11

Global Value Chains

The Road to Resilience

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11.1 INTRODUCTION

Global value chains (GVCs) are a key pillar of the trade environment today. During the last decades, trade in intermediates, trade in value-added, and trade network complexity have significantly increased. Nowadays, goods and services often cross multiple borders, go through various stages of production, and are subject to different standards and taxes before reaching the final consumer. Today, about 70 per cent of trade in goods and services involves GVCs, according to the Organisation for Economic Co-operation and Development (OECD 2022a). While the rise of GVCs has long been associated with productivity- and welfare-boosting effects, recent events have exposed the vulnerability of globalised production networks. The 2008 Global Financial Crisis, the COVID-19 pandemic, and the Russian invasion of Ukraine have disrupted many GVCs and led to acute shortages of critical products such as pharmaceuticals, energy, or food in many countries around the world. As a response, various governments have taken initiatives to make their supply chains more resilient.[1]

In general, two different approaches to GVCs' resilience have emerged: First, national, bilateral, and multilateral incentives often summarised under the label of 'friend-shoring' or 'ally-shoring', which are set to strengthen the relationships with like-minded partners and to increase the strategic autonomy of countries; and second, attempts to promote supply chain diversification by putting in incentives

[1] Examples of such government initiatives include the United States (US)–Japan Critical Minerals Agreement, the European Union's (EU) Important Projects of Common European Interest (IPCEI) programme, or the plurilateral Supply Chain Resilience Initiative by Australia, India, and Japan. Moreover, resilient and secure supply chains feature prominently in various government reports, for instance, the European Commission's Strategic Foresight Report 2022, EU Commission's Report on Strategic Dependencies and Capabilities, or the US's Executive Order on America's Supply Chains.

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to increase international cooperation and risk-sharing. This chapter focuses on the second approach to GVCs' resilience and explores which role international cooperation, and, in particular, preferential trade agreements (PTAs), can play in making GVCs more resilient.

The chapter is structured as follows. First, we give a brief historical perspective on the evolution of GVCs and elaborate on some recent shocks to GVCs and how they caused shortages and disruptions in the globalised production network. Second, we outline different strategies to make GVCs more resilient and discuss the theoretical justification for government involvement. Third, we discuss the relationship between PTAs and GVCs by providing a detailed analysis of the existing channels through which PTAs can enhance the resilience of supply chains. Fourth, we propose three additional approaches that could further increase GVCs' resilience and inform the future design of PTAs. Finally, we conclude the chapter by summarising our findings, while pointing to further research avenues on the link between PTAs and GVCs' resilience.

11.2 HISTORICAL CONTEXT OF GVCS

The development of GVCs can be understood as a natural result of globalisation: the main drivers of GVCs have been a lowering of trade costs and advances in transportation and transmission. Baldwin (2012) proposes looking at globalisation as two major unbundlings. The first unbundling roughly took place around the 1830s with the Industrial Revolution and its accompanying increase in steam power. Before the start of globalisation, each village would mostly consume what it produced. Propelled by the Industrial Revolution, the Global North (North America, Europe, Japan) industrialised while the Global South (China and India) staggered behind. At the same time, the steam revolution, with its impact on steamships and railroads, lowered transportation costs causing trade to explode during this period, but it mostly took place between countries of the Global North. This pattern of increased trade and industrialisation and lower costs continued roughly until the 1930s with the onset of the Great Depression, the Smoot–Hawley Tariff Act, and later World War II.

The second unbundling took place around the 1990s with the information and communication technology (ICT) revolution, and this is where GVCs started to emerge. The great technological advances and the reduction in communication costs made it possible for firms to coordinate complex processes at a distance and shift from just trading in goods to also trading in components and services. The big gap in wages between the developing and developed countries made this fragmentation in production profitable. The era of GVCs started when ICT made it possible to combine developed-country technology with developing-country labour. This period also coincided with significant changes in trade liberalisation. The World Trade Organization (WTO) was created; developing countries suddenly embraced

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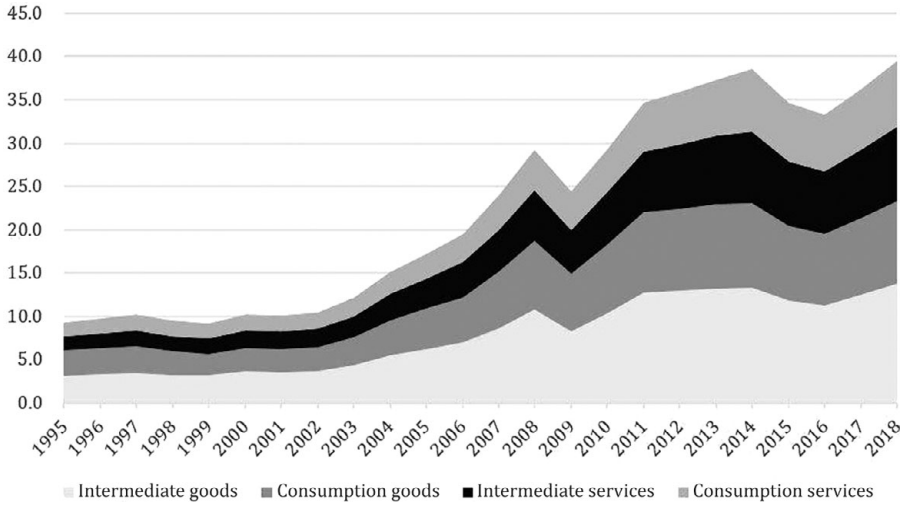


FIGURE 11.1 Decomposition of OECD gross exports, USD trillion.
Source: Created by the authors using OECD TiVA data

market openness facilitating production across countries; and along with this, there was a boom in the signing of bilateral investment treaties (BITs) and PTAs.

While GVCs undoubtedly play a central role in today's global economy, quantifying the exact extent to which GVCs dominate international trade is not trivial. In its simplest form, GVCs could be measured as the amount of imports embedded in a country's exports. It is, therefore, strongly associated with intra-industry trade. In Figure 11.1, which uses data from the OECD's Trade in Value Added (TiVA) Database and focuses on the period 1995–2018, we can see a clear increase in exports of intermediate goods and services, implying an absolute increase in GVCs. The 2008–2009 financial crisis explains the dip we see in the pattern.

Similar patterns can be observed when we focus on particular industries, as is the case for the automobile industry, which is illustrated in Figure 11.2. Here we present the foreign value-added (FVA)[2] share in the final output for six countries with different levels of integration. A prime example of the consequences of disruptions in GVCs is the recent global semiconductor chip shortage. Semiconductor chips are essential components of almost every electronic device, from cell phones to household appliances, medical devices, computers, and vehicles. Chip manufacturing is a multibillion-dollar industry which requires very specialised design and technology (Alicke and Luchtenberg 2021). However, the chip industry and its customers found themselves in a crisis during the 2020–2023 global shortage. Chip supply chains were under pressure due to the ramifications of the COVID-19

[2] We calculate FVA according to the OECD TiVA methodology. FVA = (value of foreign components in exports) / (value of exports).

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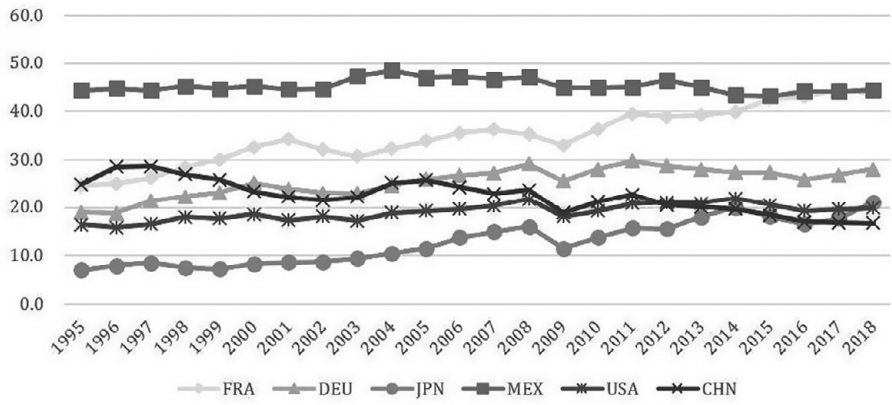


FIGURE 11.2 Foreign value-added share in the automotive sector.
Source: Created by the authors using OECD TiVA data

pandemic and the intensified geopolitical tensions between the US and China. For instance, the Biden Administration restricted exports of certain equipment and services to Chinese semiconductor companies and prompted allies to do the same. As a result, global demand for chips far exceeds global supply, a situation which has affected over 169 industries (Howley 2021). The consequence is major price increases, shortage queues, and bantering for chips between different industries. However, it is considered that the shortage started in the automobile sector during the COVID-19 pandemic before gradually affecting other industries (Wu et al. 2021).

