (WTO, 2020b). However, the pandemic also provided a boost to digital technology adoption, paving the way for further declines in trade costs. Moreover, there have been important advances in economic integration and trade policy cooperation which have supported reductions in trade costs.

Regional economic integration has recently expanded in Africa and the Asia-Pacific region, following a trend towards large plurilateral RTAs that consolidate commitments and optimize the existing RTA network, especially with respect to rules of origin. The two major regional agreements include the Comprehensive and Progressive Trans-Pacific Partnership (CPTPP), which entered into force in December 2018, and the African Continental Free Trade Area (AfCFTA), which entered into force in May 2019. This coincides with continuous efforts by the European Union to expand its network of trade agreements through negotiations with Australia, Canada, Kenya, Mercosur and New Zealand, among others, some of which have successfully concluded.

Figure B.12: Evolution of trade costs 1996-2018 (left) and the level of trade costs in 2018 (right), by broad sector



Source: WTO Trade Cost Index based on the OECD Inter-Country Input-Output tables 2021 edition.
Note: The Trade Cost Index indicates how many times higher international trade costs are relative to domestic trade costs. Services exclude construction and public services. Bilateral sector-specific trade costs are aggregated to economy-broad-sector level using theory-consistent weights. Simple averages are used to aggregate trade costs to the global level.

At the multilateral and plurilateral level, WTO members have advanced agreements and initiatives which aim at modernizing the WTO rulebook and supporting inclusive, resilient and sustainable trade. The Trade Facilitation Agreement (TFA), which entered into force in February 2017, aims to simplify and streamline customs procedures and border controls, which is key to making trade inclusive (see Chapter D).

Moreover, the package of trade outcomes secured at the 12th Ministerial Conference (MC12) in Geneva includes agreements on fisheries subsidies, the WTO response to the COVID-19 pandemic including a waiver for vaccines, a moratorium on electronic commerce duties, and two outcomes on trade and food security. Ongoing WTO joint initiatives focus on electronic commerce, on investment facilitation for development, on micro, small and medium-sized enterprises (MSMEs), and on services domestic regulation. These developments highlight the role of the WTO in advancing global trade liberalization as well as enhancing the contribution of global trade to sustainability, with the fisheries subsidies, to security and resilience, with the response to COVID-19 and the outcomes on food security, and to inclusiveness, with the investment facilitation for development and MSMEs initiatives.

Finally, the regular work of WTO committees delivers transparency and a platform for discussions in times of increased uncertainty. The WTO monitoring exercise reveals that even if WTO members resort to trade restrictive actions during crisis times, as they have done for example in the context of the COVID-19 pandemic or the war in Ukraine, they usually take care eventually to bring these measures in line with WTO rules, including through notifications. This highlights the crucial systemic role of WTO bodies in facilitating the dialogue among WTO members and thus avoiding the escalation of trade restrictions.

(c) Trade continues to evolve in a more sustainable and inclusive direction

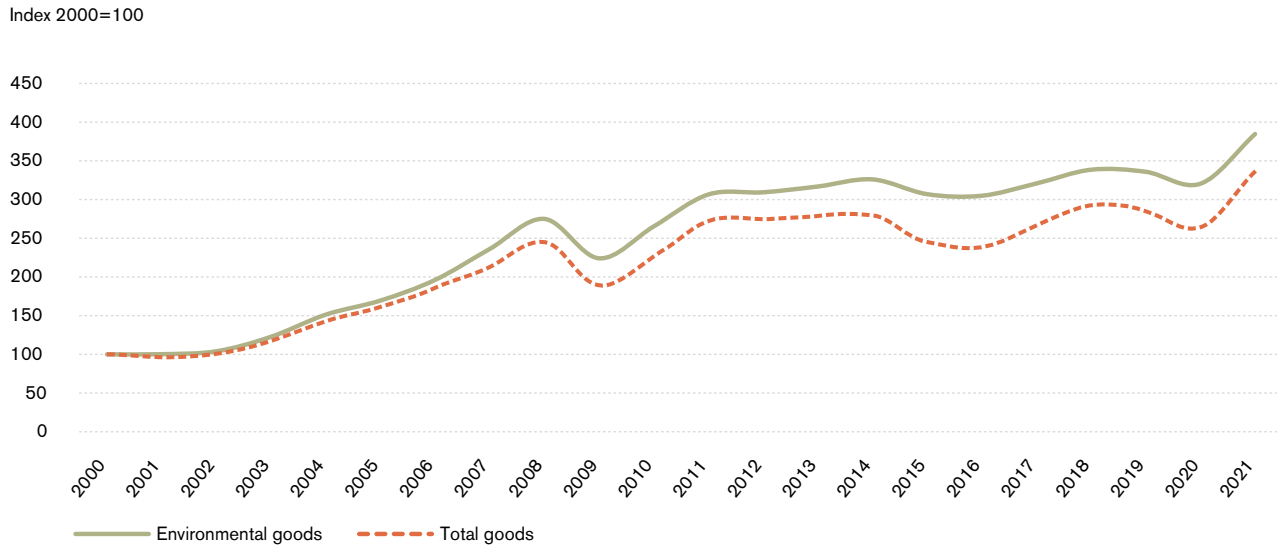
(i) Trade increasingly contributes to environmental sustainability

By providing access to environmental technologies embedded in goods and boosting energy efficiency through access to intermediate inputs, trade helps to address environmental sustainability challenges (see Chapter E).

