



Pandemic, War, and Global Value Chains¹

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The COVID-19 pandemic and the war in Ukraine have shaken confidence in the reliability of fragmented global value chains (GVCs) as a means to integrate the global economy. Supply-chain disruptions during the pandemic boosted the voices of those claiming that cost optimization achieved through GVCs came at the cost of reduced resilience in the face of localized shocks that tend to affect whole chains. The war in Ukraine, meanwhile, has raised the profile of geopolitical risks as an additional factor to be reckoned with in the configuration of – and reliance on – GVCs. The pandemic and the war, followed by commodity price shocks and together with more frequent weather-related shocks, have comprised what has been called a [“perfect storm”](#) (Canuto, 2020) hitting the global economy.

These arguments had already been raised, but the pandemic and the war have made them more persistent and louder. They have been accompanied by calls for re-shoring or near-shoring of GVCs, with ‘friend-shoring’ to minimize geopolitical risks. The great development of logistics and transport across the world's industrial clusters allowed ‘just-in-time’ manufacturing to become the main adopted production model. However, to maximize resilience against shocks, there should now be a move to a ‘just-in-case’ model. This might be costly but would reflect a trade-off between efficiency and resilience.

In this policy paper, we examine two of the issues in this debate. First, we highlight the distinction between the private- and public-sector decision-making about the trade-off between efficiency and resilience to shocks. For the private sector, i.e. the perspective of GVC owners/managers, the move toward ‘just-in-case’ tends to be constrained by cost and competitiveness implications. It may well end up being limited to inventory piling in some links of the chains, occasionally including duplication and geographical spread of some of those links. If the public sector—i.e. the ‘industrial policies’ perspective—wants the reconfiguration to go beyond that, it will have to bear the economic cost and implement the necessary tax/subsidies to cover it in their corresponding countries.

Second, we show some evidence against the argument that relying on GVCs makes an economy more vulnerable to shocks. Reliance on foreign inputs did not jeopardize economic recovery in manufacturing during the pandemic times when there was sustained disruption in GVCs. Retrenchment of GVCs to closer locations may also expose them to local shocks, without the

possibility of using alternative sources abroad. Reshoring and nearshoring do not necessarily correspond to the optimum point in the efficiency-resilience trade-off.

1. The Pandemic and the War in Ukraine Will Lead to a Relative ‘Deglobalization’

The reliance on geographically dispersed input producers can lead to the disruption of production when countries along the chain experience a negative shock, whether a natural disaster, a pandemic, or a war that leads to economic sanctions. The COVID-19 pandemic and the war in Ukraine have underlined such risks in relation to trade integration and full-fledged GVCs. The Japan earthquake in 2011 previously showed their vulnerability to weather-related hazards.

The ‘just-in-time’ model of production and the globalization of supply chains are being questioned today. Several large companies, in the automotive and electronic sectors for example¹, have begun to move gradually towards ‘just-in-case’ models, which consist of stocking raw materials and intermediate inputs in advance, while always keeping a stock of finished products available. These companies are also starting to move towards local and regional supply chains, thus supposedly reinforcing ‘economic sovereignty’. For example, the European Commission has said it wants to double the European Union’s market share of semiconductor production² to 20% of global production by the end of the decade, thus reducing EU dependence on Asian suppliers, as more than half of the EU’s semiconductor needs are met by imports from Taiwan.

Supply Chain Trade-offs between Efficiency and Resilience to Shocks: the GVC

Perspective

It is worth distinguishing between the perspectives on supply chain trade-offs of GVC managers and policymakers. How far will firms go to respond to possible future shocks by reconsidering the balance between efficiency and resilience in production, leading to long-term changes in the structure of GVCs in the form of reshoring, nearshoring, and diversification, and even the

¹ Financial Times article: “Supply chains: companies shift from ‘just in time’ to ‘just in case’ “, 2021

² Semiconductors are critical components in the manufacturing of a variety of products, ranging from smartphones and cars, to critical applications and infrastructure for healthcare, energy, communications, and industrial automation.

reversal of globalization (Canuto, 2022)?

As happened in the events following the Japan tsunami in 2011, severe supply disruptions during the pandemic affecting everything from auto parts and consumer electronics to protective equipment, have highlighted the existence of risks from concentrating too much production and sourcing in a small number of distant low-cost locations, and from overreliance on just-in-time inventory management. Rising tariffs, restrictions on market access, and other manifestations of geopolitical frictions may also lead some companies to revisit their supply chains.

