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Committee on Market Access

Original: English

THEMATIC SESSION ON SUPPLY CHAIN RESILIENCE: INTRODUCTORY SESSION WITH INTERNATIONAL ORGANIZATIONS

1 INTRODUCTION

1.1. The Committee on Market Access (CMA) held its first thematic session on supply chain resilience with the participation of international organizations on 21 November 2023.¹ As agreed by Members, the session focused on the following topics:

- 1) Definition of supply chain resilience;
- 2) How shocks affect the movement of goods through supply chains;
- 3) What affects how quickly the flow of goods can be restored after a shock; and
- 4) Where can government action and international coordination help to prepare supply chains for shocks or help to restore the flow of goods following a shock.

1.2. The session was moderated by Prof. Marcelo Olarreaga (University of Geneva), and presentations were delivered by Victor Stolzenburg (WTO Secretariat), Daria Taglioni (World Bank), Jan Hoffmann (UNCTAD) and Lazzat Daniyarova (World Customs Organization (WCO)). The presentations are reproduced in the Annex to this document.

2 DEFINITION OF SUPPLY CHAIN RESILIENCE

2.1. The Speakers presented several different definitions of supply chain resilience, which looked at different aspects of resilience.

2.2. In its World Trade Report 2021², the WTO Secretariat defined resilience as "*the ability of a system to prevent and prepare for, cope with, and recover from shocks*". This broad definition does not focus only on the performance during the shock, but also takes into account how a system is able to prevent, prepare for, and recover from shocks. It differs from narrower definitions, which consider resilience as the ability of the system to "return to normal operations" over an acceptable period after a shock occurs and separates it from the concept of "robustness" of supply chains, which is the ability to "maintain operations" during a crisis.

2.3. At its meeting in October 2023, the WCO Permanent Technical Committee discussed, a concept note prepared by the WCO Asia/Pacific Region and Asia/Pacific Regional Private Sector Group, which defined resilience as "*an entity's preparedness and readiness to anticipate, prevent, absorb, adapt, recover, and evolve from the full spectrum of natural and human-induced crises to ensure the continued delivery of critical goods and services*". This definition seeks to reach a cohesive and proactive response to future challenges in the customs domain. The WCO Permanent Technical Committee endorsed this definition of resilience and agreed to include it in the WCO Glossary of Customs terms.³

¹ At its formal meeting on 16-17 October 2023, the Committee agreed to organize a series of thematic sessions on supply chain resilience based on a proposal by the United Kingdom (JOB/MA/164).

² https://www.wto.org/english/res_e/publications_e/wtr21_e.htm.

³ <https://www.wcoomd.org/-/media/wco/public/global/pdf/topics/facilitation/ressources/permanent-technical-committee/241-242/pc0737ea.pdf?la=en>.

3 HOW SHOCKS AFFECT THE MOVEMENT OF GOODS THROUGH SUPPLY CHAINS

3.1. Presenters recognized that global supply chains are subject to different sources of disruptions, which may include both localized shocks (i.e. shocks that originate in a specific location) and global shocks. Some examples, which could fall in one or both categories of shocks depending on their nature, are climate and environmental shocks, shortage of resources, financial distress, increasing food prices, trade fragmentation and decoupling, and security considerations. In recent years, more evidence has become available showing that supply chain bottlenecks have had global propagation effects and that these shocks are costly for trade, investment and innovation. Some of the elements that tend to worsen such propagation effects include a high concentration of production in very few firms or economies, certain types of relationships among firms, the introduction of non-tariff measures, and other measures that promote uncertainty or lack of predictability in policy making.

3.1 High concentration of production

3.2. A high concentration of production in very few firms or economies can negatively affect the flow of goods during supply chain shocks. As an illustration, the WTO Secretariat pointed to the infant formula shortage in the United States in 2022, which resulted from the temporary shutdown of the largest factory producing infant formula and led to a severe shortage of this product in the domestic market. Regulations on infant formula had led the United States to relying almost exclusively on domestic production to supply the US market, resulting in an over-concentration of production, which aggravated the effects of the shock. In response, the United States adopted *ad hoc* measures to facilitate the importation of infant formula, which led to an increase in imports by a factor of more than 300 within a period of several months and helped to meet the local demand while the factory was closed, demonstrating that international trade offered a solution to the domestic supply crisis.

3.3. On a more general note, the WTO Secretariat noted that there has been an increase in concentration of production at the global level in recent years, where approximately 20% of all goods traded were currently being produced by a limited number of exporters.⁴ While international trade can provide solutions to supply chain bottlenecks at any given point in time and play a role in reducing such risks, this role is significantly diminished if there is no sufficient diversification of suppliers and production is concentrated in a few economies only.

3.2 Relationships among firms

3.4. Another aspect that was analysed by the speakers was the nature of firm relationships and how such relationships can influence resilience.

3.5. In a recent study by the World Bank⁵, the authors observed that modern economies are often structured as "massively modular ecosystems". These ecosystems were on the one hand bound together through complementarities and interdependencies, a force that drives concentration at the sector level. At the same time inputs of some highly specialized firms, in diverse global locations, are needed in the supply chains, which acts as a fragmentation force.

3.6. In such modular ecosystems, these contradictory tendencies of concentration vs fragmentation matter particularly in times of crisis and may ultimately cause a dilemma for policy makers. Policy makers may wish to limit exposure to foreign partners through decoupling, but at the same time their firms are strongly interdependent through the supply chain.

3.7. The speaker pointed out that in a world of massive modularity, partial decoupling would be costly or even unattainable while full decoupling could result in possible systemic failures as no single economy has the necessary skills and technology to produce technology intensive goods needed in modern industries. Data also showed that trade wars can hurt innovation, lead to higher costs and to increased concentration of trade, and as a result less connected firms tend to exit the market.

⁴ See [World Trade Report 2023](#), page 34.

⁵ [Massive Modularity: Understanding Industry Organization in the Digital Age — The Case of Mobile Phone Handsets \(worldbank.org\)](#).

3.3 Non-tariff measures, including regulatory issues

3.8. The WTO speaker mentioned that empirical evidence showed that while some non-tariff measures (NTMs) are legitimate trade policy tools, some of these measures may have a negative impact on trade and resilience, and, hence, the ability of trade to mitigate the effects of crises can be reduced by such measures. During the COVID-19 pandemic, for example, port of entry requirements, that is the requirement to import specific goods at certain ports only, in combination with underinvestment in port infrastructure aggravated the impact of the crisis in some cases.⁶

3.9. Similarly, UNCTAD pointed out that diversification of supply chains implies the use of more ports, improved transport and logistics, and the introduction of trade facilitating measures. After some simulations conducted at the start of the COVID-19 pandemic, UNCTAD observed that trade costs increased significantly, and in particular container shipping costs, which had contributed to inflation. According to UNCTAD, Small Island Developing States (SIDS) seemed to have been the most significantly affected by the COVID-19 crisis, while the sectors which had been hit the hardest by these disruptions were "deep" supply chains. Taking the example of high-tech products, where the linkages across the supply chains are generally very deep, the Pandemic demonstrated that even small changes in freight and shipping costs on the intermediate inputs have an impact on the price of the final product, and any interruption or disruption in these supply chains can have ripple effects.

3.4 Uncertainty and unpredictability in policy making

3.10. The WCO highlighted that supply chain shocks can be caused or exacerbated by border closures, travel restrictions, and intensive screening procedures. Customs play a crucial role in maintaining operations, ensuring the safety of the society, collecting duties and other taxes, controlling goods and people crossing borders and the clearance of goods and people involved in international trade and travel. Uncertainty and unpredictability at borders, coupled with increased demand for critical goods, such as medical supplies during the COVID-19 pandemic, can lead to considerable difficulties in maintaining the regular trade flow and the movement of essential goods needed to mitigate the impact of such shocks.

3.11. UNCTAD also pointed to the effects of uncertainty on global supply chains, as illustrated by the case of the shipping industry and the link to the decarbonization of production and transport. While more and new ships are needed to sustain global trade, the shipping industry was waiting for policy makers to agree on clear decarbonization measures before making new investments. Uncertainty in the global economy, trade, and international relations, but also in technology and the regulation for maritime transport, may lead over the next decades to supply chain crises in which shipping capacity is insufficient and hence freight rates would spike.

4 FACTORS THAT DETERMINE RESILIENCE OF SUPPLY CHAINS

4.1. Many factors are relevant for the resilience of supply chains, such as how involved firms are in global trade in general, how integrated they are in global value chains, the availability of business continuity plans and digitalized trade solutions.

4.1 Trade in global supply chains helps mitigate the effects of shocks

4.2. According to the WTO Secretariat, evidence had consistently shown that trade and global supply chains were highly resilient, even in times of crisis. The most telling example was the constant increase in the volume of trade in goods over the past 20 years. Even during recent trade disruptions, international trade had continued to grow. Over the past 20 years, there had only been two periods where trade had not grown: during the global financial crisis in 2008-2009 and the COVID-19 pandemic in 2020. Even during these periods, trade was able to recover from these shocks shortly afterwards and return to the predicted increases that it would have had in the absence of the shock.