Trade in goods that promote conservation, reduce pollution and contribute to a greener and more sustainable economy has been growing. Figure B.13 shows that the value of global trade in these environmental goods has increased rapidly over the past two decades, outpacing total goods trade.[6]

Scientific advances, more efficient production processes and rising global demand – supported by open trade – have driven a sharp decline in prices and improvements in the performance of renewable energy generation. These positive developments have made renewable energy a more appealing and viable alternative to fossil fuels, thereby accelerating the transition towards a greener economy (WTO, 2022g).

Figure B.13: Growth in global imports of environmental goods, 2000-21



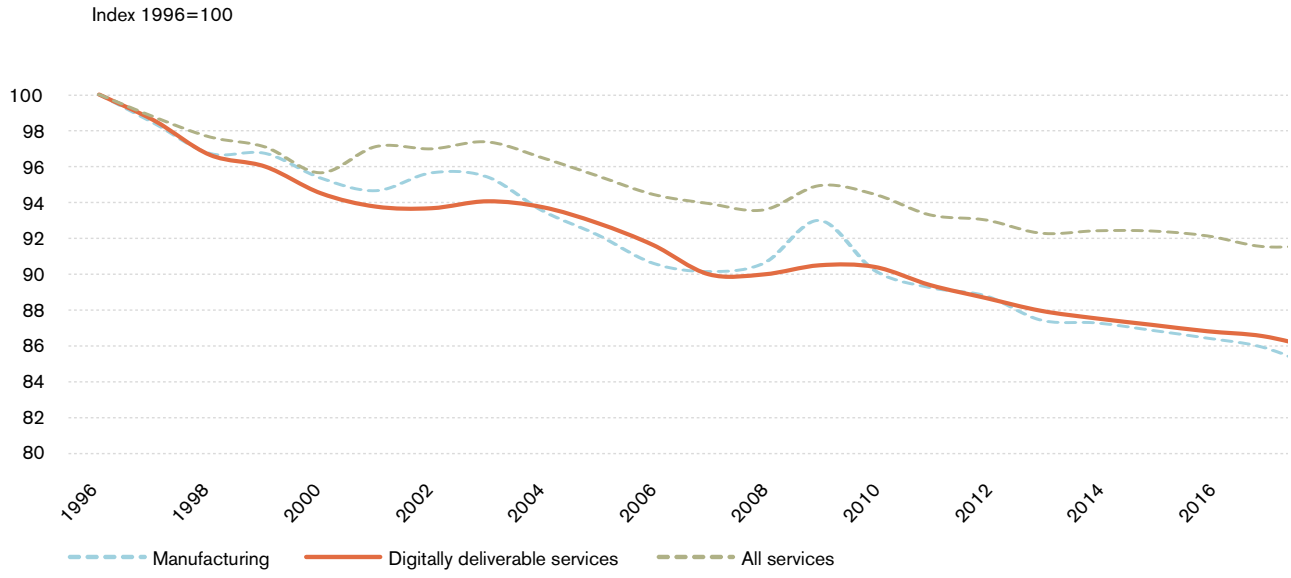
Source: WTO Staff calculations based on UN Comtrade data.
Note: Environmental goods are defined based on OECD combined list of environmental goods in Sauvage (2014).

To effectively address global sustainability challenges and combat the climate crisis, it is imperative that environmental technologies reach all corners of the world. Trade in environmental technologies embedded in goods and services facilitates the wide adoption and diffusion of these innovations, allowing even economies without complex production capacities to harness the benefits of environmental goods and services.

(ii) The ongoing digital revolution boosted trade in digitally delivered services

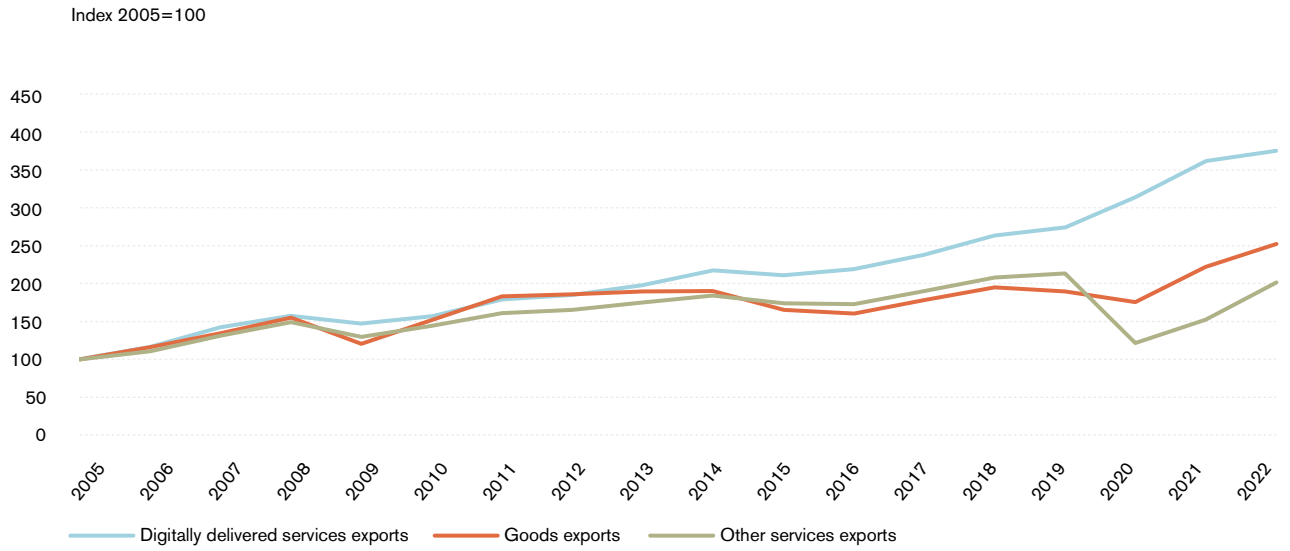
The digital revolution has had a profound impact on how we

Figure B.14: Decline of trade costs in digitally deliverable services, 1996-2018



Source: WTO Trade Cost Index based on the OECD Inter-Country Input-Output tables 2021 edition.
Note: Bilateral sector-specific trade costs are aggregated to economy-broad-sector level using theory-consistent weights. Simple averages are used to aggregate trade costs to the global level. Digitally deliverable services include financial services, business activities such as information, administrative, and professional services, and other services such as audio-visual and entertainment services. They are defined as sectors 65-67, 71-74 and 90-93 of the International Standard Industrial Classification (ISIC) revision 3.1.