In some cases, it might be decided that it pays to adopt more regional, ‘multilocal’ sourcing and manufacturing footprints, while keeping larger ‘safety stocks’ in inventory—even if these options entail somewhat higher costs. It can be said, in fact, that ‘deglobalization’, whether understood as economic segmentation between regions for geopolitical reasons or as a search for a greater degree of self-sufficiency by national economies, will take some time and has not yet started. However, this resilience seeking can be hampered by some economic reasons, such as cost optimizing considerations.

Consider the argument of seeking resilience in the face of shocks that, when reaching some point in GVCs, impact the integrated value chain. However, the effects of local shocks would also be maximized without the existence of chains abroad.

Furthermore, the configuration of global or regional chains is not accidental, but rather has happened for reasons of cost efficiency. Abandoning such configurations would involve costs. In many sectors, companies may choose to incur such costs, accumulating inventories at points in the chains and/or duplicating segments of chains at different geographical points. But the microeconomic incentives faced by companies place limits on the cost-benefit calculation of giving up cost efficiency to achieve resilience to shocks.

The technological and economic factors that have led over several decades to the international fragmentation of production remain, making a full retrenchment of GVCs unlikely, from the standpoint of their managers. The structure of GVCs is determined by fundamentals—technology, endowments, distance, etc.—and by policies that affect the cost of trade (World Bank, 2020). Technological innovations that reduced the costs of communication, as well as

wage differentials across countries, are still relevant even after a negative shock, and firms will take them into account for reasons of efficiency and competitiveness. A comprehensive retrenchment of GVCs therefore seems unlikely, except where changes in the policy environment radically affect trade costs.

The search for greater resilience against shocks will vary by industrial sector. Some industries have already been showing signs of locating production closer to customers, especially when the adoption of advanced Industry 4.0 manufacturing systems offsets higher labor costs (Canuto, 2017). Medical equipment, biopharmaceutical products, semiconductors, and consumer electronics, for instance, are likely candidates to also be subject to geopolitical and government pressures. The consequence of COVID-19 and the war in Ukraine will be a greater weight given to those considerations.

The war in Ukraine may lead to a reshaping of GVCs where there are links in countries where the geopolitical risks are greater, but this falls short of reversing globalization. Greater geopolitical risk raises the insurance premium firms need to pay—or carry—to cover the risk of future production disruptions in a foreign country that could be caused by economic sanctions or conflict. For a firm, the risk of disruption rises alongside its reliance on imports from the country at risk, so more-exposed firms are more likely to leave to avoid paying higher insurance costs.

However, several factors point to limits to the extent of that reshaping (Ruta, 2022). Cost differentials between countries are not affected by geopolitical risk. Furthermore, in some cases the sunk costs of building new infrastructure and the search costs of establishing new relationships in different countries tend to make the relocation of production an expensive endeavor. That will be the case in capital-intensive sectors, and sophisticated intermediate products, where specific relationships matter substantially.

The balance between the costs and returns of relocation will vary among sectors and firms. As shown in the aftermath of the 2011 Japan earthquake, firms did not re-shore or nearshore production, but rather replaced suppliers from earthquake-stricken Japan with new suppliers from developing countries.

Supply Chain Trade-offs Between Efficiency and Resilience to Shocks: the Perspective of Policymakers

Changes in the policy environment affecting trade costs have impacts on the configuration of GVCs, if they affect the cost-return calculus of location done by GVC managers. That in turn will depend on the other perspective on GVC operations: that of the public sector and industrial policymakers. Most likely, such policy-environment changes will imply economic costs.

Governments are likely to put greater emphasis on domestic production, particularly of medical supplies and equipment, to reduce the risk of future supply shocks. For example, Germany has expressed interest in localizing more supply chains, and South Korea is exploring measures to encourage reshoring of manufacturing. This will not necessarily translate into full neglect of the broader gains from globalization, but it will selectively reinforce a search for greater self-reliance. The pandemic prompted some governments to impose further controls on trade in medical and agricultural goods, whereas the war in Ukraine and the U.S.-Europe rivalry with China have broadened the scope of surveillance in high-tech and national security-related areas.