4.3. UNCTAD shared the same long-term positive outlook with regards to trade in goods and observed that today's landscape of trade was totally different from the past with more and more

⁶ [Ghose, Devaki; Montfaucon, Angella Faith Lapukeni. Firms in Global Value Chains during COVID-19: Evidence from Indonesia \(English\). Policy Research working paper; no. WPS 10514; COVID-19 \(Coronavirus\) Washington, D.C.: World Bank Group.](#)

developing countries participating in global supply chains. Another positive trend related to logistics. Broadly speaking, there are two types of costs associated to logistics, which relate either to transport or inventory holding, and where one can be replaced by the other. Citing the example of logistics costs in the United States, it was noted that in the past the share of inventory costs was higher than that of transport costs. However, in more recent years transport costs had a higher share than inventory costs in terms of overall logistics costs, which suggested that more efficient transport and the WTO Agreement on Trade Facilitation had contributed to reducing logistics costs hence increasing resilience of supply chains.

4.2 Global value chain integration helps firms and economies recover faster from shocks

4.4. Trade also helps mitigate the impact of shocks affecting supply chains. According to the WTO Secretariat, evidence shows that the global GDP contraction in 2020 caused by the pandemic would have been substantially larger if supply chains had been more localized. This was true also at the firm level, as demonstrated by the fact that firms that were integrated into global supply chains recovered faster from the shock than firms that relied solely on domestic supply chains.

4.5. Although the COVID-19 pandemic had been a global shock, it had not been fully synchronised across different locations: there were some economies where lockdowns and restrictions were less severe or were implemented at different times, and so it was possible to continue to produce and source inputs during the crisis through global supply chains. On the contrary, in the case of national lockdowns, localized supply chains performed on average worse during the crisis than those integrated in global supply chains.

4.3 Firms with global connections tend to perform better in turbulent times

4.6. The World Bank analysed long-term relationships between firms and governments and observed that even in a world where there are risks for firms integrated in global supply chains, it is not obvious that deglobalization or fragmentation is the optimal policy response.

4.7. Evidence showed that firms that are more connected with other firms, and have more global connections, tend to be better performing both in stable times and in more volatile times. The World Bank looked at the elasticity to a shock of a given economy and sector that would come from across the borders versus a domestic shock. It was noted that while it was true that the elasticity of gross output to a Global Value Chain (GVC) shock increases with the share of GVC participation of that economy and sector, it was also true that, at the same time, an economy that is more integrated in GVCs reduces by a similar amount the elasticity of gross output to domestic or more local shocks. In other words, while it is true that GVC participation makes a firm vulnerable to specific shocks to this value chain, it lessens a firm's vulnerability to localized shocks. The World Bank found that for more than 90% of so-called country-sector pairs worldwide, output volatility generated by GVC-related demand shocks is lower than under alternative scenarios of a lower market differentiation. For most economies and sectors, the exposure to domestic shocks is more important because domestic production is less diversified and regional trade (e.g. trade with areas that are more economically integrated) is an intermediate solution.

4.4 Trade and global supply chains provide options for substitution

4.8. The WTO Secretariat provided evidence that trade and global supply chains facilitate substitution across products and suppliers, which can contribute to increasing resilience. Two examples were provided.⁷ The first one looked at the effects of the war in Ukraine on trade in food products, more specifically trade in sunflower oil which had been particularly affected in 2022. Despite this shock, net food importing economies had been able to substitute imports of sunflower oil with imports of rapeseed oil, which had registered a strong immediate increase in its trade volume as a substitute for sunflower oil. Similar patterns had been observed for wheat and rice, which are also substitutable to some degree. In both cases, international trade had provided access to substitute inputs. The same had happened to substitution across trade partners. For example, Ethiopia and Egypt, two economies that were highly dependent on imports of wheat from the Black Sea region, had been able to substitute their imports of wheat from the United States and Argentina,

⁷ See also WTO World Trade Report 2023:
https://www.wto.org/english/res_e/publications_e/wtr23_e.htm.

in the case of Ethiopia, and from the European Union and the United States, in the case of Egypt, without major changes in trade volume of these imports.

4.5 Flexibility and adaptability

4.9. The speakers pointed out that trade and global supply chains provide better options to respond to demand volatility than, for instance, domestic or regional supply chains, which is a result of economies of scale. As an illustration, the WTO Secretariat recalled that during the COVID-19 pandemic, there was a sudden increase in the demand for medical goods. Trade in medical goods exhibited a yearly growth rate of 14.4% between 2019 and 2021, and in 2020 alone, world exports of personal protective products alone rose by 44.6%. In order to achieve this increase in scale over such a short period of time, WTO Members could not rely on the production capacity of a single economy but, rather, had to rely on efforts by a number of economies, and this could only be achieved through international trade.

4.10. Taking the example of high-tech and novel products, the WTO Secretariat observed that trade in global supply chains is crucial to the production and distribution of these products. For example, exports of COVID-19 vaccines increased from zero in 2020 (i.e. because the product did not exist) to 4.4 billion doses in 2021. In this case, only a small number of WTO Members had the capabilities to produce these goods, because the necessary know-how and technology to produce the goods was not available everywhere.

4.6 Diversification is essential to bolster resilience

4.11. According to the World Bank, over the last 20 years, the economic literature on diversification had considered the different dimensions of diversification in isolation. However, diversification needs to take into account the correlation among firms, sectors and markets. An ongoing project by the World Bank, the University of Geneva and the University of Paris, was trying to translate the concept of "phylogenetic biodiversity", which is used in biology to measure biodiversity, into economics ("*phyloeconomic*" diversity) to analyse the level of diversity of firms and export markets and their economic performance. Lessons learned from this project showed that firm diversity (firms that sell in several markets) matters the most, and that firm variation was the main driver of export diversity and resilience at the level of an individual economy. At the same time, the level of development, both of the exporter and the importer, plays a very important role, and greater firm export diversity is correlated with lower firm export volatility and less exit from markets.

4.12. The WTO Secretariat pointed to evidence which showed that flexibility was a determinant of resilience. Firms and economies with more flexibility, in particularly in their purchasing options from several partners, or buying products that can be substitutes, were generally more resilient. In addition, access to scale abroad can replace capacity that is not available in the domestic economy.

4.7 Availability of business continuity plans

4.13. The WCO Secretariat explained that the quick restoration of flow of goods in the aftermath of a supply chain shock was influenced by the level of preparedness of the different actors and by business continuity plans. The effectiveness of these plans is tested through stress tests. For example, the readiness of customs, including their emergency and business continuity management systems and procedures, plays a crucial role in how quickly the flow of goods can be restored. The speed at which the flow of goods can be restored includes the implementation of simplified and harmonised customs procedures, and the procedures in the case of a crisis. The use of technology for efficient processing and alignment with international standards and the establishment of, for example, emergency operation centres, procurement of fast deployable emergency infrastructure and improvement of staff readiness through training and standards operating procedures, were also vital factors to ensure business continuity in case of shocks.

4.8 Digitalization

4.14. One of the lessons learned from the COVID-19 pandemic had been the importance of digitalization of trade-related procedures, including the automation of procedures, the use of electronic documents, and the need to undertake other reforms which help reduce costs and make supply chains more agile in their responses to crises. While digitalization has a positive impact on

making customs procedures more efficient and less costly, it was also important for transparency, as more digitalization can lead to enhanced transparency for firms and market players.

5 GOVERNMENT AND INTERNATIONAL COORDINATION TO STRENGTHEN SUPPLY CHAIN RESILIENCE

5.1. On what governments and international cooperation could do to improve resilience, it was pointed out that the world was witnessing a transition from a highly integrated global economy to a world of "muddling through" (i.e. to manage to do something although you are not fully organized or prepared to do it). Governments were required to find answers to more complex questions, and there were more possibilities for mistake, as the measures taken may have undesired economic effects, both at home and abroad. Against this background, the speakers mentioned the following actions that could be taken to strengthen supply chains.

5.2 Enhancing international cooperation

5.2. As empirical evidence had shown, trade and supply chains had proven to be highly resilient during crises due to the flexibilities provided by the multilateral trading system. The resilience of trade supports broader economic resilience and to further improve this, cooperative solutions tend to be a much more efficient means to address bottlenecks because the sources of shocks are by definition unknown.

5.3. In a world which is undergoing a transition from a highly integrated global economy to a "world of muddling through", policymakers were under pressure from constituencies to accommodate and implement rapid and substantive measures to address all the existential threats of our time, which included inequality, over dependence on a few trade partners, environmental damage, or shifts in global economic dominance. In this situation, the role of international cooperation and international organizations is seen as important to help policy makers taking informed decisions.