Figure B.15: Growth of digitally delivered services exports, 2005-22

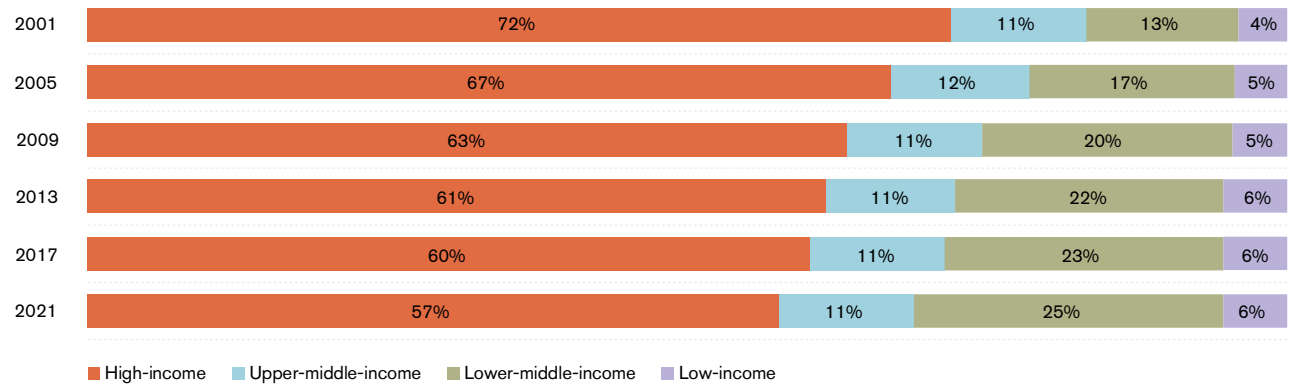


Source: WTO (2023b).
Note: Digitally delivered services include GATS mode 1 exports of financial, insurance, telecommunications, computer and information services (ICT), charges for the use of intellectual property, and most of other business services and of personal, cultural and recreational services in the Balance of Payments.

produce and consume services. It has created new markets and products, and driven a rapid decline in the trade costs of services that can be delivered digitally across borders (WTO, 2018). Cross-border trade costs in activities such as entertainment, financial, computer, administrative and other business services declined by 14 per cent between 1996 and 2018, which is much more than in the services sector as a whole (see Figure B.14).

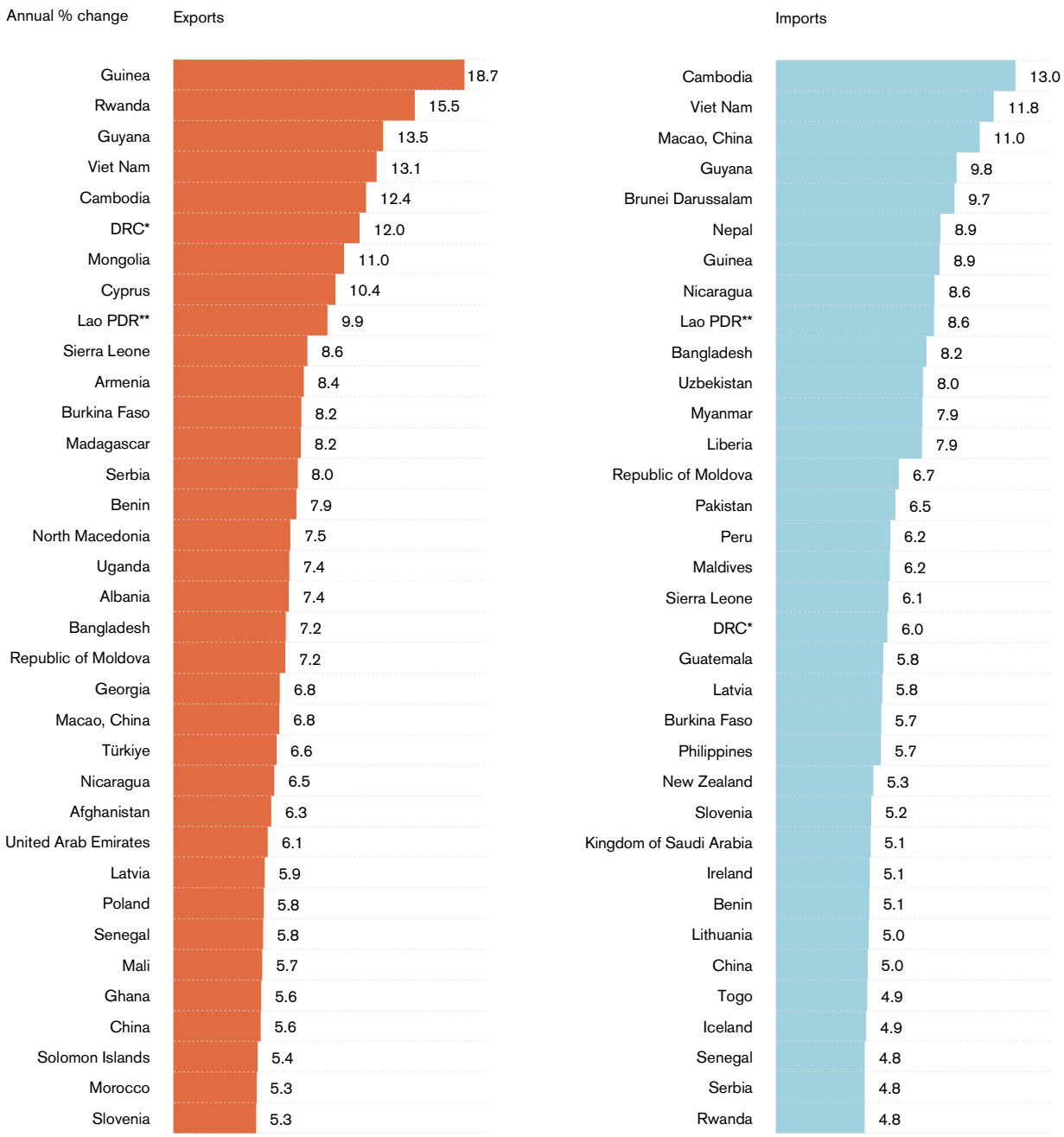
As a result, global exports of digitally delivered services have more than tripled since 2005,[7] rising by 7.5 per cent on average per year in the period 2005-19, outpacing the growth of goods and other services exports. Like other service sectors, digitally delivered services were more resilient to global economic downturns than trade in goods and, in fact, their growth was further boosted by the COVID-19 pandemic, due to new and increased need for services linked to remote working, learning, and home entertainment. While lockdowns, travel restrictions and social distancing measures had an acute negative impact on service sectors that require physical delivery and face-to-face communication, such as tourism and travel, digitally delivered services exports continued to thrive to reach a share in global services exports of 54 per cent in 2022 and