At the beginning of the COVID-19 crisis, the auto industry faced a significant drop in demand. The automakers did not, therefore, increase the semiconductor orders. At the same time, due to confinement and remote work, there was a strong increase in demand for electronic products, such as computers and other devices heavily dependent on semiconductors. The semiconductor industry shifted its production to meet this new demand. By the time the auto sector made its recovery at the end of 2020 its demand for semiconductors could no longer be met. This chip shortage soon expanded to many other industries (Alicke and Luchtenberg 2021). Another problem concerns the lack of sourcing options, with world production depending almost exclusively on Taiwan. For instance, China relies on Taiwan for 70 per cent of the semiconductors it needs for its electronic industry (Cronin 2022). Taiwan Semiconductor Manufacturing Company (TSMC) alone has a worldwide market share of 92 per cent of advanced chips and a 53 per cent market share for the global foundry market (factories contracted to make chips designed in other countries). This dependence on Taiwan for semiconductors has been called a 'silicon shield' against a Chinese attack. However, a range of geopolitically motivated trade restrictions, such as the US Chips and Science Act, have played an important role in perpetuating the crisis further.

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11.3 HOW TO MAKE GVCS RESILIENT

Global value chains are the backbone of today's global trade. However, recent events have led to a shift in the narrative of globalised production. While the discourse in the 1990s to the mid-2010s was dominated by widespread optimism about the merits and virtues of globalisation and, in particular, the productivity- and welfare-boosting effects of international production networks, the debate has changed dramatically in recent years. Against the background of rising economic and geopolitical uncertainty, the narrative surrounding GVCs has moved to emphasise the risks and vulnerabilities associated with geographically dispersed production (Bown 2021; Bade 2022; Posen 2022). This section will take a closer look at the various policy initiatives targeted at making GVCs more resilient such as 'friend-shoring' or supply chain diversification, outline the main approaches at the firm, domestic, and international levels, and elaborate on the role PTAs could play in this context.

11.3.1 *The Rise of 'Friend-shoring'*

Rising geopolitical tensions and domestic public pressure to protect markets from international competition have led many governments to rethink their approach to GVCs. In particular, making GVCs more resilient is high on the agenda of many policymakers around the world. Yet, what policymakers and experts understand by 'resilience' varies. While the International Monetary Fund (IMF) defines GVCs' resilience as 'the ability of supply chains to continue to operate even when hit by shocks' (see IMF 2022), the management literature has traditionally distinguished between the concept of supply chain resilience, which focuses on the ability to rebound and recover after a disruption, and robustness, which emphasises the ability to continue production during a crisis (Brandon-Jones et al. 2014; Brunnermeier 2021). While there is no common definition of GVCs' resilience (Khanna et al. 2022), for the purpose of this chapter, we follow the broader definition of the Brookings Institution, which incorporates both the notion of resilience and robustness. In particular, we define resilience as 'the ability of a given supply chain to prepare for and adapt to unexpected events; to quickly adjust to sudden disruptive changes that negatively affect supply-chain performance; to continue functioning during a disruption (sometimes referred to as "robustness"); and to recover quickly to its pre-disruption state or a more desirable state' (Brookings Institution 2020).

In the political discourse, one of the most prominent policy proposals to increase GVCs' resilience is the concept of 'friend-shoring'.[3] As US Secretary Janet Yellen elaborated, 'working with allies and partners through "friend-shoring" is an

[3] Similar approaches to 'friend-shoring' with slightly different meanings are 'near-shoring' and 're-shoring'. While the former concept encompasses policy initiatives that focus on the relocation of production to a geographically close region, the latter concept describes approaches that aim to bring once-outsourced production back into the territorial boundaries of a state.

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important element of strengthening economic resilience while sustaining the dynamism and productivity growth that comes with economic integration' (CNBC 2022). The Biden Administration has championed this new approach to GVCs and senior policymakers of other countries have started to follow. For instance, Canadian Treasury Secretary Chrystia Freeland views friend-shoring as a 'new norm' (Financial Post 2022). Likewise, the concept of 'secure trade' features prominently in the European Commission's Strategic Foresight Report 2022, calling into question the open trading system of the post-Cold War period.[4]

The new narrative is also reflected in a range of unilateral, bilateral, and multilateral policy initiatives in a variety of countries. In the US, a mix of executive and legislative actions have been taken, which include the Chips and Science Act aimed at encouraging the onshoring of semiconductor production; the Defense Production Act, which restricts funding for sourcing minerals in foreign countries; and the Inflation Reduction Act, which in parts promotes 'friend-shoring' of manufacturing processes. Moreover, a range of bi- and multilateral incentives aimed at enhancing economic relationships with 'friendly' countries and allies are taking shape, such as the Indo-Pacific Economic Framework for Prosperity (IPEF) and the US–EU Trade and Technology Council (TTC). In Europe, the European Commission launched the IPCEI programme to strengthen the continent's 'strategic autonomy' and the European Chips Act, which aims at relocating and setting up semiconductor production capacities in Europe. Such initiatives have also been taken or are underway in other parts of the world. For example, China is pursuing its Dual Circulation Strategy, and Japan has set up a fund to relocate factories from China back home or to neighbouring countries.

While it seems apparent that 'friend-shoring' has become part of the foreign economic policy zeitgeist (Harput 2022), some see this new policy strategy as a dangerous retreat to protectionism and the fragmentation of global trade. For instance, Ngozi Okonjo-Iweala, Director General of the WTO, voiced concerns about the current trend of 'friend-shoring', highlighting that fragmentation might not only be costly but hinder the multilateral cooperation necessary for tackling global problems such as climate change (WTO 2022). Moreover, it remains unclear whether those policy initiatives will achieve the desired goal of making GVCs more resilient. Recent studies raise questions about the effectiveness of 'friend-shoring' and whether GVC disruptions are a market failure best fixed by policy interventions (Grossman et al. 2021; Peiris et al. 2021). For one thing, firms themselves have incentives to manage the risks in their supply chains and make them more resilient (Christopher and Peck 2004). For another thing, diversification – instead of

[4] The European Commission's 'Secure Trade' approach focuses mainly on integrating EU interests into trade and investment policies, for instance in export controls or foreign investment screening mechanisms, as well as on working with so-called like-minded partners in protecting GVCs from geopolitical risks and securing access to critical raw materials (EU Commission 2022).

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'friend-shoring' – might be the socially more desirable and economically more efficient policy option (Grossman et al. 2021).

11.3.2 *Alternative Paths to GVCs Resilience*

In general, one can distinguish between different paths on the road to resilient GVCs. 'Friend-shoring' and related policy initiatives are one path that has gained prominence in the current political environment. However, as outlined above, these initiatives also carry significant risks, as they may be neither the most efficient nor the most politically sensitive strategy to increase the resilience of GVCs in the context of growing geopolitical tensions. A second path to resilient GVCs focuses on promoting the diversification of supply chains by putting more emphasis on international cooperation and risk-sharing. Here, PTAs could play an important role as a tool to make GVCs more resilient. Yet, before elaborating on how exactly PTAs could improve GVCs' resilience, it makes sense to recall what exactly the policy objective of resilient GVCs entails.

Various risks are associated with GVCs depending on the sector, geographical location, production characteristics, business models, and firms' strategies (Cattaneo et al. 2010). In general, the risks firms face in GVCs can be distinguished between supply shocks, demand shocks, and transportation disruptions. Examples of supply shocks include disruptions caused by natural disasters, cyberattacks, workers' strikes, or broader economic and political instabilities. Demand shocks are, for instance, new competitors, reputational damages, bankruptcy, etc. Transportation disruptions examples are the Suez Canal Blockage in 2021 or disruption in port logistics (see Miroudot 2020a). While many shocks to GVCs in the past have been geographically limited, such as the 2011 Tohoku earthquake in Japan (Carvalho et al. 2021), more recent shocks, such as the COVID-19 pandemic or the Russian invasion of Ukraine, have led to more widespread disruptions.