5.4. International organizations, like the WTO, could serve as convenors between stakeholders and communities that traditionally have not met in order to facilitate discussions on issues that are interlinked (e.g. trade and security, trade and environment, etc.). In addition, international organizations should promote discussions among Members to find new approaches to address supply chain resilience.

5.3 Multilateral reduction of trade costs

5.5. Investing in the multilateral trading system, embedded by the WTO, provides importers and exporters with as many options as possible during crises, contributing to lowering trade costs multilaterally. On the contrary, raising trade costs selectively to address concentration and to force diversification could have the effect of reducing options and might not strengthen supply chain resilience in the future. In addition, addressing regulatory bottlenecks, increasing information flows and transparency and setting up more robust crisis response mechanisms might be additional aspects to strengthen supply chain resilience.

5.4 Strengthening transparency

5.6. Governments could help mitigate the impact of supply chain disruptions by being more transparent and sharing more information as greater transparency translated into better analysis and thus better policy targeting. In a world of increasing interdependence, trade partners should continue to interact and foster enduring relationships to arrive at mutually beneficial solutions and forge trust. Trade partners should avoid miscommunication: "cheating" could be used sometimes with the intent to recalibrate the balance of powers, the terms of trade between members, and to challenge established norms, but this could be a very dangerous long-term strategy because it might significantly erode constructive cooperation and eliminate trust.

5.5 Data as a public good

5.7. All speakers pointed out that better data, in particular at the firm level and in an international comparative manner was required to better analyse supply chain resilience. It was important for this data to be freely accessible to international organizations and academic researchers in order to

improve the understanding of how supply chain resilience can be achieved, while safeguarding business confidentiality of individual firms. It was pointed out that international organizations, like the WTO, could cooperate to create a data repository in this regard.

5.6 Collaboration with the private sector

5.8. Collaboration of both governments and international organizations with the private sector played a critical role during the COVID-19 pandemic, as the private sector has detailed knowledge of the most pressing problems. During the response phase, creating a disaster task force, adjusting work environments, expediting clearance procedures, and incorporating stress testing can improve the quality, stability and reliability of cross-border trade. In the recovery phase, designing a recovery planning team, assessing the situation and revising business continuity plans can aid in restoring the flow of goods.

5.7 Implementation of the WTO Trade Facilitation Agreement

5.9. From UNCTAD's perspective, there is a strong correlation between those WTO Members that had implemented provisions of the Trade Facilitation Agreement (TFA), such as in particular those on electronic payments (Article 7.2), risk management (Article 7.4), authorised operators (Article 7.7) and border agency cooperation (Article 8), and a higher "Country Container Port Performance Index". In addition, there seems to be a need to invest in port infrastructure and logistics to ensure that cross border trade remains open and smooth.

ANNEX

PRESENTATION BY VICTOR STOLZENBURG – WORLD TRADE ORGANIZATION




Committee on Market Access – Thematic Session on Supply Chain Resilience

Insights from research on supply chain resilience


Victor Stolzenburg
World Trade Organization

Geneva, 21 November 2023



Definitions

- There is no consensus on the definition and concept of “resilience”, nor on how to measure it.
- The WTO World Trade Report 2021 adopts a broad definition:
Resilience is the ability of a system to prevent and prepare for, cope with, and recover from shocks.
- This differs from narrower definitions (e.g. Miroudot, 2020) that define:
 - *resilience* as the ability of a system to return to normal operations over an acceptable period after a shockin contrast to
 - *robustness*, the ability to maintain operations during a crisis.



1

Definitions



- A broader definition is sensible because
 - the primary aim is to minimize output losses which can be achieved both by resilience and robustness.
 - data typically does not allow to differentiate.
 - differences mainly reflective of specific industry characteristics.
- Differences in definitions provide insights into better policy responses.

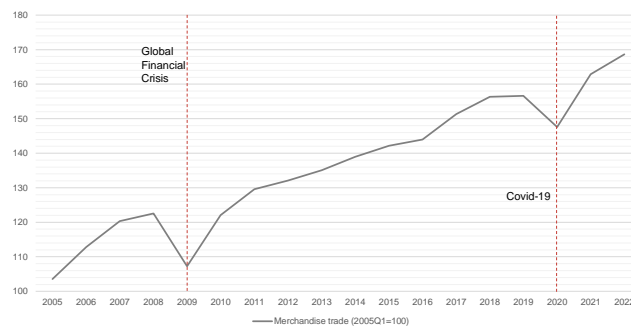


2

The evidence on supply chain resilience



- **Despite disruptions, evidence shows that trade and global supply chains are highly resilient.**



3

The evidence on supply chain resilience



- **As a result, trade and global supply chains mitigate the impact of shocks.**
 - Global GDP contraction during the pandemic would have been larger in case of nationalized supply chains (Bonadio et al. 2021, OECD 2021).
 - Firms integrated in global supply chains were on average more resilient than domestic firms (Ghose and Montfaucon, 2023).
 - More localized supply chains do not result in a significant increase in the stability of GDP, production and consumption relative to *interconnected* regimes (Caselli 2020, OECD 2021).

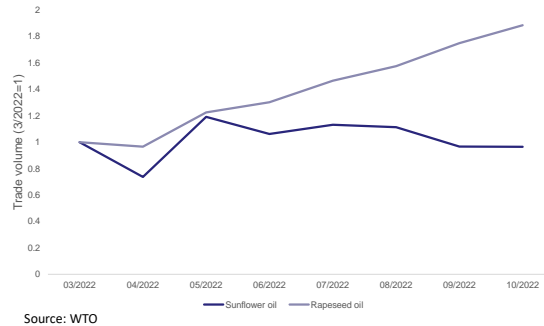


4

The evidence on supply chain resilience



They do so by providing options for substitution across products...

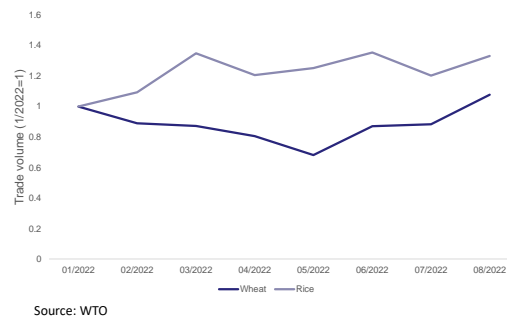


5

The evidence on supply chain resilience



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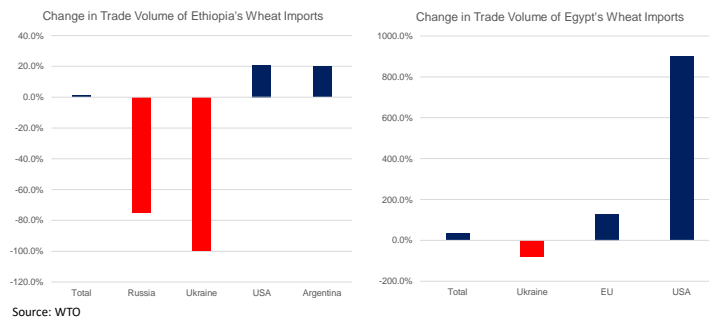


6

The evidence on supply chain resilience



... and across exporters, especially via the multilateral trading system.



7

The evidence on supply chain resilience



- **Due to scale requirements, supply chains are particularly crucial to respond to demand volatility.**
 - Trade in medical goods exhibited a yearly growth rate of 14.4 per cent between 2019 and 2021. In 2020, world exports of personal protective products alone rose by 44.6 per cent (WTO, 2022).
- **Due to technological requirements, supply chains are particularly crucial to distribute high-tech and novel products.**
 - Exports of COVID-19 vaccine doses increased from nearly zero in 2020 to 4.4 billion in all of 2021 (World Bank and WTO, 2022).



8

Determinants of resilience and issues



- **Flexibility (options) and adaptability (access to scale and capabilities).**
 - NTMs such as port of entry requirements severely aggravated the impact of the pandemic on Indonesian exporters (Ghose and Montfaucon, 2023).
 - Uncoordinated policy responses aggravated the impact of the pandemic (Baldwin and Evenett, 2020).
 - Underinvestment in central infrastructure and regulatory issues can create bottlenecks (Baldwin and Evenett, 2020).
 - High concentration of production severely aggravated the 2022 infant formula crisis in the United States (WTO, 2023).