Given the revealed costs—failures—of unilateral trade policies of the sort pursued by President Trump in the U.S., such unilateral policies are not likely to resurface to the same extent (Canuto, 2020). But there may be plurilateral efforts to broaden the agenda of trade restrictions as a quid-pro-quo in negotiations about rules and standards.

On the technology front, the potential decoupling of the U.S. and Chinese sectors—which could make devices and IT systems in both markets no longer interoperable—might have further repercussions. China has signaled that it is searching for more self-reliance by talking about ‘dual circulation’ and ensuring a greater diversity of sources of commodity imports. Again, the COVID-19 crisis did not create these frictions, but it has emphasized and reinforced them.

What about public policies seeking to change such calculations? Tariff trade policies like Trump’s have proved to be a burden on employment in America’s own manufacturing industry—not to mention the agricultural hit from the U.S. trade war with China.

Economic rivalry between groups of allied powers will tend to be exercised through action in technological and national-security sectors, such as advanced semiconductors, military and

medical equipment, and data privacy. Access to critical minerals for the use of such technologies and for the energy transition will also become a more pressing subject of geopolitics. Rivalry is also expected to be exercised in the search for influence via foreign financing and investment, as would be the case with alternatives to the Chinese Belt and Road initiative. For obvious reasons, Europe will also seek to reshape its energy system.

The reversal of globalization will not be sought, however, in the case of foreign trade in other items. There will be a burden for those who seek an exaggerated demarcation of what is to be considered ‘strategic’.

Accelerated digital transformation has even broadened the scope for possible globalization of services. Think of the Indian doctors ready to offer international services online. Richard Baldwin, a professor at the Geneva Institute, suggested foreign trade in services without the displacement of people as part of “*globalization 3.0*” (Baldwin, 2022). The scope for services as an engine for development has an open road ahead.

On the Chinese side, one can assume a preference for not spilling over the globalization broth that facilitated its success in growth with structural transformation, even though China is sensitive to new geopolitical developments and has signaled a search for less dependence on foreign countries. Strictly speaking, we believe that not even Western sanctions on Russia will be enough for China to quickly seek abrupt departure from the dollar-based monetary-financial system.

One can certainly expect slower globalization (‘slowbalization’) and a greater degree of regionalization. The term ‘slowbalization’—slowing growth in cross-border flows—can indeed be applied to the trends in goods, capital, and people after the global financial crisis, rather than deglobalization, or outright declines in cross-border flows and stocks. The increases in digital cross-border activity also strengthen the concept of ‘newbalization’: the nature and scope of globalization is set to evolve in the coming years with flows continuing to slow in tangible areas, such as trade in goods, while speeding up in intangible areas, including trade in services and cross-border data flows.

Meanwhile the success cannot be taken for granted of efforts to move segments of global chains

closer to rich markets (near-shoring) and friends (friend-shoring) (Canuto *et al*, 2022). For instance:

- Without sustained improvement in domestic fundamentals, including macroeconomic stability, regulatory and legal certainty and simplicity, physical infrastructure, education and skills, productivity and innovation, and export promotion and facilitation, investors' interest will be modest and short-lived.
- Furthermore, 'picking winners' will have to rely on careful assessments of existing or latent comparative advantages. An outside focus on import-substitution industrialization, as in Latin America in the third quarter of the twentieth century, is more likely to result in inefficient resource allocation than long-term success.

Summing up the argument, there are both microeconomic (GVC-level) and macroeconomic (industrial-policy level) aspects to GVC reshaping after the shocks of the pandemic and the war in Ukraine. Both suggest that 'deglobalization' and reshaping of GVCs (including reshoring, nearshoring, and friend-shoring) will be sector-specific and limited.

Next, we argue against the idea that relying on GVCs makes an economy more vulnerable to shocks. That has not been the case during the pandemic.