Against this background, firms operating in international production networks have developed various tools to increase the resilience of GVCs. These tools range from supply chain reengineering, collaboration, agility, and supply chain risk management (Christopher and Peck 2004) to specific pro-resilience strategies, including the promotion of interchangeability of inputs or the boosting of inventories (Alicke and Luchtenberg 2021; WEF 2021). The crucial question remains, whether there is a need for policy intervention to guarantee resilient GVCs. A useful conceptualisation of this question is provided by Baldwin and Freeman (2022), who argue that state action might be desirable if there is a Pigouvian wedge between the private assessment of the trade-off between risks and rewards associated with GVCs and the social evaluation of this trade-off (see Figure 11.3). If the public has a lower risk tolerance, illustrated by point X, than the private sector, illustrated by point Y, then state intervention may be justified. Whether this scenario applies to reality is an empirical question. However, as pointed out by the authors, in sectors

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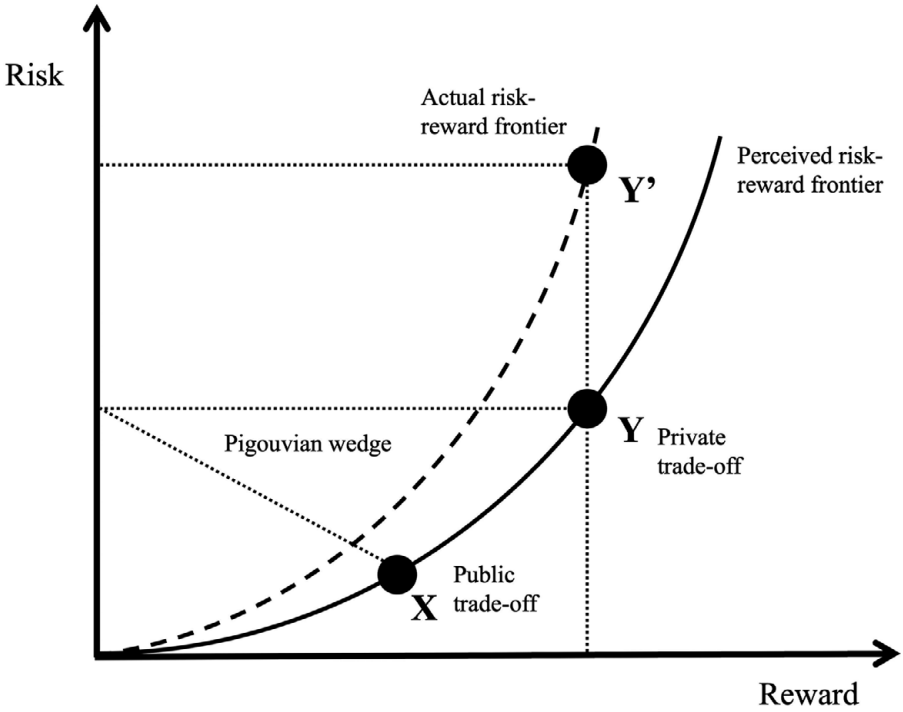


FIGURE 11.3 Illustration of the public–private wedge analysis of GVC risks.
Source: Created by the authors

such as banking, food production, or defence, the public–private risk wedge has traditionally justified government measures (Baldwin and Freeman 2022).

Policy interventions aiming at promoting GVCs' resilience might be legitimate in sectors critical to economic or national security, such as semiconductors, pharmaceuticals, or energy. While careful attention is required to ensure that the designation of 'security-related' measures to particular sectors is not exploited by special interests seeking to extract rents from state intervention, it seems obvious that in light of current events, some sectors are of fundamental national interest. Indeed, many recent policy initiatives aimed at enhancing GVCs' resilience are targeted at sectors regarded as crucial for national security. The remaining question is, therefore, what policies effectively increase the resilience of GVCs. In general, we argue that substantial improvements in the resilience of GVCs are only possible through an interplay of public and private initiatives. As Figure 11.4 shows, targeted measures at all levels of GVCs governance are needed.

For example, at the company level, these initiatives include building and maintaining higher inventory levels, digitising the supply chain, or investing in risk management capabilities. Indeed, recent evidence suggests that companies have been increasing their inventories and improving their warehousing in reaction to

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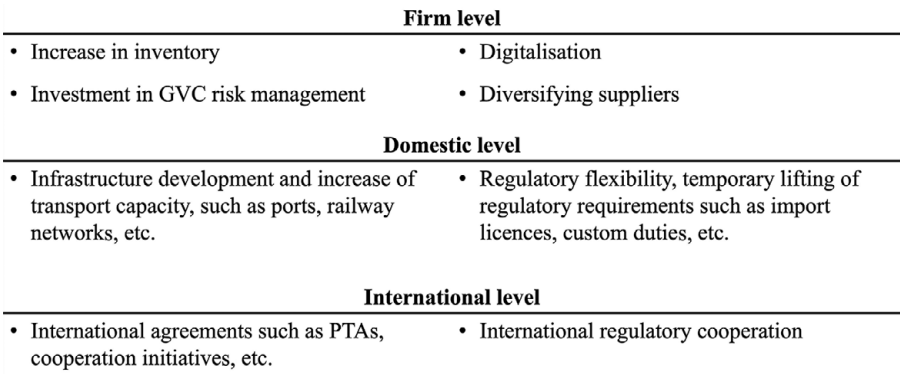


FIGURE 11.4 Tackling GVCs' resilience at different levels.
Source: Created by the authors

recent shocks to supply chains (Zhang and Doan 2023). At the domestic level, improved logistics infrastructure, such as port capacity and rail networks, as well as more flexible regulation and better supply management, can contribute to the greater resilience of GVCs. Finally, at the global level, international cooperation and information sharing, particularly improved pluri- and multilateral international agreements and cooperation initiatives, as well as regulatory cooperation, can increase the resilience of GVCs.

11.3.3 *An Example of the Multilevel Approach in the Case of Trade in Services*

The multilevel approach to GVCs' resilience discussed previously illustrated its potential for yielding the desired outcome in the case of trade in services. During the COVID-19 pandemic, trade in goods was not directly targeted by pandemic policies, except for export bans and restrictions on specific medical supplies and medicines. However, policies limiting the movement of people or reinforcing border controls led to disruptions in trade. For instance, the transport industry demonstrated how goods trade could be affected through services (Miroudot 2022). Restrictions on the movement of people negatively impacted international transportation networks, as demonstrated by the decline in passenger flights, which, in turn, adversely affected the air cargo services supply. Additionally, road transport was impacted by quarantine and sanitary measures at borders, and maritime transport was significantly disrupted by bottlenecks in ports and the reluctance of shipping companies to adapt to the recovery (Miroudot 2020b).

Furthermore, lockdown policies resulted in a decrease in output and a shift in demand, for example heightened demand for goods needed for home offices. Services activities are heterogeneous, so different service sectors were impacted

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differently by the pandemic, depending on the mode of provisions and the shifting demand. Pandemic policies more severely affected service sectors that involved consumer or producer movement than service sectors that could be supplied digitally or through commercial presence within a country (Shingal 2021). For instance, service sectors involving jobs that could be performed from home (Dingel and Neiman 2020) or service sectors such as e-commerce, computer services, and health services, which benefited from the shift in demand, suffered less (WTO 2022). In contrast, transport and travel services, which account for about one-third of total export services in the G20 countries, suffered the most from pandemic policies. These sectors recovered slowly compared to the other service sectors, such as financial services, telecommunications and information services, and other business services.

To make trade in services more resilient in the future, measures at the firm, domestic, and international levels were necessary. Resilience was primarily built by firms employing dynamic capabilities like agility, flexibility, cooperation with other firms, and visibility in the supply chain (Kamalahmadi and Parast 2016). It was, therefore, crucial for firms to invest in these capabilities and to build effective risk management strategies. However, service firms often operated in highly regulated environments, where governments played an important role; thus, accompanying government policies at the domestic and international level were necessary to facilitate and support firms in building more resilient GVCs. Hence, at the domestic and international levels, rule setting and standards encouraged firms to build risk management strategies to comply with necessary capacities. For example, air and maritime transport, severely impacted by COVID-19 and having indirect but crucial effects on the functioning of product markets, was also subject to high trade restrictions, creating bottlenecks and emphasising disruptions (OECD 2022b). Sectors like these held high potential by introducing reforms that improved capacity, flexibility, and transparency to foster the ability to adjust to demand shifts and ensure supply continuity.

Moreover, during the crisis, the focus lay on maintaining the operation of essential GVCs and increasing supply. This was achieved by facilitating trade and investment to foster supply, prioritising shipments of essential goods, and adapting the rules for the movement of key personnel. An open trade and investment environment was needed to reduce the recovery time. This included supporting micro-, small, and medium enterprises (MSMEs) and addressing financial and other issues of firms that might delay the recovery. In this context, creating a stable regulatory environment, introducing standard and certification procedures, including risk awareness, and reviewing transport and customs regulations to better absorb disruptions could promote resilient GVCs in the long term. To make GVCs more robust during the crisis, policies aimed to maintain the operations of essential GVCs and scale up the production of key products while promoting international cooperation (Miroudot 2020b).