Figure B.16: Share of global merchandise exports volume by income group, 2001-21



Source: WTO Trade Statistics.
Note: Income groups are based on the World Bank classification in 2001.

Figure B.17: Average annual growth in merchandise trade volume of selected economies, 2010-21



Source: WTO Trade Statistics.
Note: Global merchandise trade volume growth averaged 3.7 per cent per year between 2001 and 2021.
* Democratic Republic of the Congo ** Lao People's Democratic Republic

a rise in total value of 37 per cent above 2019 levels (see Figure B.15).

A large proportion of digitally delivered services consists of business-to-business services. Trade in these intermediate services reflects the internationalization of production that has been under way.[8] According to WTO estimates, intermediate services accounted for the largest share of global services trade – more than 58 per cent – prior to the pandemic. While trade in intermediate goods might have peaked, trade in intermediate services continues to grow, supporting the view that services offshoring is the new globalization frontier (ADB et al., 2021). As argued in the opinion piece by Pamela Coke-Hamilton, intermediate services are key to competitiveness and to more inclusive global trade.

OPINION PIECE

Connected services: A pathway to development[9]

By Pamela Coke-Hamilton

Executive Director, International Trade Centre

Connected services can turbocharge economic transformation. But to do so, they must be accessible to all firms.

Services are hard to grasp. We drive, wear and sleep in products made by industry. We eat the products of the land. But services sometimes seem invisible, even though they are everywhere. This is because they are intangible – you don't touch them, and often you don't even own them. Also, they are increasingly incorporated into something else.

This publication is a good example. Its value does not come from its physical properties. It derives from the specialized services that went into creating it: researching, editing, translating, designing and printing. The dozens of people who perform these services usually do not all meet in person, but technology allows them to work seamlessly together.

The production of this report thus embodies two trends that are reshaping services. First, they account for a growing share of the value of whatever is produced. Second, they are increasingly supplied using digital technologies.

But not all services are the same. A set of four activities – which the International Trade Centre (ITC) has dubbed "connected services" – are at the forefront of these trends. Financial services, information and communications technology (ICT), transport and logistics, and business and professional services link the various parts of a supply chain, and are spearheading digital innovation.

These connected services are valuable in their own right. Employment created in these four services sectors is growing rapidly, particularly in low-income economies. Globally, these sectors are also exporting more, attracting more investment from abroad and reinvesting a larger share of their revenue in innovation.

However, it is their contribution to overall competitiveness that makes connected services critical. ITC research shows that firms in all sectors are more competitive when they have access to high quality connected services. They provide the key ingredients that all firms need to prosper: efficient payment solutions and innovative financing, reliable digital and physical connectivity, and cutting-edge business expertise.

Connected services also make our societies more equal. Through them, small businesses can integrate into value chains and adopt digital technologies to produce and engage with buyers and suppliers more efficiently. In this way, trade becomes more inclusive, with gains more broadly distributed.

Unfortunately, many small businesses in developing economies cannot access connected services easily. Governments have a role to play in closing this gap, particularly when it comes to regulation. Connected services companies often cite technical requirements, taxation, the temporary movement of individuals abroad to supply services, and quality control measures as the most burdensome barriers to trade, according to ITC Non-Tariff Measures Business Surveys in a handful of countries.

As digital technology transforms the services sector, new regulatory challenges emerge. Issues such as data flow and privacy, competition, digital taxation and intellectual property protection will require enabling regulation if firms are to operate and flourish.

We must put in place the necessary measures to make connected services flourish, to benefit all firms, foster more prosperous economies and build more inclusive societies.