2. Were GVCs a Throttle or a Brake for the Post-COVID-19 Manufacturing Recovery?

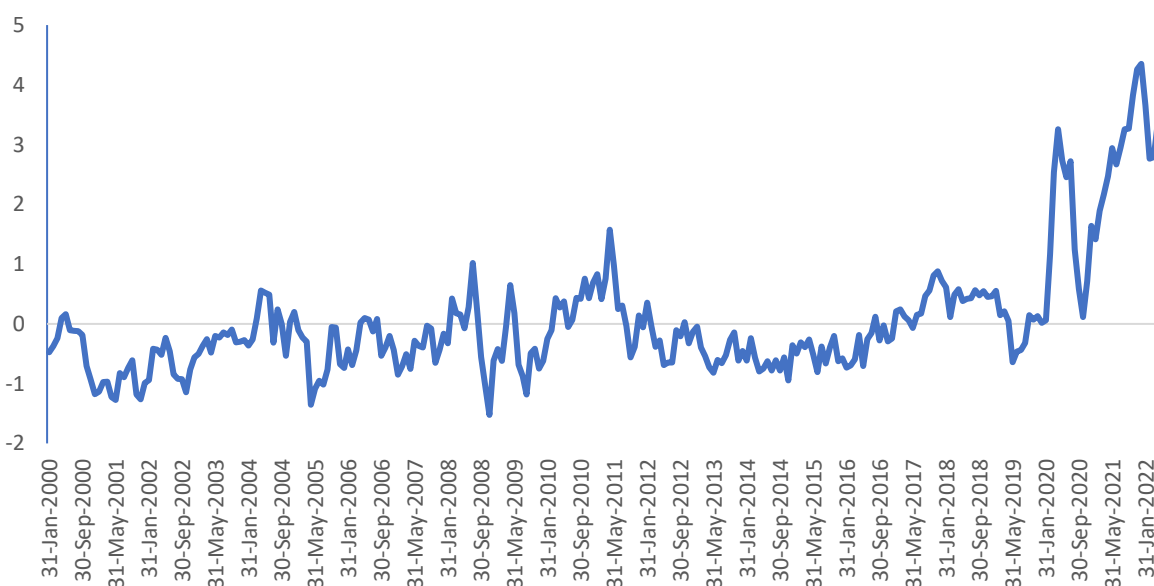
The COVID-19 pandemic brought the global economy to its knees. Strict lockdowns all over the world during the second quarter of 2020 put tremendous constraints on the production system and disrupted GVCs heavily. The fall in global demand compounded the initial shock and led to the deepest recession in peacetime since the Great Depression of the 1930s. World output shrank by over 3% in 2020, with GDP in OECD countries slumping by 10% in the second quarter of the year. According to IMF estimates, the fiscal and monetary responses averted a much deeper recession, in which global output would have plummeted by around 9% in the year. Indeed, fiscal, and monetary authorities injected trillions of dollars to alleviate the dire impact of the shock on production and the wellbeing of households. In addition, the wide vaccine rollout

across mainly developed economies led to a swift return to normal life.

How Did GVCs Perform Right After the COVID-19 Outbreak?

The recovery of economic activity following the removal of sanitary restrictions created strong demand pressures for all types of goods, including consumer goods, intermediate inputs, and commodities. Yet, on the supply side, production and supply chains did not resume their activities at the same pace, with a recovery that remained slow and limited. Consequently, GVCs pressures have reached record highs. Between December 2019 and the end of 2021, container prices increased more than fivefold, affecting maritime delivery costs and times. Shipments between China and the United States, for example, took an average of 80 days in 2021, representing an 86% increase over pre-crisis times. The *Global Supply Chain Pressures Index*, which measures the strain on global supply chains, has been rising steadily since November 2020, reaching a high in 2021 (Figure 1).

Figure 1: Global Supply Chain Pressures Index, 2000-2022



Source: Federal Reserve Bank of New York.

The unbalanced recoveries of supply and demand can be first and foremost explained by the repeated temporary closures caused by COVID-19 outbreaks, and the restrictive measures enacted as a result, including China's current Zero-COVID strategy. In fact, temporary closures can explain 40% of the supply difficulties in the manufacturing industry worldwide (Oya Celasun *et al*, 2022). Second, bottlenecks in maritime cargo transport generated by labor shortages and port congestion in major ports including Shanghai, Rotterdam, and Los Angeles, have significantly constrained global supply. Third, labor-market imbalances have also been one of the determinants of this uneven recovery of global demand and supply rates, because of labor shortages related to the reallocation of workers to sectors where labor demand is high. Finally, government transfers to households, combined with a shift in consumption composition during the pandemic—a substitution of hardware goods, such as home appliances and computers, for contact-intensive services—resulted in a significant increase in global demand for GVC-produced manufacturing goods.