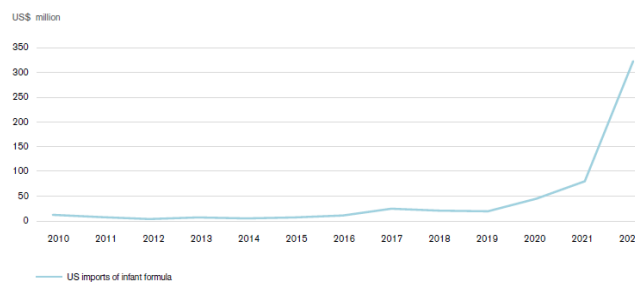


9

Determinants of resilience and issues



Figure C.J: Imports were critical to respond to the infant formula shortage in the United States

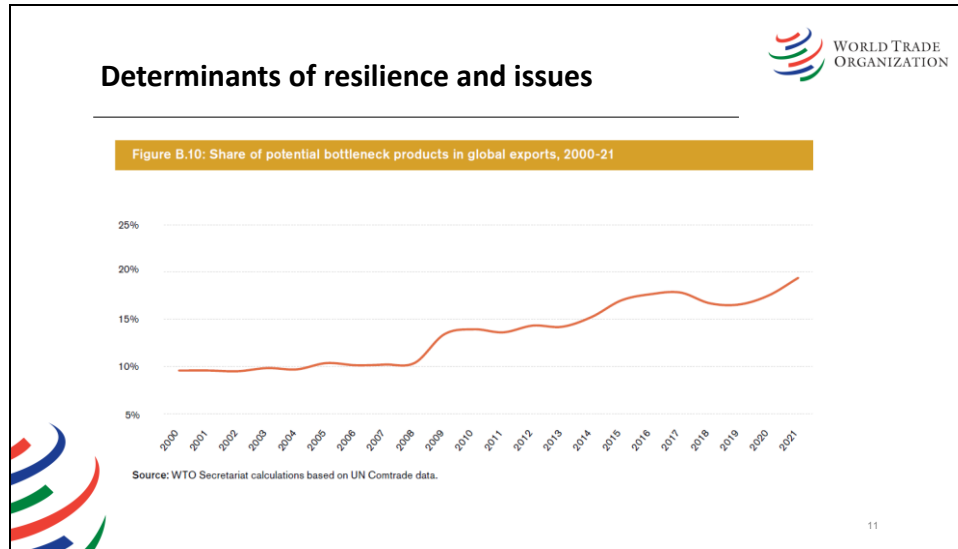


Source: Source: WTO based on US Census data.

Notes: Imports of baby formula approximated by data on imports of HS code 190110 "Food Preparations For Infants".



10



Solutions

- **Some solutions require highly context-specific approaches.**
 - Different solutions exist to further increase resilience: diversification (WTO, 2021), inventories (Lafrogne-Joussier, 2023), strong relationships (Khanna et al. 2022).
 - Optimal solution tends to depend on industry characteristics: relationship-specificity.

Solutions

- **Other solutions are more generic.**
 - Investing in the multilateral trading system to provide importers and exporters as many options as possible during crises.
 - Lowering trade costs multilaterally increases options and allows for ex-post diversification (WTO 2023, Lafrogne-Joussier et al. 2023).
 - Raising trade costs selectively to force diversification tends to reduce options.
 - Addressing infrastructure and regulatory bottlenecks identified during the pandemic.
 - Increasing information flow and transparency and set up robust crisis response mechanisms.

Takeaways



- 1. Trade and supply chains are highly resilient due to the flexibilities provided by the multilateral trading system.**
- 2. The resilience of trade supports broader economic resilience by providing options during crises.**
- 3. Cooperative solutions are the most efficient means to address bottlenecks and concentration, especially when the source of shocks is unknown.**

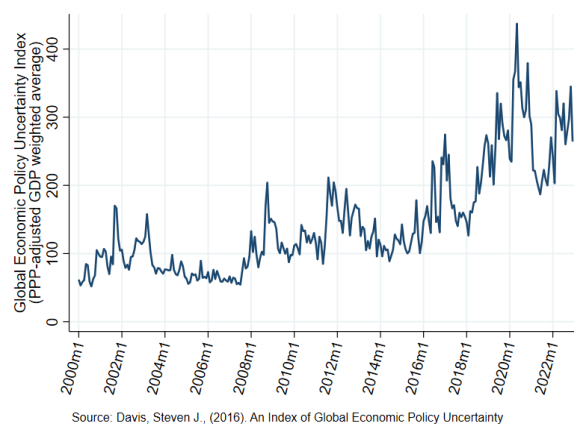


PRESENTATION BY DARIA TAGLIONI – WORLD BANK

Research on Supply Chain Resilience at the World Bank: Some Insights

Daria Taglioni, World Bank

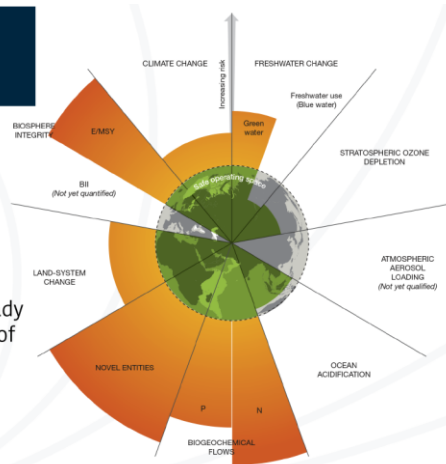
November 21, 2023



1. Many dimensions to the vulnerability and resilience problem

BUSINESS AS USUAL IS UNSUSTAINABLE...

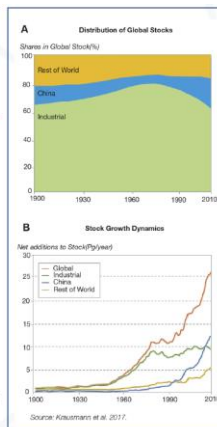
- Materials consumption accounts for
 - 90% of total biodiversity loss
 - Up to 2/3 of global GHG emissions
 - 33% of health impacts due to air pollution
 - Deforestation, soil depletion and water stress
- Current demand for global natural resources already exceeds Earth's regenerative capacity by a factor of 1.75 (2 planets in 2050)



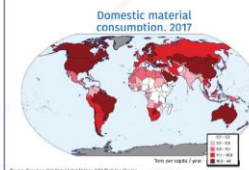
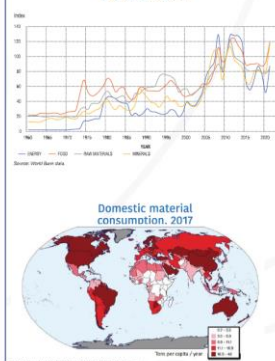
Source: Stockholm Resilience Center, based on Steffen et al. (2015); and Persson et al. (2022).

...ACROSS A NUMBER OF DEVELOPMENT DIMENSIONS

- Direct environmental impacts** are increasingly offshored to LDCs/MICs
- Security of supply**
 - Physical vs economic scarcity
 - Commodity price shocks
- Global equity**
 - Average per capita consumption = about 13 tons of materials
 - Extremely uneven distribution globally
 - When measured in terms of global stocks, rather than yearly flows, the material divide is even starker.

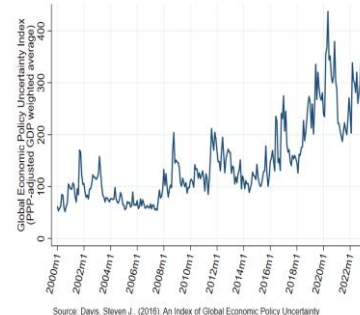


Trends in key commodities prices, 1961-2021



Solutions to existential threats are required at a time in which the global economy is severely under stress

- **Near Term:** Higher than expected global growth in 2023 due to strength of US economy and EMEs minus China - but overall weak growth due to inflation concerns and geopolitical tensions.
- **Medium Term:** Falling potential growth due to weakening structural factors – increase natural and man-made shocks, adverse demographics, record high debt levels, and investment shortfalls in most parts of the world.
- **Many risks:** financial distress, debt overhang, food prices, climate and environmental shocks, trade fragmentation.
- **Trade specific risks:** US-China decoupling and fragmentation are costly for trade, investment and innovation; supply bottlenecks have global propagation.

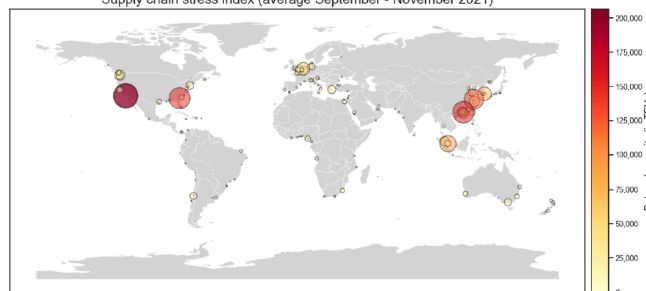


Relatively few chokepoints create global disruptions

Asia => Mostly pandemic related should diminish

US=> Systemic likely to persist with strong demand well into 2022.

Supply chain stress index (average September - November 2021)



2.

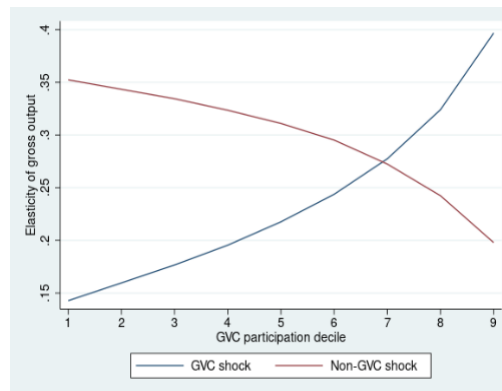
Some conceptual and measurement considerations to the evaluation of exposure and resilience to shocks

2.1

Lot of talk about resilience to foreign shocks. But what is the cost of excessive exposure to domestic shocks?