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In addition, policies aimed at enhancing information exchange, namely investment in infrastructure, could reduce bottlenecks and add capacity for services firms to deal with an increase in demand. This was done by increasing collaboration to guarantee the supply reliability of critical products during the crisis, and by incentivising information exchange and transparency across internal departments and suppliers. As proposed previously, by setting standards, control towers, and cross-functional supply chain management hubs, efficient infrastructure might have helped firms adapt to disruptions by efficiently reorganising their activities. In addition, policies fostered regulatory flexibility that allowed firms to continue to operate during a crisis. COVID-19 demonstrated how crucial the movement of people across borders was to supply services. Further cooperation at the international level could have helped to develop common rules and harmonised measures. The following section discusses the role PTAs could play in this context as a specific form of international cooperation.

11.4 WHAT ROLE PTAS ALREADY PLAY

Over the past decades, PTAs have grown more complex, expanding to cover a broader range of policy areas and increasing in detail (see Figure 11.5). Recent studies have shown that diversification of GVCs among foreign suppliers can promote resilience as

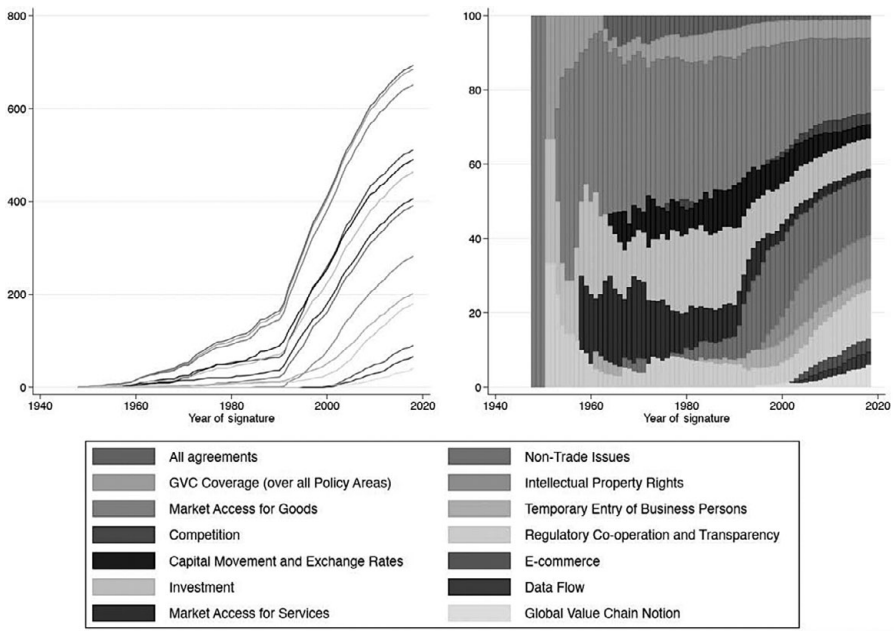


FIGURE 11.5 Coverage of GVC-related provisions in PTAs (DESTA OECD data set).
Source: Created by the authors based on DESTA OECD data set

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the exposure to single countries is reduced (Bank of England 2021). One way to facilitate diversification is through the conclusion of PTAs. In recent decades, PTAs have become one of the main instruments of global trade governance (Mansfield and Milner 1999; Dür et al. 2014; Baccini 2019). Their existence and design shape the nature of GVCs. A rich body of literature has shown that GVCs and PTAs are closely linked. Global value chains play a substantial role in the diffusion of PTAs. For example, large and productive firms involved in foreign direct investments and offshoring activities facilitate the conclusion of PTAs and their design (Chase 2005; Manger 2009; Blanchard and Matschke 2015; Baccini et al. 2018). However, the relationship between GVCs and PTAs is not one-directional. Preferential trade agreements influence the shape and nature of regional and global production networks. For instance, the North American Free Trade Agreement (NAFTA) substantially impacted the geographic distribution of production in the automotive sector in North America (Wall, 2002; Klier 2017). To further explore the role of PTAs in the development of GVCs and their resilience, we first describe the existing channels through which GVCs are managed in PTAs. Second, we present some new approaches to regulating GVCs more comprehensively.

11.4.1 *Promote Long-term Relationships with Trading Partners*

Preferential trade agreements have the potential to promote GVCs' resilience by diversifying input sources and promoting long-term partnerships. We identified seven groups of provisions which are especially promising to build trust among trading partners. Our analysis is based on the updated Design of Trade Agreements (DESTA OECD) data set, which covers GVC-related provisions. The following seven groups of provisions support the functioning of GVCs and include potential instruments for managing GVCs' resilience. These are: direct references to GVC management, the specific investment definition, the application of dispute settlement mechanisms (DSMs), competition rules, rules of origin (RoOs), transport, and regulatory cooperation. In the following sections, we explain the channels through which obligations in the various groups might affect GVCs' resilience. These obligations might serve as complements or substitutes among each other, and the list discussed below is by far not complete. Also, the channels through which the obligations impact GVCs' resilience might have contradicting intentions and outcomes.

11.4.2 *Direct References to GVC Management*

This group of provisions covers whether a PTA includes terms like supply chain, production network, or value chain. These terms are only part of PTAs signed in the last decade. This shows that the terminology around GVCs slowly starts to be part of the government's negotiation process and reflects how negotiators have become aware of the growing role of GVCs.

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11.4.3 *Investment Definition*

Several studies have already observed that deep PTAs foster GVC operations (Laget et al. 2020). The impact of deep PTAs is higher on trade in value added in intermediates rather than value-added trade in final goods and services. Preferences of international firms may differ in terms of the design of deep PTAs depending on how firms have organised their value chains (Eckhardt and Lee, 2018). Further, signing a deep PTA with investment provisions has a higher impact on trade in value added compared to signing a shallow PTA and a BIT (Boffa et al. 2019). This is a recently observed trend towards regulating investment in deep PTAs rather than in BITs. Since investment enables GVCs' expansion and development in different dimensions, we assume that certain investment provisions of deep PTAs have an impact on GVCs' resilience. When firms serve foreign markets or organise their GVCs, there is no binary choice between trade and investment, that is, between working with independent firms or with subsidiaries owned by the parent company. In between, different types of relationships involve some form of alliance or control but are not based on equity or ownership. As with trade and investment, these strategic partnerships can complement or be substitutes for other corporate relationships. The data set takes seven specific types of these non-equity modes (NEMs) or strategic partnerships into account, namely contract manufacturing and services outsourcing, contract farming, licensing, franchising, management contracts, concessions, and strategic alliances and contractual joint ventures. Thus, investment chapters typically contain a definition of what qualifies as an investment and who qualifies as an investor. The enterprise-based definition of investment with a closed list of what is considered as investment was featured in the NAFTA and several Canadian PTAs. Since then, the investment definition has evolved to an open-ended asset-based list.

Moreover, many investment chapters include a provision on the denial of benefits (DoB), specifying that only investors or investments with substantial business activities (SBA) are entitled to the PTAs' benefits. The chapter on trade in services contains similar provisions for service providers. These clauses can be seen as RoOs for goods which lay down under which conditions goods qualify as originating from the PTA Members.

In the context of GVCs with widespread production fragmentation, RoOs (see Section *RoOs*) can create significant distortions in firms' strategic decisions on the location of production and supply relationships. Since multinationals closely integrate trade in goods, services, and investment in the operation of GVCs, clarity and consistency between these rules are important (see Section *Regulatory Cooperation*). Coherence is necessary to ensure neutrality between different trade and investment decisions and avoid distortions.

11.4.4 *DSMs*

Preferential trade agreements typically offer relative and absolute standards of protection to foreign investors, often backed by an investor–state DSM. The

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possibility of settling disputes between states and states and investors helps to prevent the adverse effects of unresolved trade conflicts. They also mitigate the imbalances between stronger and weaker players by settling disputes based on rules rather than having the power to determine the outcome. Two types of DSMs are often included in PTAs *State-to-State Dispute Settlement (SSDS)* and in PTAs with investment chapters also *Investor–State Dispute Settlement (ISDS)*. In theory, both mechanisms can be used to cover regulations and institutional arrangements addressing the divergence of private and social returns that arise with the inadequate appropriation, either between the states (SSDS) or for investors by the host state (ISDS). They cover rights recognised in the PTA, such as national treatment, most-favoured-nation (MFN) treatment, fair and equitable treatment (FET), and full protection and/or security (FPS). Some PTAs further distinguish two situations (UNCTAD 2012): first, direct expropriation, in which an investment is wholly or partially nationalised or otherwise directly expropriated through formal transfer of title or outright seizure; and second, indirect expropriation, in which a party's action or series of actions have an effect equivalent to direct expropriation without formal transfer of title or outright seizure (*Direct Expropriation and Indirect Expropriation*). In addition, provisions regulating compensation for losses in case of strife are also considered (*Compensation: Expropriation and Strife*)

11.4.5 *Competition*

Another group of provisions we identified as having a crucial impact on managing GVCs is the consistency in global competition law. Anti-competitive behaviour impacts GVCs in many ways. Generally, a cartel raises prices downstream while a buyer's cartel depresses prices upstream. Firms with monopolistic roles can also abuse their market power to exclude competitors when they try to extend their activities to other levels of GVCs or refuse to deal with firms other than their affiliates. Mergers also affect market positions. Horizontally they create market power, and vertically they create incentives for abusing a dominant position. Thus, gaps between regional enforcement of competition policy can be a problem.