These disruptions had a significant impact on prices as well. In the first three quarters of 2021, the manufacturing component of producer prices in the euro area was approximately 10% higher than its pre-pandemic level (Georgieva *et al*, 2022). According to the IMF, supply shocks account for roughly half of the increase in manufacturing prices, with improved demand accounting for the other half. Furthermore, the effects of higher freight costs could last for 12 to 18 months, with the 2021 increase expected to raise inflation by about 1.5 percentage points in 2022 (Carriere-Swallow *et al*, 2022).

How Did Manufacturing Recover in Times of Sustained Disruption of GVCs?

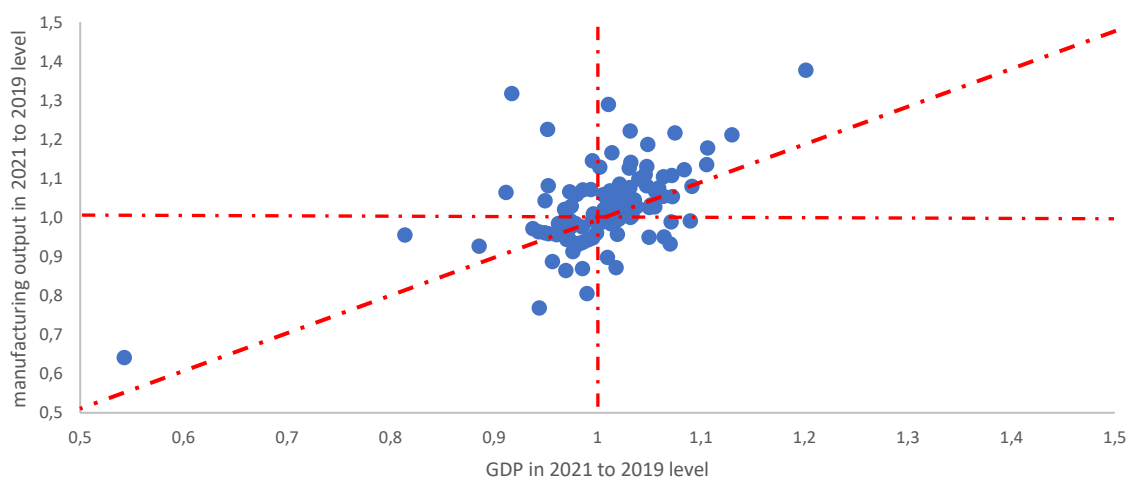
The brutal slump in economic activity in 2020 was followed by a significant and relatively quick rebound. Growth jumped to 5.9% in 2021, wiping out the losses of 2020 and bringing the global economy back to its 2019 output level. However, the recovery was uneven across countries and sectors, contributing to widening inequalities across and within countries. Developed countries managed to mobilize necessary resources and had access to vaccination at a greater scale than developing economies.

On the sectoral level, tourism and travelling continues to be one of the sectors most damaged by the COVID-19 crisis. Although the sector has shown signs of strong recovery in 2022 (UNWTO, 2022), it still lags the manufacturing sector. In the following, we describe the performance of the manufacturing sector in from 2019-2021. The analysis will lay down the likely heterogeneity across industries³. We then investigate to what extent performance is related to the dependence of countries on foreign inputs, while the third section is dedicated to an analytical model, attempting to comprise the factors that could explain the performance of the sector, including demand and supply variables.

How did manufacturing production evolve across the world in 2021? In 2020, manufacturing output dropped dramatically, but this was followed by a spectacular bounce back. Among the 113 countries for which data is available, output in real terms shrank for 84% of the sample. Economies that managed to sustain a positive performance of their manufacturing sector were mostly located in Asia or Africa, including China, Singapore, Senegal, and Angola. Though the recession in 2020 was deep, the recovery in 2021 was impressive and outstanding. According to UNIDO, global manufacturing output rebound significantly in 2021 at 9.4%, after the 2020 drop of 4.2%. At the global level, this performance outpaced the rebounding of the economy (Figure 2). Most economies recorded a rebounding of their manufacturing output that was faster than their overall economic recovery. In over 60% of the countries in our sample, manufacturing output reverted to or outperformed the pre-COVID-19 level. Countries including Senegal or Singapore saw their manufacturing output rise 21% higher than the 2019 level.

³ Manufacturing performance is gauged using the evolution of the quarterly index of manufacturing production released by UNIDO, which measures the volume of industrial production in real terms. It is available for 114 economies.

Figure 2: Rebound in Manufacturing Output Compared to Total Economic Activity Per Country, 2021 vs 2019



Source: UNIDO, WDI, authors calculations.