Even in a world where there is risk, it is not obvious that deglobalization is the optimal policy response

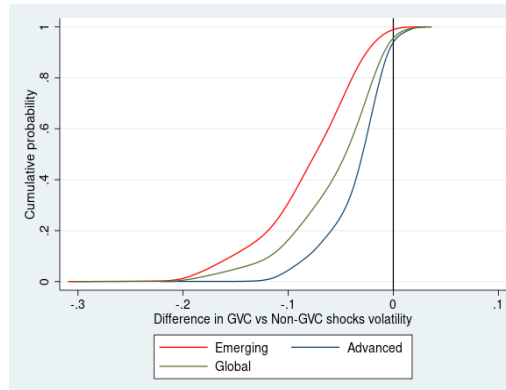
Output elasticity to GVC and non-GVC demand shocks



Source: Borin, Mancini, Taglioni ([World Bank 2021](#) and [VOXEU 2022](#))

For more than 90% of country-sector pairs worldwide, output volatility generated by GVC-related demand shocks is lower than under alternative scenarios that post lower market differentiation.

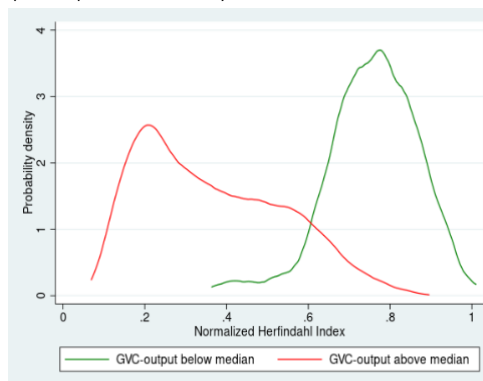
Output elasticity to GVC and non-GVC demand shocks



Source: Borin, Mancini, Taglioni ([World Bank 2021](#) and [VOXEU 2022](#))

GVC participation is associated with greater market diversification

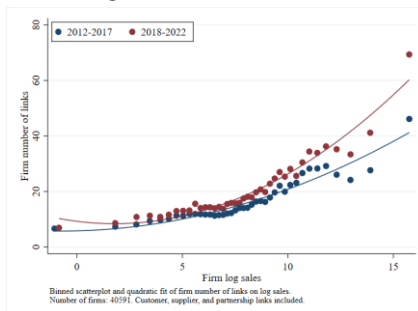
Normalised Herfindal-Hirschman Index (HHI) of final market concentration, by GVC participation intensity



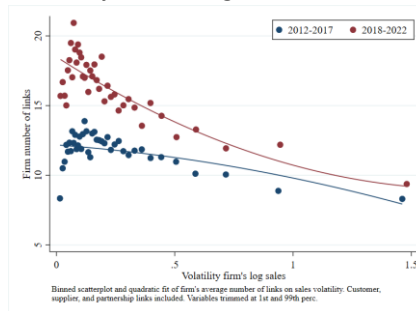
Source: Borin, Mancini, Taglioni ([World Bank 2021](#) and [VOXEU 2022](#))

More interconnected firms have posted better economic performance even in turbulent times

Firm log sales



Volatility of firm's log sales

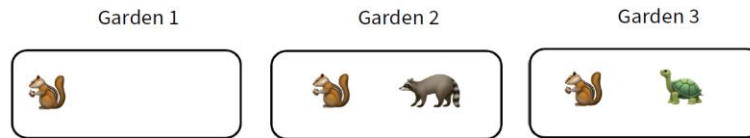


Source: Beck and Taglioni, work in progress

2.2

Importance of measuring diversity in a way that accounts for the covariance between dimensions (firm, sector, market)

Phylogenetic Biodiversity



Biodiversity is greater in Garden 3 than in Garden 2 because the genetic distance between species is greater.

Source: Crozet et al., work in progress

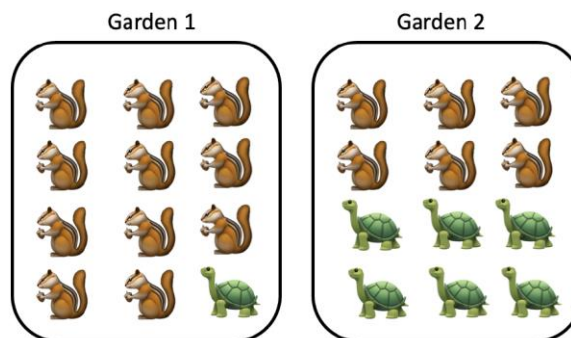
Phylogenetic Phyloeconomic diversity



Firm 3's trade is more diversified because the economic/geographical distance between Canada and Cambodia is greater than between Canada and the United States.

Source: Crozet et al., work in progress

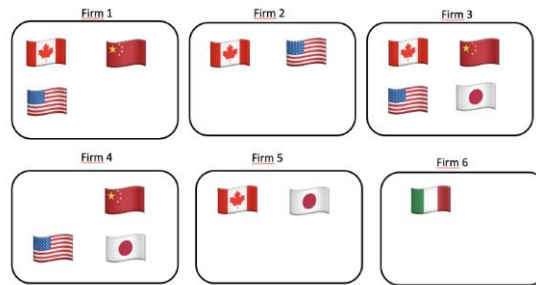
Phylogenetic Phyloeconomic diversity



Biodiversity is greater in garden 2

Source: Crozet et al., work in progress

Singularity



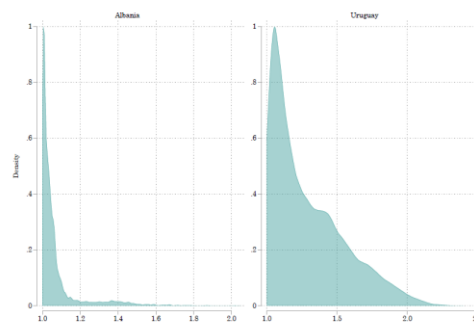
Firm 6 has the lowest level of diversity... but its portfolio is very different from that of the other firms

Firm 6 contributes significantly to the trade diversity at the national level

Source: Crozet et al., work in progress

A tale of two countries: very different dispersion in firms' export diversity

Figure 1: Density plots of firm export diversity index



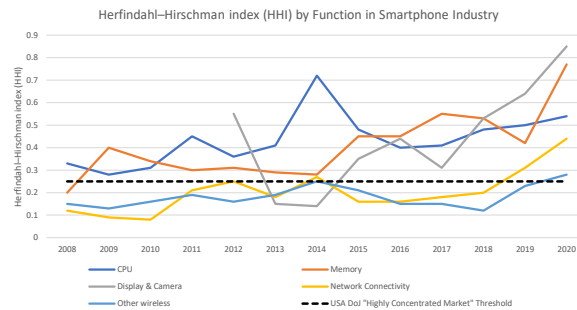
Note: Diversity indexes based on geographic distances. All years of data for each country used in the country's plot.

Source: Crozet et al., work in progress

Lessons from phyloeconomic diversity

- Firm diversity matters most: firm variation is the main driver of export diversity at the country level
- Level of development matters
- Greater firm export diversity is correlated with lower firm export volatility
- Greater firm export diversity reduces exit from export markets

Concentration and fragmentation: global firms have fewer suppliers to choose from, particularly in smartphones and other ICT products.



Source: Thun, Taglioni, Sturgeon and Dallas, 2022 "Massive Modularity: Understanding Industry Organization in the Digital Age – The Case of Mobile Phone Handsets". World Bank Policy Research paper 10164 and [VOXEU column](#).