(iii) Global value chains have expanded to encompass more economies

Participation in GVCs has fostered export-driven economic growth in many developing economies, drawing workers from subsistence agriculture into more productive industrial activities. In the past two decades, the share of low-income economies in global merchandise exports increased by 50 per cent and the share of lower middle-income economies almost doubled (see Figure B.16).

The expansion of GVCs brings higher productivitiy and lower consumer prices in developing as well as advanced economies. International trade promotes the reallocation of resources toward sectors and firms with higher efficiency, thus improving aggregate and sectoral productivity. Moreover, GVCs boost firm-level productivity by expanding access to cheaper intermediate inputs (e.g., Kasahara and Rodrigue, 2008; Halpern et al., 2015; De Loecker et al., 2016; Brandt et al., 2017). Productivity gains and cheaper access to imported final consumption products then benefit consumers through cheaper prices and greater choice (e.g., Feenstra and Weinstein, 2017; Caliendo et al., 2019; Amiti et al., 2020).

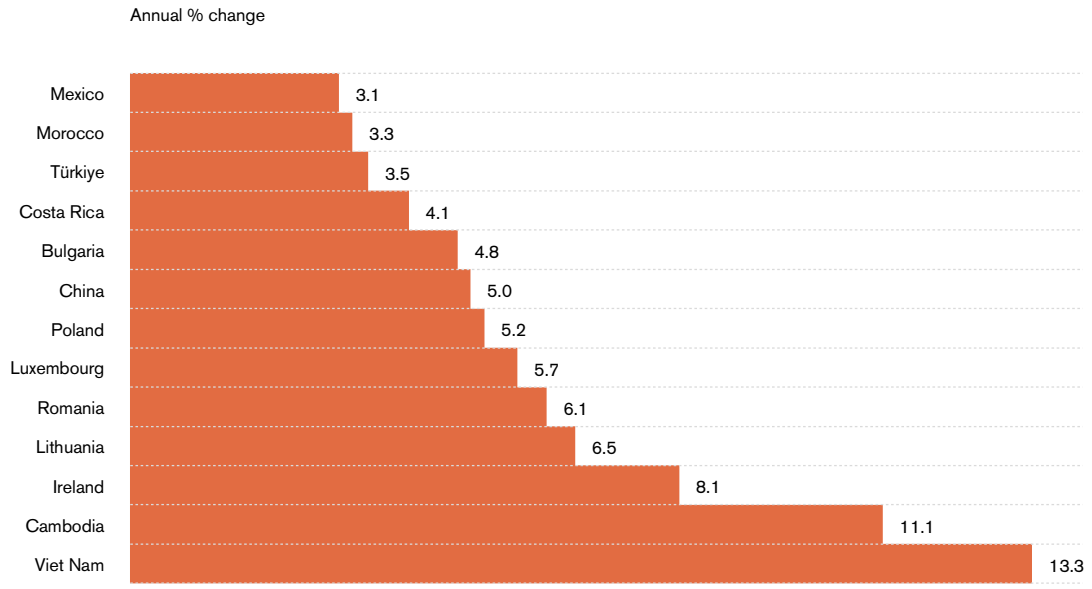
Moreover, participation in GVCs helps to increase productivity and innovation by providing better access to knowledge and know-how, which are embodied in imported intermediate inputs (e.g., Keller, 2002; Nishioka and Ripoll, 2012; Piermartini and Rubínová, 2021) and directly transferred in face-to-face interactions (e.g., Branstetter et al., 2014; Hovhannisyan and Keller, 2015; Kerr and Kerr, 2018; Miguelez, 2018). Empirical evidence from China also suggests that, even though low-income economies typically start at the lowest value-added stages of GVCs, such as assembly of final products, they learn from their GVC participation, and the associated boost in economic activity enables firms to perform more production stages over time (Chor et al., 2021).

Despite a falling global trade-to-GDP ratio, many developing economies continue to grow through trade. Among the economies with the highest average annual growth in exports and imports over the past decade are almost exclusively developing economies (see Figure B.17). While much of this growth happened from a low base, also larger economies such as Viet Nam, Cambodia or Türkiye recorded strong increases in trade. This highlights that the trading system continues to have scope for further diversification.

In line with this, new developing economies continue to enter GVCs. Viet Nam, Cambodia and Romania saw a particularly rapid increase in their GVC participation between 2010 and 2020 (see Figure B.18). Viet Nam attracted large foreign technology brands to setup manufacturing plants, which was reflected by a two-digit yearly average growth (13.3 per cent) in Viet Nam's GVC participation in the period. As a newcomer to the multinational production network, Viet Nam specializes in the assembly stage of the value chain, which is reflected by the high reliance of its exports on imported intermediate inputs: half of the value added in Viet Nam's exports originated from abroad in 2020.

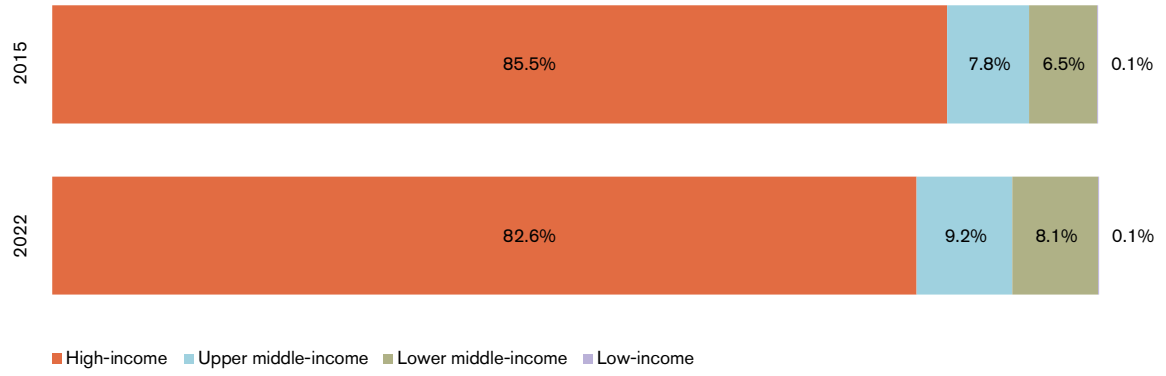
Cambodia's GVC participation also grew significantly, on average by 11.1 per cent per year in the period 2010-20. The