At the sectoral level, as raised by UNIDO in its annual report, industrial performances were heterogenous. Grouped by technological content, high-tech industries performed relatively well and above average. However, leather and related products, and wearing apparel, are among the sectors that have struggled to revert to pre-COVID-19 levels, with median performances 15% and 9% lower than pre-COVID-19 respectively (Figure 3).

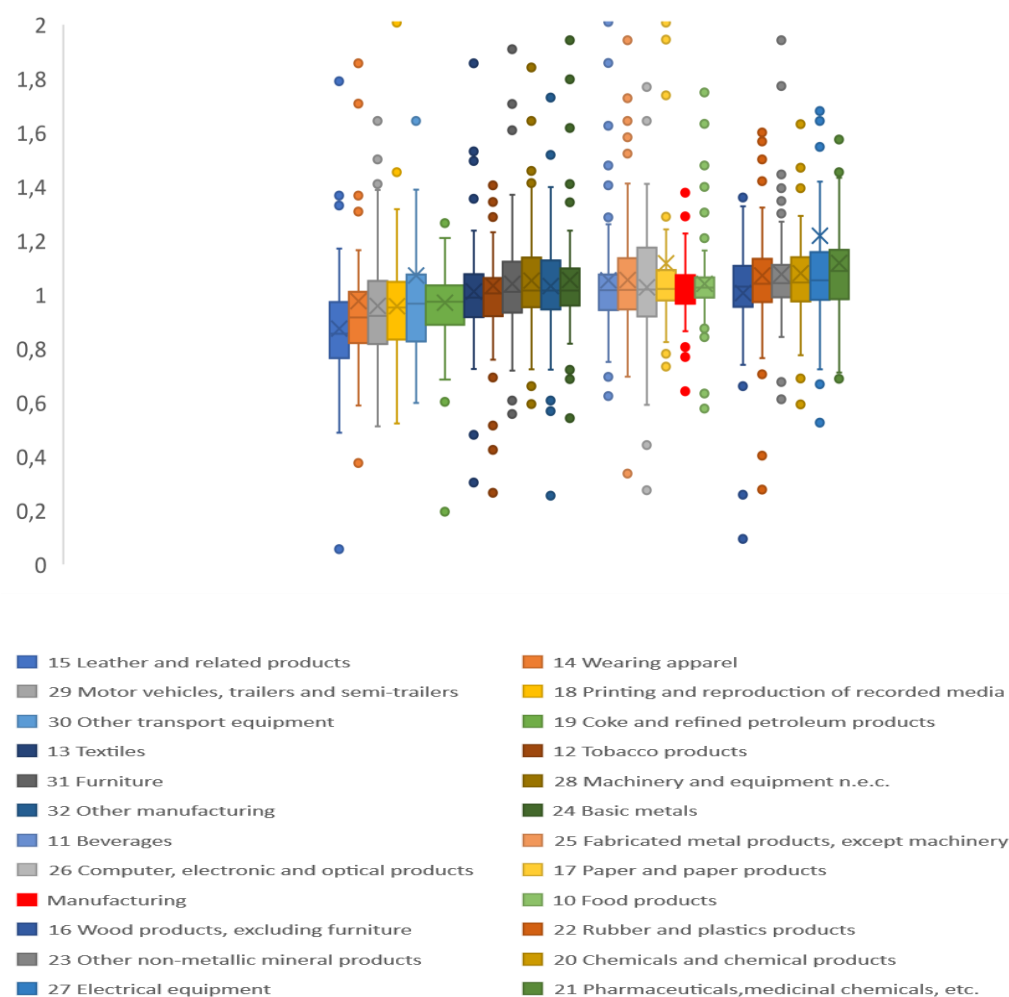
Among the most-affected industries, motor vehicles and transport equipment were still below their pre-COVID-19 levels at the end of 2021. These two industries suffered from the semiconductor chip shortage. They could not secure enough chips and had to delay vehicle production or close their production lines and adapt their vehicle models using fewer semiconductors (McKinsey, 2022). Demand for these components, which were already affected before the pandemic by geopolitical tensions between the United States and China, was further strengthened by the health crisis, in particular because of strong demand for new technology products induced by the acceleration of digitalization in the context of the crisis. The

procurement policies of companies also had an impact. Companies have re-oriented towards building up inventories to guard against persistent shortages, whereas previously the just-in-time production model was predominant. In this context, supply-chain disruptions seem to have affected car producers all over the world. Only 36% of economies managed to rebound and attain or outpace pre-COVID-19 levels.