Note: The study is based on evidence from pooled longitudinal data from 456 mobile phone handsets introduced between 2008 and 2019; 15,544 hardware components; nearly 10 million company contributions to various releases of Google's Android operating system from 2008–2020, and data on about 16,000 company contributions to each generation of mobile telecom standards from 2001–2019

Geographic Clustering and Dispersion: functions in these global industries are increasingly clustered in geographically dispersed locations

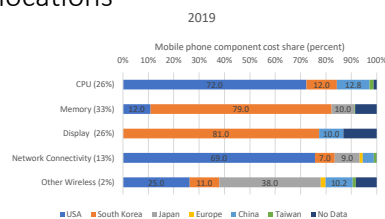
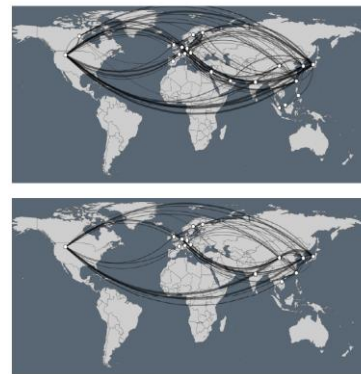


Table 2: Geographic clustering in mobile phone production, by function classes

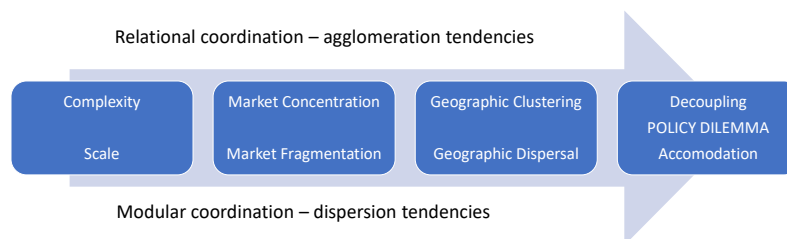
Min.	<2009	2009-2012	2013-2017	2018-2020
1. Apps and Baseband	0.72	0.82	0.79	0.83
2. Camera	0.46	0.32	0.53	0.98
3. Display/Touchscreen	0.28	0.47	0.40	0.77
4. Memory	0.43	0.53	0.52	0.65
5. Radio Frequency / Power Amplifier	0.41	0.44	0.49	0.67
6. Wireless Module	0.41	0.38	0.40	0.49

Notes: The table reports the HHI calculated for each function class f as $HHI_f = \sum_{i=1}^n s_i^2$, where i denotes supplier countries, and s_i is the market share of that country in the total value (cost share) of components belonging to that function.

Figure 1: Supply chain of mobile phone handsets before 2012 (top panel) and after 2017 (bottom panel)



Massively modular industrial organization contradictory tendencies



Source: Thun, Taglioni, Sturgeon and Dallas, 2022 "Massive Modularity: Understanding Industry Organization in the Digital Age – The Case of Mobile Phone Handsets". World Bank Policy Research paper 10164 and [VOXEU column](#).

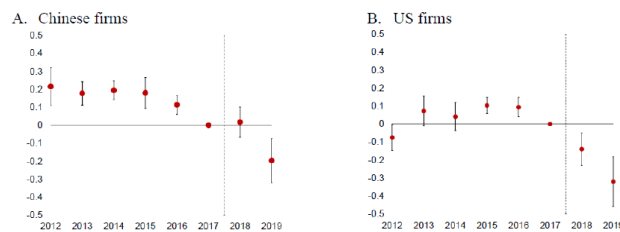
Partial decoupling costly or unattainable while full decoupling may be fatal, in massively modular industries

Partial import substitution - risks:	Full decoupling - risks:
<ul style="list-style-type: none"> • High capital costs • Reshoring in one segment may create a spate of new import dependencies • Industrial segment selected by the policy maker may not be the correct one 	<ul style="list-style-type: none"> • Very high capital costs • Possible systemic failure • Loss of export scale/revenue (walled garden), including in complements
	<ul style="list-style-type: none"> • Early obsolescence of lumpy, non-market-driven investments • Accelerated brain drain • Loss of product and system functionality
In both cases: <ul style="list-style-type: none"> • Interruptions in ongoing collaborative technological learning across the MME, possibly including learning from global standard-setting activities and participation in open-source projects. • Interruptions in human resource development. 	

Source: Thun, Taglioni, Sturgeon and Dallas, 2022 "[Massive Modularity: Understanding Industry Organization in the Digital Age – The Case of Mobile Phone Handsets](#)". World Bank Policy Research paper 10164.

Trade wars hurt innovation

Measures taken after 2018 adversely affected innovation of Chinese firms which had prior collaborations with the US—and US firms which had prior collaborations with China

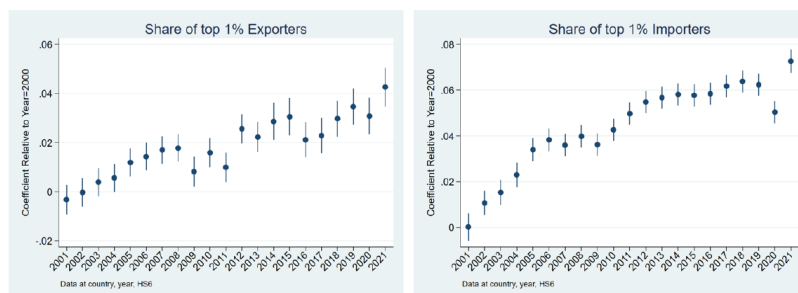


Source: Patent applications at EPO, WIPO and USPTO.

Note: Event study plots of the patent applications of US (Chinese) firms with collaborations before 2018 with inventors in China (US).

Source: De Nicola, Mattio, Timmis (work in progress).

Higher costs lead to increasingly concentrated imports and exports

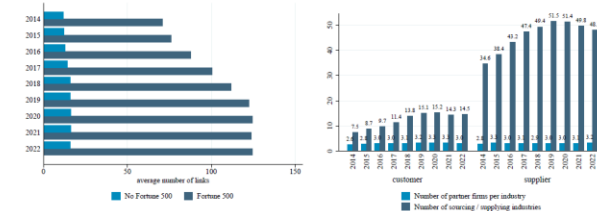


Note: Coefficients based on regressions on country-product year (HSE) fixed effects, to control for changes in country and sector composition of the sample

Fortune 500 agri-business firms are central to the network

Average number of links substantially larger

Complex network with customer and supplier links to many different industries

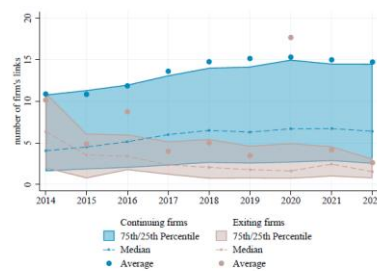


Note: The left graph shows the average number of customer and supplier links for actively covered Fortune 500 agri-business companies and other firms over time. The right graph shows the average number of suppliers (customers) per NAICS 6-digit industry (light blue bars) for the sample of actively covered Fortune 500 agribusiness companies for 2014 to 2022, as well as the average number of industries to which the firm maintains direct customer or supplier links in a given year (dark blue bars).

Source: Beck, Lin, and Taglioni (2023).

Exiting firms tend to be less connected

Firm survival and connectedness



Note: The graph displays the 25th, 50th, and 75th percentiles, as well as the average number of supplier and customer links for exiting and continuing firms. The sample comprises actively covered agri-business firms in a given year, meaning firms that appear as source companies in at least one record. Exiting firms are defined as those firms without a relationship record in the subsequent period. The number of total links is calculated by summing a firm's supplier and customer links in a given year, adjusting for the duration of the link's operation during the year.

Source: Beck, Lin, and Taglioni (2023).

3. What to do then? The role of international cooperation

From a globally integrated economy to a world of muddling through

- **We are witnessing a transition from a highly integrated global economy to a world of 'muddling through'.** It would be a mistake to assume that this is due to a disconnect of policy makers from reality. We must acknowledge that the reality has changed.
- **Policymakers are under pressure to implement quick, big, and visible measures to address inequality and deindustrialization, overdependence on a few trade partners, environmental damage, or shifts in global economic dominance.** Their citizens expect them to be active across complex agendas—from securing the supply of essential goods, to cushioning impacts of unexpected shocks, to solving global emergencies such as climate change.
- **While the complexity and inter-relatedness of decisions that governments need to take is daunting, the scope for discretion (and distortions) in taking these decisions has increased proportionately.** Rules and governance frameworks conceived in less turbulent times are easily side-stepped, and new actors such as the defense or the environmental community are called to contribute to economic decision making.
- **This is a reality in which there is greater scope for mistakes, and in which measures adopted can lead to serious unintended economic effects, both at home and abroad.**

What should international organizations do in this changed political-economic context?

- It is lot harder for governments to navigate a world of “muddling through”, particularly under pressure to act fast.
 - It involves lot of case-by-case decisions, tough trade-offs, and ample scope for mistakes.
 - Since this is not going to go away any time soon, international organizations must produce ways to help decision makers take informed decisions.
- There are **three** roles for international organizations to play:
 - Conveners to discuss differences on issues at the intersection of previously distinct topics: such as economics and security, economics and the environment.
 - Promoting new approaches to leveraging cross-border relationship-specificities (in a world in which global interdependence is not going to go away).
 - Data and knowledge source to inform policies.

How can governments help international organizations help them?

- **Share transparently and in a timely fashion information about their economies, and policies.**
- **Internalize in their decision and negotiating process the risks of zero-sum game strategies.** World Bank ongoing research which utilizes evolutionary game theory identifies three pivotal factors in international trade relations to evade a destructive competitive downward spiral and to forge trust and mutually beneficial solutions:
 - Repeated Interactions:** Amidst the political polarization and leadership changes of recent years, changing course has become indispensable. Fostering enduring relationships between global decision makers is necessary to establish the level of trust needed for collective action.
 - Mutually Beneficial Solutions:** The prevalent zero-sum perspective on international economic relations must be supplanted by genuine, mutually beneficial concessions to circumvent a destructive competitive dynamic.
 - Avoid Miscommunication:** "cheating" is sometimes used with the intent to recalibrate balance of power between countries and challenge established norms, but analysis indicates that this erodes significantly constructive global cooperation.