Figure B.18: Average annual growth in GVC participation of selected economies, 2010-20



Source: WTO calculations based on the OECD TiVA database.
Note: GVC participation is measured as the sum of foreign value added in exports and domestic value added in other economies' exports. Preliminary data for 2020.

Figure B.19: Exports of digitally delivered services by income level, 2015 and 2022



Source: WTO estimates.
Note: Income groups are based on the World Bank classification in 2022.

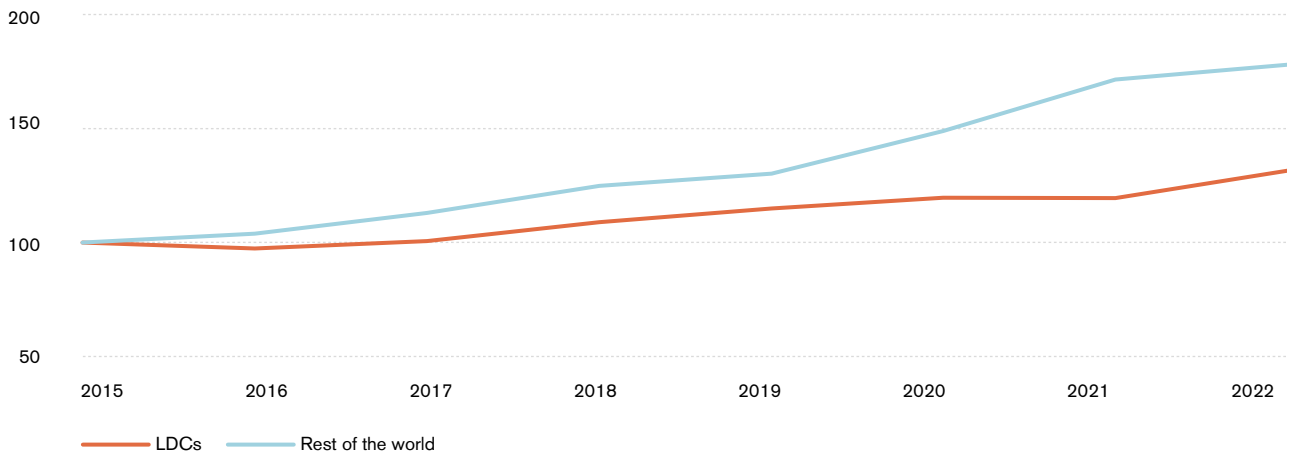
economy has emerged as a manufacturing hub, particularly in textiles, apparel and agri-food industries.

Romania saw its GVC participation increase by 6.1 per cent between 2010 and 2020, mainly as a result of the development of production and trade of vehicle parts with regional car-makers in France, Germany and Italy, and also due to its participation in food supply chains. Besides manufacturing, Romania's success in joining the multinational value chain has also been driven by services offshoring, as global companies established shared services centres to take advantage of Romania's highly skilled and relatively low-cost labour force.

Other developing economies have taken advantage of the growing digital economy to supply digital services. In 2022, the share of upper-middle- and lower-middle-income economies in global exports of digitally delivered services was 9.2 per cent and 8.1 per cent, respectively (see Figure B.19). Combined, middle-income economies gained 3 percentage points share since 2015.

Low-income economies' share, on the other hand, remained at a modest 0.1 per cent and exports of digitally delivered services from least developed countries (LDCs) have lagged behind, particularly during the COVID-19 pandemic (see Figure B.20). However, most recent WTO estimates point towards a potential reversal of this trend as LDC exports

Figure B.20: Growth in digitally delivered services exports of LDCs



Source: WTO (2023b).
Note: Digitally delivered services include GATS mode 1 exports of financial, insurance, telecommunications, computer and information services (ICT), charges for use of intellectual property, and most of other business services and of personal, cultural and recreational services in the balance of payments.

Box B.3: The nascent digital services sector in Bangladesh

According to WTO estimates, Bangladesh's total exports of digitally delivered services have been growing by 15 per cent annually since 2005, compared with 11 per cent for goods.

Bangladesh has put digitalization at the core of its development. Around 14 per cent of the online freelance global workforce originates and resides in Bangladesh, making it the top supplier of the online workforce in creative and multimedia services.[10]