From a geographical perspective, it doesn't appear that a specific region was hit harder or suffered from an idiosyncratic factor. The computer industry attained higher production levels than 2019 but suffered, to a lesser extent, from the semiconductor shortage.

As expected, some sectors performed above average and staged an impressive recovery. In the food industry, the median growth performance between 2019 and 2021 was 4%. The sector saw limited losses in the pandemic since the demand for these products—and eventually the supply—was inelastic to revenue shocks and thus ensured stable growth. Stockpiling contributed to surging demand for food products. Other sectors exhibited resilience during the pandemic and the common thread between them was likely related to the shift to working from home, pushing up the demand for specific products. Household furniture, based on wood, saw an increased demand during the pandemic (UNCE, 2021). Electrical equipment is the second most dynamic sector across countries, with median growth hovering around 5.2%. At the top, comes the pharmaceutical industry, which is by far the sector that attracted the most attention during the pandemic and afterwards. The median country performance reported an 8.7% increase between 2019 and 2021. American and European pharmaceutical companies, accounting for over 63% of the global market, reported annual output of 734 billion USD in 2020, increasing by around 2%.

Figure 3: Manufacturing Performance Distribution (Ratio of 2021 Output to 2019 Output, Across countries and Industries)



Source : UNIDO, authors calculations.

Integration in GVCs Has Not Been a Threat to Recovery

Most economic sectors are either integrated backward or forward in GVCs, particularly for manufacturing activities. Foreign value added in total exports is relatively higher in the manufacturing sector compared to the rest of the economy, with heterogeneous dynamics across countries (Table 1). This trend is strong in particular for the automotive industry. Although the

sector is highly concentrated in a few countries and companies, its value chains are extremely complex and characterized by a multiplicity of stakeholders, interconnected sectors and activities located in different geographical areas (OECD, 2016). For instance, the reliance on foreign inputs—expressed in value added—reaches over 72% for Hong Kong, while it is below 12% for Kazakhstan (though this country accounts for less than 0.1% of global car production). Chinese automotive exports contain around 14.6% of foreign value added—China is the world’s largest car producer with above one third of the market. In second position comes electronics with one of the highest dependence ratios on foreign inputs.

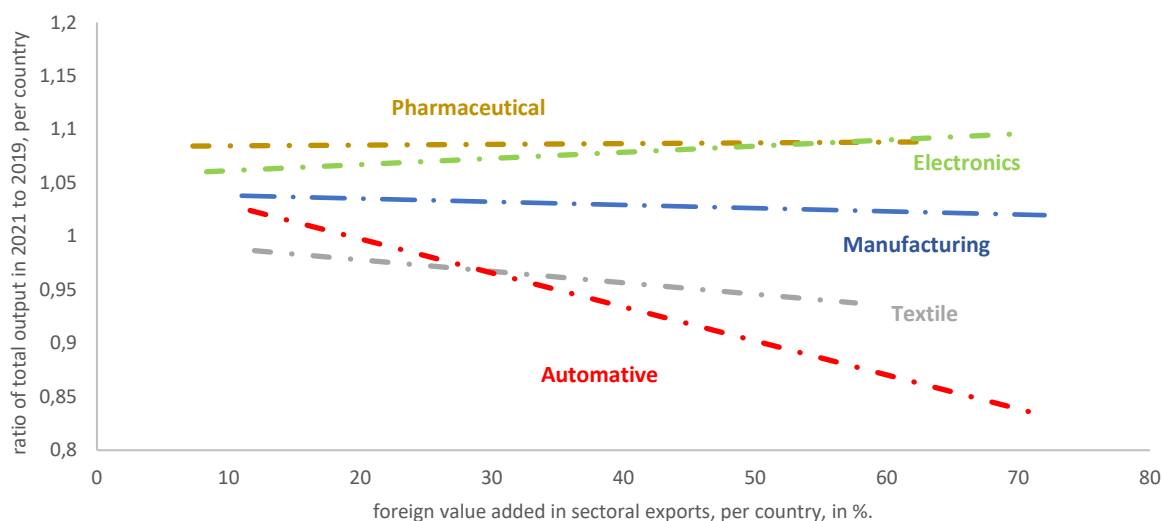
Table 1: Foreign value added in exports by sector, in %