PRESENTATION BY JAN HOFFMANN - UNCTAD



WORLD TRADE
ORGANIZATION

COMMITTEE ON MARKET ACCESS

THEMATIC SESSION ON SUPPLY CHAIN RESILIENCE:
INTRODUCTORY SESSION WITH INTERNATIONAL ORGANIZATIONS

21 November 2023, 10:00-13:00 (CET)

Perspectives from trade logistics
Jan.Hoffmann@UNCTAD.org

UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT
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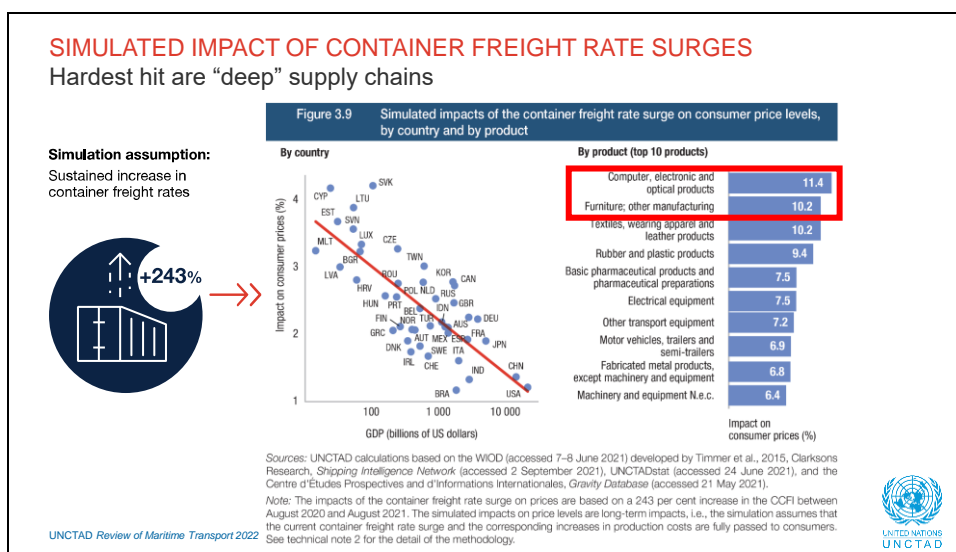
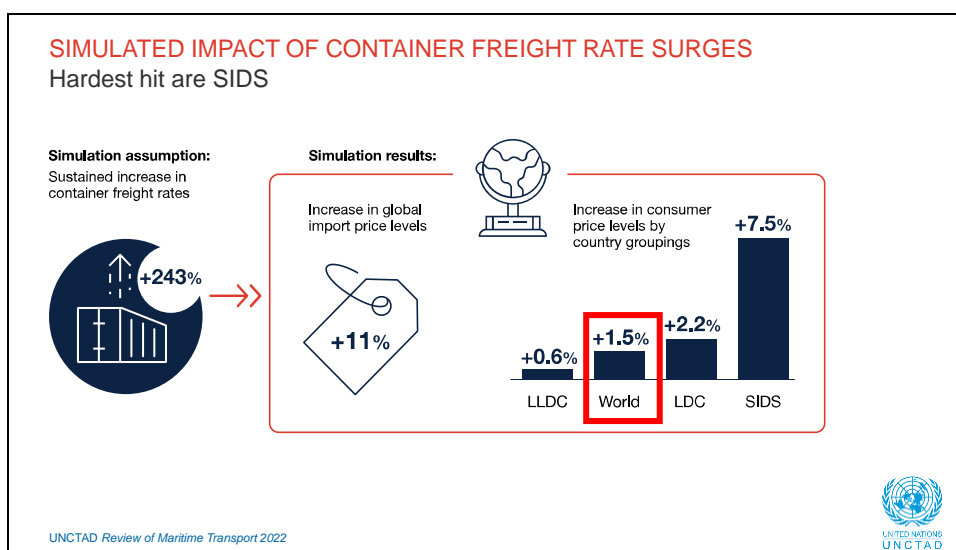
- 1) Supply chains matter**
for prices, employment and development
- 2) Positive long-term trends**
interrupted
- 3) Outlook**
and what can be done in trade logistics



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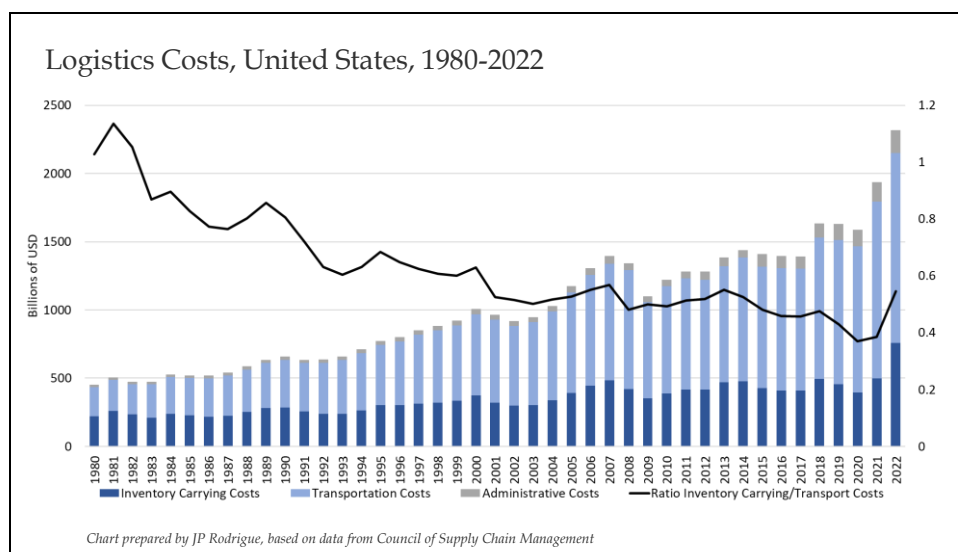
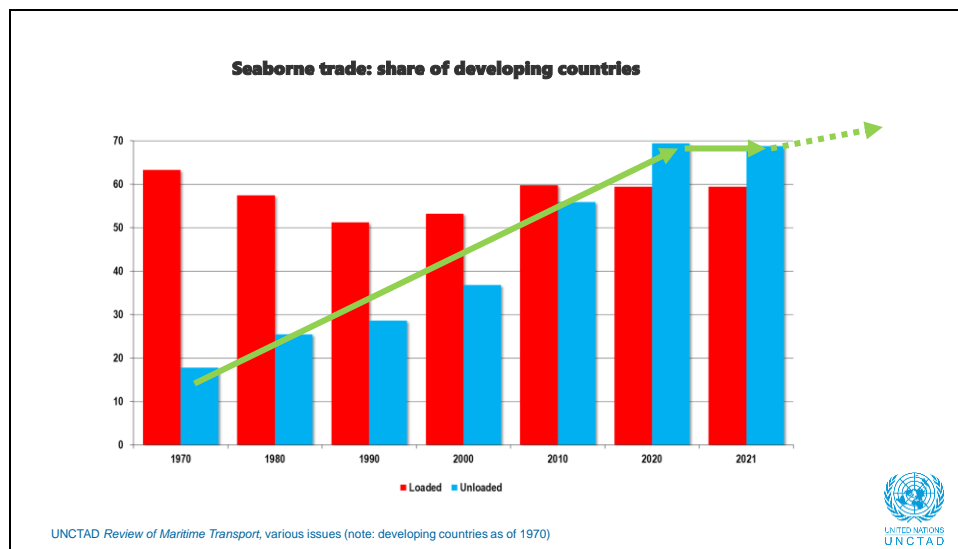
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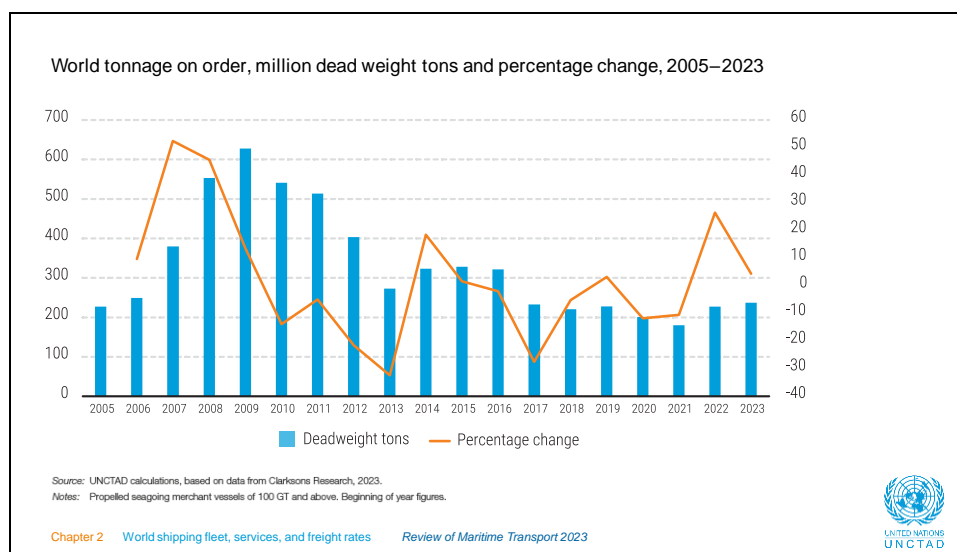
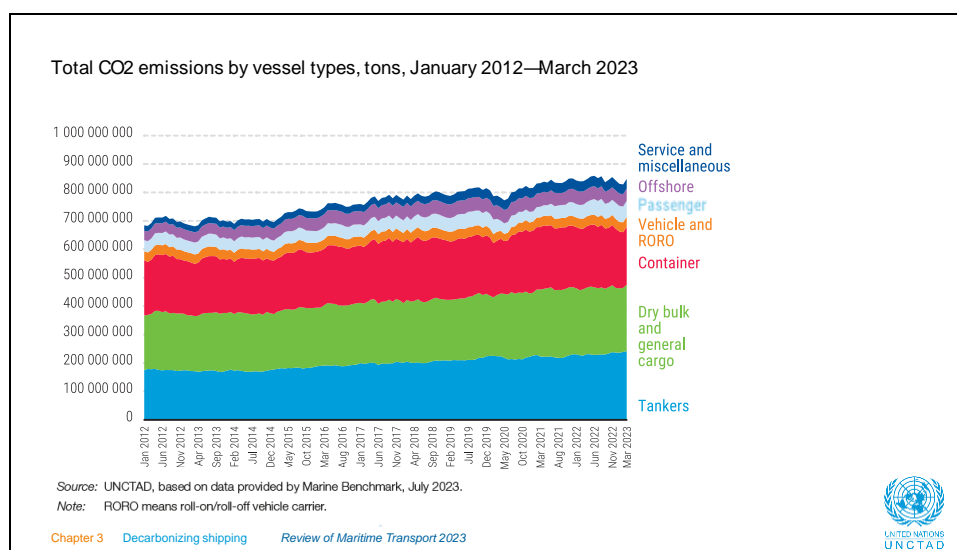
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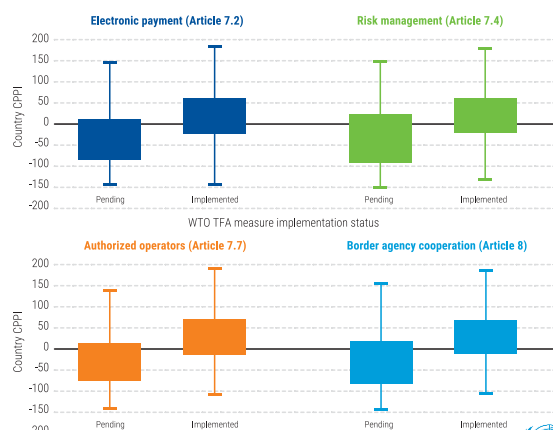