However, the literature proposes that competition law is not a good instrument for the reallocation of added value among various stakeholders within the chain or for changing the country's position at the production chain stages (Davies 2018). Existing domestic competition legislation does not explicitly favour particular firms, as the maximisation of production efficiency is conceived to benefit all parties universally. Consequently, governments address distributional apprehensions through alternative policy channels. Nevertheless, the strategic application of international competition law can contribute towards achieving distributional goals by preserving competition within and between GVCs, eliminating entry barriers, and facilitating shifts in the production stage position, given that the firms can compete with existing entities. Governments naturally prioritise the welfare of their own

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producers over consumers in foreign countries. Additionally, disadvantaged producers, who are marginalised by larger downstream firms, are unlikely to receive compensation from the benefiting consumers (Geradin 2009). Therefore, strengthening international competition law is essential for addressing distributional issues in the context of GVC management.

The DESTA OECD data set covers several competition provisions. The principle of non-distortion of competition, a well-established and early incorporated doctrine, is included in most PTAs. Subsequently, the competition policy area was reaffirmed as a fundamental pillar along GVCs, leading to the inclusion of a competition-focused chapter in approximately one out of every four PTAs. Figure 11.6 *Panel d*

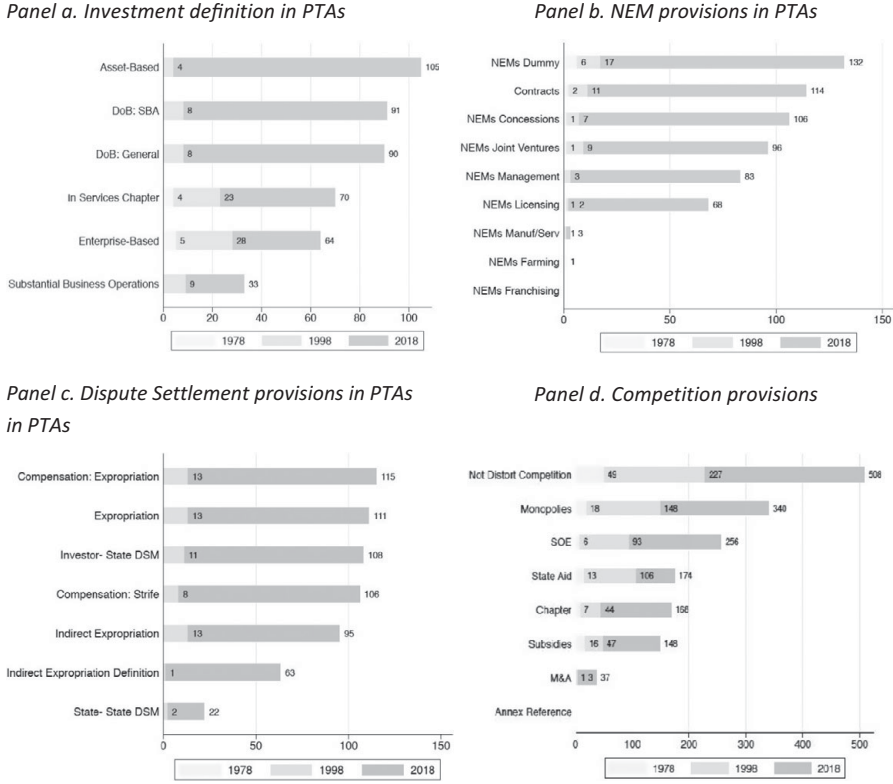


FIGURE 11.6 Provisions in PTAs I.
Note: DoB: SBA = denial of benefits: substantial business activities; DoB: General = denial of benefits: general NEM; Contracts: contracts are included in the definition of investment; NEMs Dummy: PTA covers at least one of the seven NEMs and/or allows for contracts being part of the investment definition; DSM = dispute settlement mechanism; SOE = state-owned enterprises; M&A = mergers and acquisitions; FET = fair and equitable treatment; FPS = full protection and/or security.
Source: Created by the authors based on DESTA OECD data set

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indicates that competition commitments are more exhaustive in PTAs signed recently compared to those signed prior to 2000. More recent PTAs also encompass provisions related to specific competition-related topics such as monopolies and cartels (*Monopolies*), mergers and acquisitions (*M&A*), state-owned enterprises (*SOE*), state aid (*State Aid*), and subsidies (*Subsidies*).

11.4.6 *RoOs*

Rules of origin are an inherent part of any PTA. They define the conditions a good must comply with to be considered an 'originating good' and, therefore, eligible to be exported at the preferential tariff rate. The primary purpose of the RoOs is to avoid trade deflection making sure that the non-signatories of the PTA do not take advantage of it without signing it. The most common rules either define the specific transformation that goods must undergo to be considered originating (change in tariff classification) or determine what percentage of the product's final value (regional value content) needs to have been sourced in the preferential trade area of the agreement.

Rules of origin can naturally shape GVCs, and conversely, GVCs can affect the RoOs being negotiated. From a firm perspective, signing a trade agreement means gaining preferential access to a new market, and potentially using economies of scale to service the current and the new markets (Eckhardt and Lee 2018). Firms sourcing mostly domestic inputs (e.g. a juice company) might prefer to have more restrictive RoOs (a higher percentage of originating goods to benefit from the agreement) to conquer a larger part of the market and avoid competition from firms that might consider sourcing their inputs (e.g. fruits) from abroad. Firms relying primarily on foreign inputs (e.g. an electronics company) might prefer to have laxer RoOs (lower percentages of originating goods required to benefit from the agreement) to obtain their inputs from the most competitive suppliers. Consequently, more flexible RoOs not only improve economic competition but also, in the event of a negative external shock, GVCs are less likely to be disrupted if firms can readily supply themselves with inputs from other countries.

An illustration of the substantial nexus between RoOs and GVCs is that the world's biggest international manufacturing clusters, for example, Factory North America, Factory Europe, and Factory Asia (Baldwin and Lopez-Gonzales 2013), coincide with the most comprehensive PTAs worldwide: the NAFTA, Treaty on European Union, and Association of Southeast Asian Nations (ASEAN). The RoOs and related provisions in these PTAs are often key determinants of the dynamics of the integrated industries in the region.

11.4.7 *Transport Services*

Another highly interconnected set of provisions regarding the management of GVCs are services provisions. Service supply chains are generally more resilient to

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shocks than manufacturing value chains. On the one hand, services value chains are more branched (Baldwin and Venables 2013; Davies and Markusen 2021). They have fewer production stages because their production usually coincides with their consumption. Interestingly, just-in-time production strategies have been criticised as being more prone to shocks due to low inventory, but in the case of services, it is the opposite. According to Netland (2020), the most resilient firms rely on lean production to react better to demand shocks. Not being subject to inventory adjustments is an advantage for services (Ariu 2016) because they cannot be overproduced and the producers instantly know the change in demand (Miroudot 2020b).

On the other hand, services involve long-term arrangements that mitigate the impact of fluctuations in demand. These arrangements are used in uncertain environments to respond to risks (Amann and Marin 1990; Swinney and Netessine 2009). But they do not offer full protection against shifts in demand, as seen in the increased shipping time. The ocean timeliness indicator (OTI) measures how long it takes from pickup in Asia to final delivery in North America or Europe. Before the pandemic, it was 50 days; in late 2020, 70 days; and since late 2021, up to today, 100 days (Flexport research). Different factors drive this increase: on the supply side, fixed capacities (ports and boats), people on sick leave (in not automated ports), and truck driver shortage. On the demand side, unpredictable consumer spending patterns, and large consumer durables (space on the logistic network per dollar spent).

Since the production of goods is highly dependent on transport services, we see this indirect impact through increased shipping times having a significant effect on the functioning of GVCs. The literature on transport restrictions shows that international transport services play an important role in influencing international trade flows (Andriamananjara 2004). For example, a substantial welfare gain could be obtained by letting foreign shipping companies operate on domestic routes in the US (Francois et al. 1996). The fact that certain transport service sectors are included in or excluded from the services and/or investment chapter of PTAs might have an impact on the functioning of GVCs. The DESTA OECD data set covers this in different dimensions: on the one hand, it differs between air, land, and maritime transport service sectors, and on the other, it differs between domestic and international services, asking explicitly whether these sectors are excluded from the service sector of the PTA (see Figure 11.7 *Panel a*).