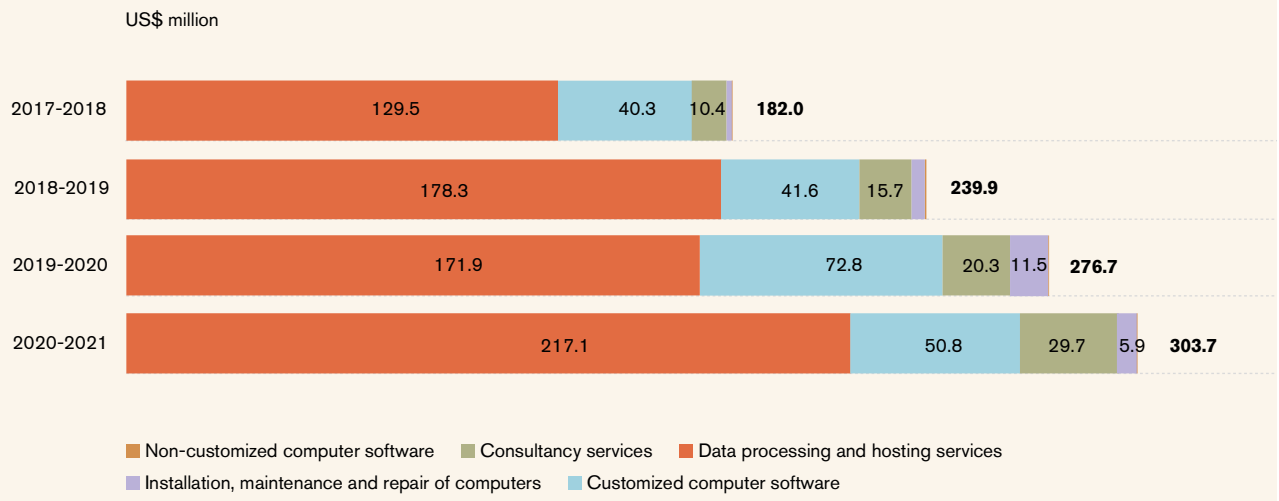
Business-to-customer e-commerce is expected to grow by 18 per cent annually.[11] In 2021, around 11 million users already had access to high-speed internet.[12] The establishment of 8,280 digital centres has enabled ICT services to reach the most remote and vulnerable sections of the economy.[13]

In the fiscal year (i.e., July to June) 2020-21, some 400 companies exported services worth US$ 1.3 billion through digital means to 80 economies, according to the Bangladesh Association of Software & Information Services (BASIS). Exports increased to serve 137 destinations, for a value of US$ 1.4 billion, in the fiscal year 2021-22. The contribution of domestic companies to information and communications technology (ICT) exports rose from 75 per cent to 90 per cent, meaning that the ICT sector now contributes 1.28 per cent to Bangladesh's GDP and has directly created 300,000 jobs – a number that is predicted to rise to 500,000 jobs by 2025.[14]

Data from Bangladesh Bank show that computer services, which include data processing and hosting services and software services, as well as installation, maintenance and consultancy services, rose from US$ 182 million in the fiscal year 2017-18 to US$ 303.7 million in the fiscal year 2020-21 (see Figure B.21). Data processing and hosting services accounted for more than 70 per cent of computer services exports in the fiscal year 2020-21, and grew by 19 per cent per year between the fiscal years 2017-18 and 2020-21. As part of the national development agenda, the "Digital Bangladesh" initiative has strengthened digital infrastructure with the establishment of nine high-tech parks promoting knowledge-intensive business and 19 data centres.[15]

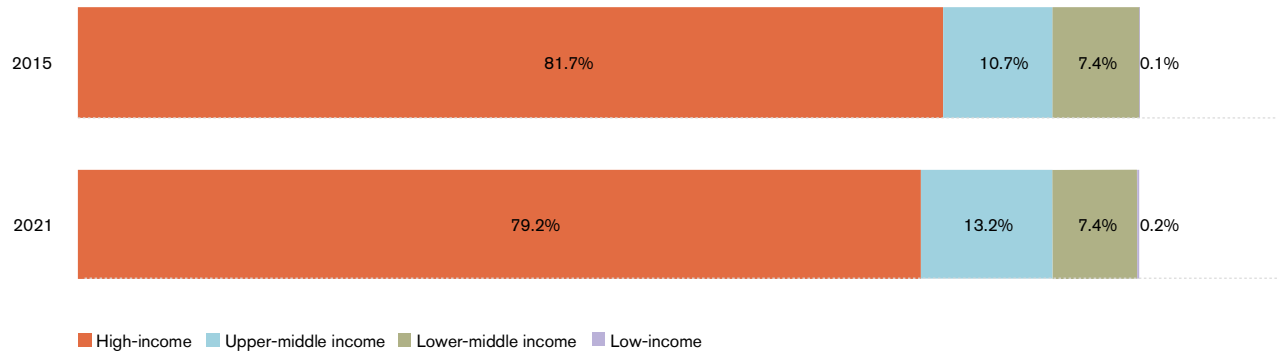
The bulk of Bangladesh's exports of other business services are digitally delivered. Exports of professional services such as legal, accounting, management consulting and public relations services expanded on average by 30 per cent annually from US$ 60 million to US$ 171 million between fiscal years 2016-17 and 2020-21. Other sectors also saw rapid expansion. Exports of other trade-related services rose 62 per cent in fiscal year 2020-21. During the COVID-19 pandemic, exports to China of advertising and market research services more than tripled, while those of architectural and technical services almost doubled. Although the amounts are not large – US$ 8 million and US$ 13 million respectively – there is significant potential for growth.

Figure B.21: Bangladesh's exports of computer services by subsector, fiscal year 2017-18 to 2020-21



Source: Bangladesh Bank.

Figure B.22: Exports of intermediate services by income group, 2015 and 2021



Source: WTO estimates.
Note: Income groups are based on the World Bank classification in 2022.

grew faster than the rest of the world in 2022. Moreover, Bangladesh stands out among LDCs as an economy that saw a rapid growth in exports of digitally delivered services, with professional services exports almost tripling in value between 2016 and 2021 (see Box B.3 for more details).

Advances in the participation of developing economies in exports of intermediate services have been driven by upper-middle-income and low-income economies (see Figure B.22). Notably, the share of low-income economies doubled between 2015 and 2021, even if it remains at a modest 0.2 per cent.