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and what can be done in trade logistics

Country Container Port
Performance Index values 2022 by
implementation status of selected
measures under the WTO Trade
Facilitation Agreement



Source: UNCTAD, based on data from the Container Port Performance Index 2022 and the WTO Trade Facilitation Agreement.

Note: Country grouping implementation status based on the WTO TFA articles. Distribution showing port efficiency according to the 2022 Container Port Performance Index, of the World Bank and UNCTAD, grouped by the implementation Agreement status. The middle line represents the median, the top and bottom line of the box represent the first and third quartile, and the top and the bottom line (the whisker) represent the minimum and the maximum values (excluding outliers).

Chapter 4 Port performance and maritime trade and transport facilitation *Review of Maritime Transport 2023*



 **Global Supply Chain Forum**
Barbados 21–24 May 2024

<https://unctad.org/conference/global-supply-chain-forum-2024>

<https://resilientmaritimelogistics.unctad.org/>

 Ian.Hoffmann@UNCTAD.org 



PRESENTATION BY LAZZAT DANIYAROVA – WORLD CUSTOMS ORGANIZATIONS



World Customs Organization

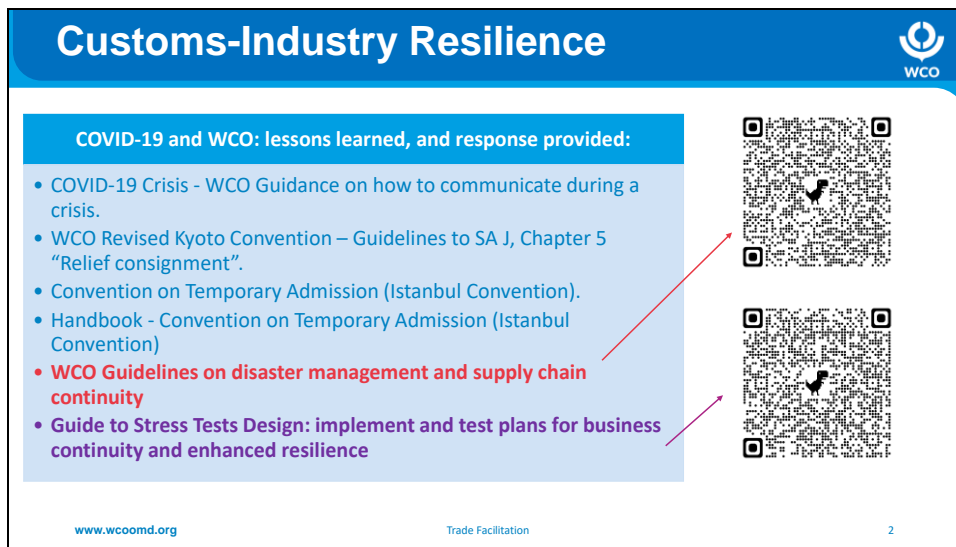
Supply chain resilience

Lazzat Daniyarova
Compliance and Facilitation Directorate
World Customs Organization

**COMMITTEE ON MARKET ACCESS
THEMATIC SESSION ON SUPPLY CHAIN RESILIENCE:
INTRODUCTORY SESSION WITH INTERNATIONAL
ORGANIZATIONS**

21 November 2023

www.wcoomd.org Trade Facilitation 1



Customs-Industry Resilience

COVID-19 and WCO: lessons learned, and response provided:

- COVID-19 Crisis - WCO Guidance on how to communicate during a crisis.
- WCO Revised Kyoto Convention – Guidelines to SA J, Chapter 5 “Relief consignment”.
- Convention on Temporary Admission (Istanbul Convention).
- Handbook - Convention on Temporary Admission (Istanbul Convention)
- **WCO Guidelines on disaster management and supply chain continuity**
- **Guide to Stress Tests Design: implement and test plans for business continuity and enhanced resilience**

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Customs-Industry Resilience



At the 241st/242nd Sessions of the WCO Permanent Technical Committee (PTC), Australia, in its capacity as WCO APVC, presented the draft Concept Note: "Strengthening Customs-Industry Resilience" (24-26 October 2023).

It recognizes that Customs was a critical first responder during the COVID-19 pandemic, with uncertainty caused by the rapid closure of borders and the suspension of travel.

The Concept Note suggests that a standard definition of resilience be endorsed and included in the WCO Glossary of Customs terms.

The document elaborates on the symbiotic relationship between Customs and industry.

The PTC expressed its general support for the draft Concept Note and endorsed a standard definition of "resilience" for inclusion in the WCO Glossary of Customs terms. Additionally, the PTC provided guidance on the way forward, stressing the importance of digitalization and of close partnership between Customs and the private sector.

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Customs-Industry Resilience



Definition of "resilience"

- *An entity's preparedness and readiness to anticipate, prevent, absorb, adapt, recover and evolve from the full spectrum of natural and human-induced crises to ensure the continued delivery of critical goods and services (wco Glossary of Customs terms).*

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Customs-Industry Resilience



HOW

do shocks affect the movement of goods through supply chains?

- border closures
- travel restrictions
- intensive screening procedures

WHAT

affects how quickly the flow of goods can be restored?

- Business Continuity Plans (BCPs)
- stress tests
- Emergency Operations Centers
- Standard Operating Procedures (SOPs)

WHERE


can government action and international coordination help to prepare supply chains for shocks, or help to restore the flow of goods following a shock?


- disaster management (reviewing national Customs legal frameworks, and advocating for the licensing/registration of humanitarian actors)
- response phase (creating a disaster task force, adjusting work environments, and expediting clearance processes)
- recovery phase (designing a recovery planning team, assessing the situation, and revising Business Continuity Plans and SOP)

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5






World Customs
Organization

Thank you

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6