11.4.8 *Regulatory Cooperation*

We split the group into three dimensions: coherence, transparency, and the introduction of new regulations. The first dimension covers regulations with other PTAs that might contain overlapping and contradicting provisions. Many countries have been rethinking, revising, and evolving their BITs, occasionally including market access commitments. Likewise, investment treaties potentially overlap with PTAs

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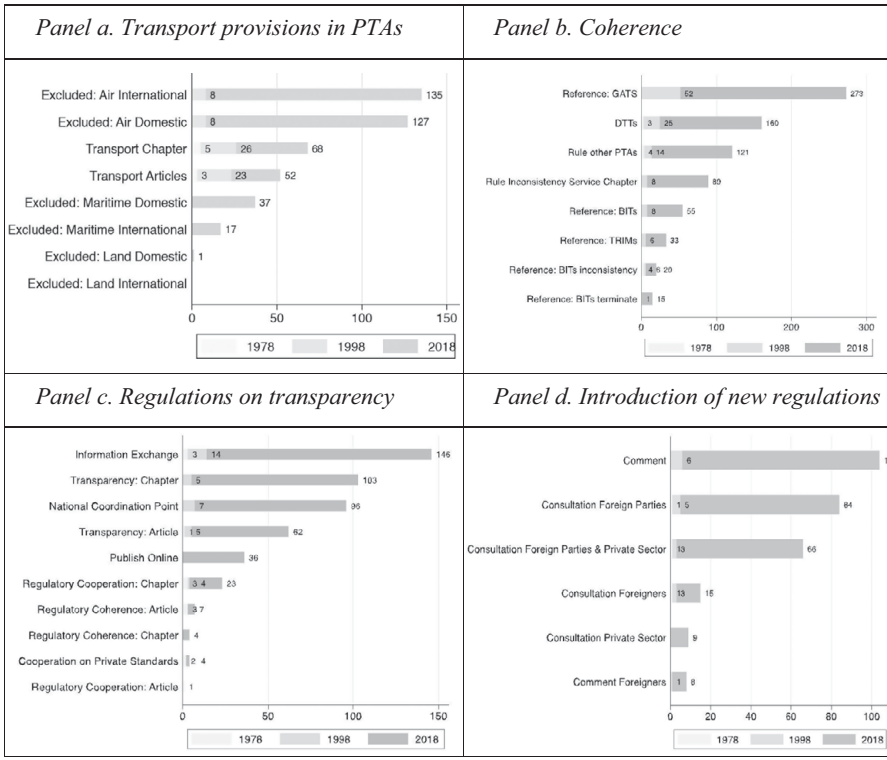


FIGURE 11.7 Provisions in PTAs II.
Notes: GATS = General Agreement on Trade in Services; DTTs = double taxation treaties; PTAs = preferential trade agreements; BITs = bilateral investment treaties; TRIMs = Trade Related Investment Measures.
Source: Created by the authors based on DESTA OECD data set

with investment protection provisions. But potential overlaps and complementarities appear not only in BITs and other PTAs, but also in double taxation treaties (DTTs) with complementary measures that affect investment decisions. This coherence requires specific rules, for example, in terms of which agreement prevails in the case of inconsistency.

The second dimension covers regulations on transparency. They include a broad spectrum of provisions from consultations and exchanges of information to mutual recognition and harmonisation. They cover any provision aimed at reducing the impact of divergences in regulatory approaches among the parties to the agreement. Figure 11.7 shows that information exchange provisions are widespread (146 PTAs include an information exchange regulation covering all sectors and policy areas). Also, the organisation and regulation of transparency in PTAs can vary substantially. We find commitments on the online publication of regulations (*Publish Online*), the establishment of national contact points for regulatory coordination (*National*

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Coordination Point), and references to information exchange (*Information Exchange*) and private standards in the agreement (*Cooperation on Private Standards*).

The third dimension covers provisions for the introduction of new regulations. Two variables capture *comment* mechanisms, and four variables capture *consultation* mechanisms. Consultations require action from the state, asking the relevant stakeholders (legal community, civil society, businesses) what they think about a proposed regulation. Although these stakeholders are not obliged to give their comments, if they do, the state needs to react to these comments. Comments are more passive because the state (or state agencies) receive the inputs from stakeholders without explicitly asking for these comments.

11.5 WHAT ROLE PTAS COULD PLAY IN THE FUTURE

The previous section has elaborated on various provisions already part of many PTAs meant to enhance supply chain resilience. This section outlines three additional approaches that could further promote the resilience of GVCs and inform the future design of PTAs. Thus, in contrast to the already existing provisions that indirectly affect GVCs' resilience, we propose additional design features that aim at directly addressing the management of GVCs. First, we suggest that PTAs can play an important role in enhancing GVCs' resilience by making it easier and cheaper for corporations and authorities to develop and manage inventories for critical products. Second, we argue that RoO provisions in PTAs could be leveraged to increase GVCs' resilience. Finally, we propose that developing and including new minimum resilience standards for GVCs in PTAs can further protect supply chains from shocks and increase their resilience. Resilience refers to the process of successfully adapting to difficult situations. It relates to attributes such as strength, flexibility, and adaptability. Accordingly, these same attributes are reflected in the proposed strategy: firstly, larger common inventories make firms stronger. Additionally, less restrictive and more homogeneous RoOs provide firms with additional flexibility in supplying their inputs; and lastly, the minimum industry standards would permit firms to adapt to future shocks quickly.

11.5.1 *Common Inventories*

Future PTAs could include provisions related to the development, management, and accessibility of pooled inventories for critical products. The build-up of stockpiles can be an effective part of a broader strategy to increase GVCs' resilience (OECD 2022c). While forming PTAs can already make it easier and cheaper for companies and authorities to build up stocks by encouraging supplier diversification and reducing costs, the impact of PTAs could be further enhanced by incentivising contracting parties to engage in regional stockpiling of critical products. The basic

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idea is to add a provision to a PTA regulating the pooling and sharing of inventories. For instance, two countries could agree within the framework of a PTA to build up stockpiles of different critical products, for example, medical products, food, energy, etc., which, in case of an external shock, will be deployed to the country in crisis. Such a new provision would therefore have to define clear rules regarding the pooled stockpile's development, maintenance, and deployment. For instance, this provision could set legally binding obligations when it comes to sharing the pooled stockpiles. While common inventory provisions might be more feasible for regional PTAs, for example, PTAs whose members are in geographically close proximity, falling transportation and logistical costs make the relocation and distribution of resources across long distances increasingly manageable. How common inventory provisions might work in practice can be illustrated by the case of pharmaceutical supplies during the COVID-19 pandemic.

When the first wave of COVID-19 infections hit the US at the beginning of 2020, over 100 drugs were already in shortage (FDA 2020). The disruption of supply chains following various pandemic-related policy measures led to severe shortages of various essential medical devices, pharmaceutical products, and personal protective equipment (Lupkin 2020; Perrone and Johnson 2020). This was the case because the production of pharmaceutical products is highly internationalised (Baldwin and Evenett 2020). Against this background, policy measures ranging from lockdowns to travel and export bans further aggravated the situation. For instance, travel restrictions constrained health authorities' capacities to inspect overseas drug manufacturing facilities, reducing their ability to approve new sources of drugs (Socal et al. 2021), while export bans prevented the distribution of essential medical supplies (Evenett 2020). Hence, the pandemic shed light on a significant long-term weakness of many health systems worldwide, which could not supply the pharmaceutical products needed to meet the rapid rise in demand.

One major cause of the poor response to the COVID-19 pandemic was the initial low level of stockpiles (Bhaskar et al. 2020). For instance, during the 2009 H1N1 Swine flu pandemic, the US had a national strategic stockpile of 100 million masks, but when COVID-19 hit, the US did not have even half of that number at its disposal (Queen 2020). The very low levels of stock of critical medical equipment in the US limited not only the capabilities of the health system to respond adequately to the crisis, but the following drastic rise in demand for medical products from the US and other rich countries led to price surges and shortages as countries simultaneously tried to build up their stocks. Preferential trade agreements can not only play an essential role in facilitating global trade and the functioning of supply chains during times of crisis by promoting trust and legal predictability, but they can also help societies build a sufficient stockpile of essential medical supplies *before* a crisis hits.