4. Conclusions

Recent headlines suggest a trading system in crisis, some of which is supported by data. Since the global financial crisis of 2008-09, international trade has lost much of its momentum. Recent shocks to the global economy have fuelled narratives that give prominence to the benefits of localization and fragmentation, rather than those that highlight the benefits of further globalization and economic integration, and the former have already seeped into trade policymaking. Unilateral trade-restrictive policies in selected sectors, often motivated by environmental, national security and geopolitical objectives, are on the rise, which in turn affects trade flows. Initial trends towards friend-shoring are visible in the data, as is increased concentration.

Beyond these headline events, trade continues to grow and trade liberalization progresses. While supply disruptions did occur, the trading system has held up throughout past crises and has been able to adapt flexibly. This allowed goods and services to reach the destinations where they were most needed, and to increase supply promptly in times of volatility. Despite the policy headwinds, global trade costs continued to decrease after the global financial crisis of 2008-09, albeit at a slower pace. The stagnation of the trade-to-GDP ratio, the most common indicator of global trade openness, can be explained by compositional changes in the global economy and a slow-down in the structural forces that drove its expansion in the early 2000s, not by a reversal of trade liberalization.

Trade not only grows but it evolves in a direction that is more resilient, inclusive, and sustainable. Trade in digitally delivered services is expanding rapidly, enabled by advances in digital connectivity and technology. Low- and lower-middle-income economies' share of global exports increased from 17 per cent in 2001 to 31 per cent in 2021. GVCs are expanding too, both in terms of the products and the economies involved. The digital revolution is enabling further specialization in business service activities and services offshoring. Bangladesh, Cambodia, Romania and Viet Nam, which were previously specialized in low-value-added supply chains such as textiles and apparel, have entered the international high-tech production networks.

Continued trade policy integration is necessary to deliver further progress, unlock productivity gains and accelerate innovation and technology diffusion. Food security – especially in developing economies – can benefit from deep international markets. Yet, trade costs in agriculture have barely changed in the past two decades, remaining almost 50 per cent higher than in manufacturing, and many LDCs still have difficulties in participating in the global trading system.

With technology enabling new services and products to be internationally produced and distributed, there is no reason for trade not to continue to be the source of prosperity and poverty reduction that it has been for decades, should the right policies and environment enable further trade integration and re-globalization to take place. However, the challenge for re-globalization will be to achieve global income gains as well as to help achieve a more resilient, inclusive and sustainable global economy if it is to counter inward-looking narratives.

Endnotes

1. WTO Staff calculations based on data from Conte et al. (2022).
2. The ratio for the European Union would be much lower if intra-EU trade was excluded.
3. See Goes and Bekkers (2022) for detailed definition of the hypothetical geopolitical blocs.
4. Products are considered concentrated based on their relevance and market concentration. Relevance requires trade in these products to exceed minimum thresholds that evolve over time. Market concentration requires the Hirschman-Herfindahl index to exceed 0.25, which is the value a market with only four suppliers of equal size would have. The cut-off of 0.25 follows the definition of the US Department of Justice for concentrated industries.
5. The WTO Trade Cost Index is a broad measure of international trade costs (see http://tradecosts.wto.org). It captures all factors that make international trade more costly or difficult than domestic trade. These include transportation costs, trade policy barriers, costs to comply with foreign regulations, communication costs, transaction costs or the costs of obtaining information.
6. The list of environmental goods, as defined in Sauvage (2014), encompasses 248 six-digit Harmonized System (HS) lines. It is important to acknowledge that certain environmental goods might be used for non-environmental purposes, which could result in an overestimation of their value and share in global trade.
7. The WTO General Agreement on Trade in Services (GATS) distinguishes between four modes of supplying services: cross-border trade (mode 1), consumption abroad (mode 2), commercial presence (mode 3), and presence of natural persons (mode 4). Digitally delivered services comprise mode 1 exports of various types of services, ranging from business and professional services, to computer services, financial services, insurance services and others. Digitally delivered services, which can be digitally order or not, are defined as including services delivered remotely, i.e., over computer networks, over the internet (including via mobile devices) or via private networks (e.g., extranets), via emails but also by phone, given that phone and fax communications are increasingly digitalized (IMF et al., 2023).
8. The reference for the definition of intermediate services is the correlation table between the Extended Services classification in the Balance of Payments (EBOPS 2010 – see https://www.oecd-ilibrary.org/trade/data/oecd-statistics-on-international-trade-in-services/trade-in-services-ebops-2010-edition-2020_ca7a6d85-en) and the Cooperative Patent Classification (CPC) (see https://www.epo.org/searching-for-patents/helpful-resources/first-time-here/classification/cpc.html) and Broad Economic Category (BEC rev.5) classification (https://unstats.un.org/unsd/trade/classifications/Manual%20of%20the%20Fifth%20Revision%20of%20the%20BEC%20(Unedited).pdf), which is an international statistical classification on the predominant use of goods and services.
9. Based on ITC (2022).
10. See https://a2i.gov.bd/a2i-missions/future-of-digital-economy/.
11. See https://www.tbsnews.net/economy/bangladesh-e-commerce-sales-more-double-2026-research-497134.
12. See https://datahub.itu.int/data/?e=BGD&c=701&i=11624.
13. See https://basis.org.bd/public/files/content_file/18c2e-ca51e9ffaf59d5e21607935e003-22112022112429.pdf.
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15. See https://basis.org.bd/public/files/content_file/18c2e-ca51e9ffaf59d5e21607935e003-22112022112429.pdf and https://www.datacenterjournal.com/data-centers/bangladesh/.