Modern healthcare systems rely heavily on the effective management of pharmaceutical inventory. The management of pharmaceutical inventory is a complex

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process involving developing, sustaining, and re-evaluating the stock of pharmaceutical products against financial constraints and technological advances (Management Sciences for Health 2012). Generally, one can distinguish between the basic stock, for example the level of stock held to meet average demand, and the safety stock, for example the additional amount of inventory held to compensate for potential fluctuations in demand (NCPA 2021). Effective management of pharmaceutical inventory is a balancing act between limiting the stock level to reduce pharmaceutical wastage, inventory holding costs, and ultimately financial loss, and maintaining a high stockpile as protection against uncertainties in demand or as a buffer in case of disrupted supply chains.

In most countries, domestic regulation requires hospitals and other healthcare providers to have a particular stock of specific pharmaceutical products. However, the healthcare sector was not immune to the general trend of just-in-time production, which fundamentally transformed production relations in recent decades. The basic idea of just-in-time production is that companies can increase their efficiency by sourcing products in smaller numbers and more frequently, which reduces the costs of holding large inventories (Ohno 1988). This management philosophy contributed to the decline in inventory levels in many sectors, including the health and pharmaceutical industry. While just-in-time production is associated with an increase in a firm's profitability, it is also correlated with higher volatility caused by external events (Ortis 2021). Hence, in cases of natural catastrophes such as hurricanes, storms, or pandemics, the low inventory levels linked to just-in-time production might bear severe consequences for human well-being and safety. In this context, PTAs can be one channel through which the stockpiling of critical products can be facilitated.

Generally, building up buffer stocks can be achieved through three channels. First, the government can build up strategic national reserves of critical supplies, which will be developed and sustained by national health authorities. Second, the government can incentivise healthcare providers, such as hospitals, and producers of pharmaceutical products, to find a better balance between inventory management strategies based on a just-in-time philosophy to a just-in-case approach. Indeed, a recent study by Lafrogne-Joussier et al. (2022) shows that effective inventory management can help firms to weather shocks better. And third, countries can engage in regional stockpiling of critical products. Regional stockpiling entails that countries share the burden of building up resistance levels of critical medical inventories. For instance, the EU Commission has initiated the creation of a strategic stockpile of medical equipment based in nine Member States which can be accessed by other Members participating in the EU Civil Protection Mechanism (EU Commission 2021).

In this context, PTAs can play a key role in supporting the stockpiling of critical products by making it easier and cheaper for companies and government agencies to store them. For one thing, PTAs can promote the diversification of supply for critical

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medical products by increasing the regulatory convergence of standards for medical products between different countries. Regulatory convergence or 'regulatory cooperation' is a prominent feature of modern PTAs (Polanco, Lazo and Sauvé 2018). In pharmaceutical products and medical practices, greater regulatory harmonisation can be one building block of making national healthcare systems more resilient. More harmonisation not only promotes the exchange and transfer of medical goods across borders in times of crisis, but also makes it easier for corporations and authorities to increase stockpiles as they can choose from a broader range of suppliers. For another, PTAs can decrease the price of sourcing critical medical products, making it easier for corporations and authorities to build up and manage inventory. Preferential trade agreements can reduce the costs associated with non-tariff measures as harmonisation and mutual recognition reduce compliance costs for firms (Cadot and Gourdon 2016). As a result, the decrease in sourcing costs can offset part of the costs associated with holding large inventories.

11.5.2 *Rule of Origin Provisions*

Rule of origin provisions in PTAs could be leveraged to increase GVCs' resilience. The previous section illustrated the strong nexus between RoOs and GVCs. Firm surveys have indicated that burdensome RoOs can be a significant detriment to making use of a trade agreement limiting the sourcing options available to the firms if they wish to export at a preferential rate. The problem with the spaghetti bowl syndrome presented below is that firms might have to adjust their production depending on what country they are trading with, despite having PTAs with either of them, to comply with the different RoOs. Against this background, we provide three suggestions related to RoOs that may help make GVCs more resilient:

1. *Less restrictive RoOs:* With more flexible RoOs, a firm could supply its foreign inputs from more countries. It would also create more economic competition, given that more firms could comply with the rules and service both the domestic and foreign markets while providing more alternatives and lower consumer prices. Finally, more flexible RoOs mean that if a negative shock hits a particular country or firm, it could readily supply inputs from another competitor, rendering the supply chain more resilient.
2. *More homogeneous RoOs across PTAs*: Having more homogeneous RoOs would help dampen the problems with the spaghetti bowl syndrome. Firms would not need to drastically alter their production process when exporting to different countries if the RoOs required to trade preferentially are similar to all the trading partners. Under the Pan-European preference system, for example, all PTAs signed by the EU include essentially the same RoOs and use the same EUR.1 certificate of

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origin, with all its trading partners, lessening the administrative burden for the traders.

3. *Wider cumulation schemes*: Cumulation rules basically determine if the countries that count towards accumulating 'origin' for a good are only the signatories of the agreement or if certain third countries can also join. The cumulation scheme would determine not only where the inputs can be provided from but also what processes are permitted for these third countries. A wider cumulation scheme, namely, going from a bilateral towards a diagonal or a full cumulation scheme, can effectively have the same impact as relaxing product-specific RoOs or homogenising them across PTAs.

The problems arising from the lack of proper management of RoOs are best exemplified by the 'spaghetti bowl' phenomenon which has been exacerbated in the past few decades due to the proliferation of PTAs. Initially coined by Bhagwati (1995) in the context of a potential Asia-Pacific Economic Cooperation (APEC) PTA following the NAFTA, the 'spaghetti bowl' problem describes the accumulation of criss-crossing RoOs included in the various PTAs with different partners which require other activities and inputs to be considered. This results in high transactions and administrative costs for industries and distorted trade and investment decisions by firms, which in turn can have a negative impact on the smooth functioning of GVCs (Bhagwati et al. 1998). Interestingly, the boom of PTAs in Asia during the 2000s prompted the Asian Development Bank's President Haruhiko Kuroda to warn about the Asian noodle bowl effect and its challenges to regional and global integration. Figure 11.8 illustrates the 'spaghetti bowl' problem by mapping the distribution of RoOs in a sample of PTAs.

If a firm wishes to export a product without paying a tariff, it will have to incur the costs necessary to satisfy the RoOs requirements determined in the trade agreement it wishes to use. 'The costs include managerial costs for redesigning their production networks, transaction costs for searching new vendors of intermediate goods, physical costs for setting up a new facility if necessary, as well as documentation costs for obtaining a certificate of origin.' (Kimura et al. 2006). However, given the significant costs associated with complying with the various RoOs, companies often choose not to use the preferential access granted under the trade agreement and pay the non-preferential tariff instead. For instance, for the predecessor to the NAFTA, the US–Central America Free Trade Agreement (US-CAFTA), Krueger (1999) reports that some Canadian firms preferred to pay the tariff instead of having to comply with the burdensome RoOs of the agreement. Similarly, Kawai et al. (2009) find that in a series of surveys of South Asian firms, 42% of giant firms, 26% of large firms, and 25% of small and medium enterprises (SMEs) indicate that having multiple RoOs across PTAs represents a significant business cost. In this context, an empirical study of 132 countries using a gravity model framework finds a positive bilateral relationship

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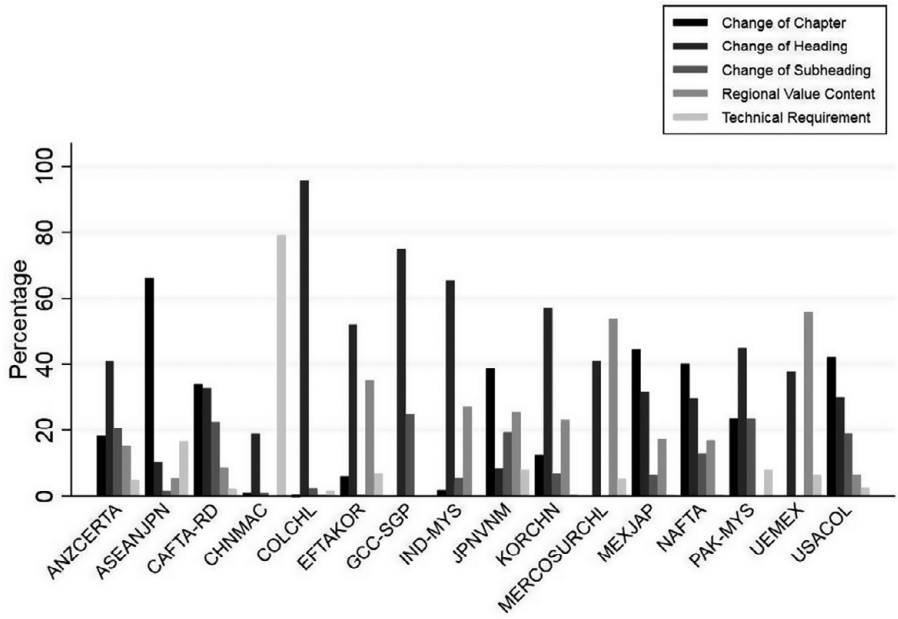


FIGURE 11.8 RoOs across PTAs.
Note: The signatories of these PTAs are the following: ANZCERTA (Australia, New Zealand); ASEANJP (ASEAN, Japan); CAFTA-DR (Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Dominican Republic, the US); CHNMAC (China, Macau); COLCHL (Colombia, Chile); EFTAKOR (European Free Trade Association countries, Korea); GCCSGP (Gulf Cooperation Council countries, Singapore); MERCOSURCHL (Mercado Común del Sur countries, Chile).

between trade and having a trade agreement, but a negative agreement between trade and the amount of other PTAs, indicating the existence of the spaghetti bowl phenomenon (Kimura et al. 2006).

Given this phenomenon, a greater emphasis on the role of PTAs in homogenising RoOs and reducing their restrictiveness can help to address the 'spaghetti bowl' problem. As indicated by firm surveys and econometric studies, the harmonisation of RoOs would reduce both the administrative and operative costs for firms and allow them to source their inputs from a larger number of countries, ensuring the smooth functioning of supply chains. Related to this, more lax cumulated provisions should be attached to the RoOs. Depending on the agreement's cumulation framework, this would allow the countries to either cumulate origin just with the parties of the PTA or include third parties, effectively making the RoOs easier to comply with.

11.5.3 *Standard on GVC Resilience*

Finally, we propose to develop a standard (control tower) that on one side allows making informed decisions to improvise effective solutions and on the other side is

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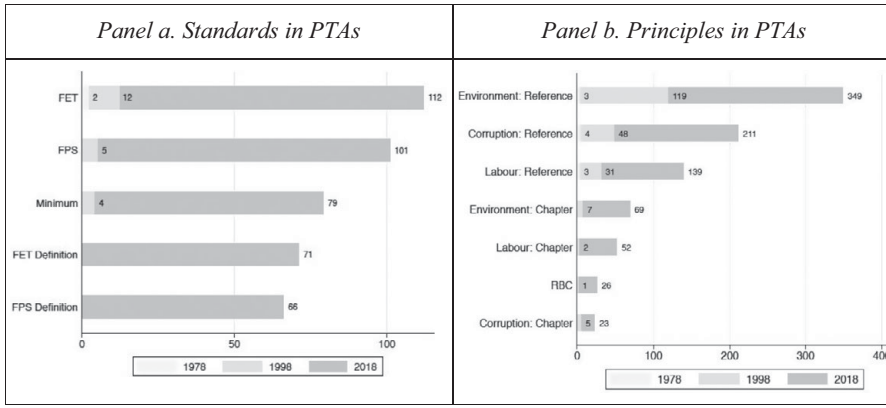


FIGURE 11.9 Provisions in PTAs III.
Note: FET = fair and equitable treatment; FPS = full protection and/or security; RBC = responsible business conduct.
Source: Created by the authors based on DESTA OECD data set

accepted among all parties (states, firms, and customers). In the following paragraphs, we explain the existing approaches for standards in PTAs. We first present FET and FPS and differentiate between absolute and relative standards. Then we explain corporate social responsibility (CSR) and responsible business conduct (RBC) and briefly show the emergence of non-binding principles on labour, corruption, human rights, and environment. Finally, and inspired by the different designs of the above-mentioned standards, we propose the control tower approach.

Figure 11.9 shows the coverage of different standards and principles in PTAs. In contrast to national treatment and MFN treatment, which are relative standards based on the discriminatory treatment afforded to other groups of investors, in most recent PTAs FET and FPS standards are absolute standards drawn from customary international law. Fair and equitable treatment and FPS have, to this day, no international consensus on their definition and have been given an ample interpretation in ISDS cases, transposed differently depending on national context. But also, companies express interest in provisions guaranteeing that trade and investment operations follow high standards and that societal concerns are considered. For these concerns, CSR and RBC were developed. Responsible business conduct is defined as a set of standards and business ethics promoted by governments for companies that invest to integrate environmental and social issues within core business activities, throughout supply chains and business relationships, while CSR is considered less comprehensive and integral to core business (Bule and Tebar Less, 2016). As an example, the OECD adopted the 'Guidelines for Multinational Enterprises' as part of the Declaration on International Investment and Multinational Enterprises in 1976. Since then, the guidelines have been updated five times and today constitute the most comprehensive set of government-backed recommendations on RBC in existence. More recent PTAs

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also cover different principles in areas such as labour, environment, human rights, and/or anti-corruption. But these provisions are mainly non-binding. Responsible business conduct encourages companies to commit themselves to international standards in these areas and to engage with stakeholders. This is quite different from the previously mentioned FET and FPS standards, which are binding standards enforced by the law and governments. In this sense, FET and FPS are enforceable through ISDS, while CSR and RBC are mainly 'best efforts' and do not trigger ISDS.

The literature mentions different approaches to such standards in terms of GVCs' resilience. In the case where suppliers are not meeting increasing demand, the implementation of cross-functional control towers is discussed (Atali et al. 2022). We explain this approach with an example in the following paragraph.

The previous example of semiconductors showed how digitisation across industries and a widespread move to a home office environment, in combination with panic purchasing, supplier shutdowns in Asia, and political instabilities, have induced a shortage in supply and a collapse of the market in several industries. Stops in production and damage to growth ambitions and performance have led to an unfavourable environment for crisis management. What might help in this situation is an instrument that allows making informed decisions to improvise effective solutions. To achieve this, one possible answer might be a control tower, or supply chain management hub, that enables centralised data sharing, bridging the information gap between internal departments and suppliers. Inspired by the already existing and previously explained standards and principles, these control towers can have different designs in terms of enforceability, bindingness, and implementation. On the international level, incentives can be set by promoting standards and certification procedures that include risk awareness either by using absolute standards drawn from international law such as FET and FPS, or by introducing voluntary standards such as RBC. The focus when introducing such a standard should be put on information management across functions, departments, and suppliers.

Such an instrument can set priorities according to conditions and product categories. It can automate communication and guarantee transparency by informing about product recovery time, plant utilisation, and inventory level of product lines. Predictive forecast models can solve complex allocation decisions to reconfigure geographical priorities and resource allocation. Decision-making platforms allow implementing decisions rapidly across multiple departments, all while assessing performance indicators. Such a flexible and straightforward structure lowers uncertainty but also costs. Whether these structures will prevail in the future depends on how sustainably demand will exceed supply.

11.6 CONCLUSION

In this chapter, we elaborated on the role of PTAs in making GVCs more resilient. Historically, GVCs are seen as a product of the same technological and

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socio-economic dynamics that have shaped globalisation. Lower trade costs caused by revolutionary advances in shipping and information and communication technologies have led to an increasingly complex trade network. New regulations are needed to ensure the smooth and equitable functioning of supply chains. At best, these regulations prevent the formation of monopoly positions of countries, sectors, and firms, cushion economic and geopolitical uncertainties, and ensure regulatory transparency and flexibility. However, increasing economic and geopolitical uncertainty has increased the vulnerability of widely dispersed and poorly regulated production networks and put the resilience of GVCs on the agenda of many policymakers worldwide. In this context, one can distinguish between two different approaches to GVCs' resilience: The first approach, often referred to as 'friend-shoring' or 'ally-shoring', focuses on strengthening relationships with like-minded partners, while the second approach emphasises the role of international cooperation and risk-sharing to promote supply chain diversification. This chapter has focused on the second approach and explored the role that PTAs can play in increasing the resilience of GVCs.

To assess the role of PTAs within the orchestra of public and private initiatives at the firm, domestic, and international levels, we examined different channels through which international regulations can apply incentives to increase GVCs' resilience sustainably. First, we identified seven groups of provisions that already exist in PTAs and impact the functioning of the trade network. Second, we described three new approaches to increasing GVCs' resilience directly. These are common inventories, a synchronised RoOs strategy, and introducing a GVCs' resilience standard. Yet, the link between PTAs, their design, and the resilience of GVCs is still an understudied field. Global value chains have only recently started to feature in PTAs, and little is known about the complex relationship between PTA provisions and their effect on GVCs' resilience. Which provisions in PTAs have an actual impact on GVCs' resilience? What are the legal implications of national legislation on supply chain resilience on PTAs? How do 'friend-shoring' initiatives aimed at GVCs' resilience impact the global trading system? These and further research questions will require a more comprehensive and detailed investigation than the scope of this chapter. However, we hope our explorative analysis of the link between PTA design and GVCs' resilience can serve as a basis for further research in this area.

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