Metrics	Total economy	Manufacturing	Food products	Textiles	Pharmaceutical products	Electronics	Automobile
Min	3.7	11.0	7.3	12.0	7.3	8.3	11.6
Max	66.4	72.0	56.7	57.6	62.4	70.7	71.8
Median	24.4	32.7	25.4	29.5	29.8	33.8	37.3
Mean	26.7	33.0	25.6	30.2	32.1	37.1	39.1
Variability	12.4	13.2	10.9	11.2	12.7	13.9	14.5

Source: TIVA database, 2018, authors calculations. Note: For the manufacturing sector, data is only available for the foreign value added to exports (‘backward integration’), and not for domestic value added sent to third economies (‘forward integration’).

Did the integration into GVCs matter for the rebounding of the manufacturing sector? The answer is not straightforward and depends on the sector. Starting from a bivariate analysis, it seems that, with the exception of the automotive industry, sector performance does not seem to be associated with the extent of reliance on foreign inputs, as shown by the flat slope of the adjusted line in Figure 4. Accordingly, integration into GVCs, at least from this perspective, is not a constraint on manufacturing output growth or the ability to rebound after a negative shock. Bonadio *et al* (2020) documented how the “*renationalization*” of global supply chains does not necessarily make countries more resilient to pandemic-induced disruptions. They argued that eliminating reliance on foreign inputs doesn’t shield value chains from domestic shocks. They found that the drop in average GDP—and therefore manufacturing output—would have been slightly larger in a world without trade in inputs and final goods.

Figure 4: Reliance on Foreign Inputs and Recovery of the Manufacturing Sector.



Source : UNIDO, TIVA and authors calculations.

The automotive industry stands out (Figure 4). It appears clear that countries relying less on foreign inputs have reported larger output growth. On average, the recovery to pre-COVID-19 levels or above has been possible for countries with domestic value added in total exports of above 80%. However, this trend can be misleading, as the automotive industry has been hit hard by the disruption of GVCs and the shortage of semiconductors. The car industry is a major client of semiconductor manufacturers. Around 10% of semiconductors are sold to car producers around the world, and some cars for instance require up to 3,000 chips.

The industry shortage cannot be attributed solely to supply chain disruptions. It is also down to the skyrocketing global demand that the supply capacity was able to meet (Bown, 2020). Supply capacity was already dealing with several issues before the COVID-19 pandemic and the surge in global demand put it under additional stress. The weaponization of this strategic component between China and the U.S. disrupted even further the value chains and raised concerns about the risks the car industry will face in catching up with losses in 2020 (Bown, 2021). In addition, the production of chips is highly concentrated among a few countries and suppliers, because significant upfront investment in production limits the number of suppliers. Thus, the value chain issue masks more complex factors, ranging from escalating geopolitical tensions to highly

concentrated supply. Blaming supply chain fragmentation does not seem appropriate.

Drivers of Manufacturing Output Across Countries: The Role of Supply and Demand Factors

In the previous section, we assessed the role of backward integration of GVCs and argued that, except for the automotive sector, there is no clear evidence that an increasing share of foreign value added in a country's gross exports has impeded its economic recovery. To test further assumptions, we estimated a simple linear cross-sectional model to gauge the factors explaining the recovery in the overall manufacturing sector. Our endogenous variable is the change in production volume from 2019 to 2021. We deployed demand variables, such as the fiscal impulse of the country as % of GDP⁴, the real effective exchange rate (REER) change extracted from World Development Indicators in %, the weighted growth rate of partners as a proxy for foreign demand, and supply factors, namely the level of stringency measures to prevent the spread of the coronavirus locally⁵ and backward integration into value chains⁶.

Variables	Coefficients ⁷
Constant	-4.7
Supply-side variables:	
<i>Foreign value added in manufacturing exports, in %.</i>	-0.02
<i>Stringency index 2020-2021 average, in logarithm.</i>	1.4
Demand-side variables:	
<i>Fiscal impulse, in % of GDP</i>	-0.1
<i>Foreign demand, in %.</i>	1.2 *
<i>REER, in %.</i>	-0.3 ***

⁴ This variable includes COVID-19 related measures, taken by fiscal authorities, since January 2020 and covers measures for implementation in 2020, 2021, and beyond, namely additional spending, foregone revenues, and liquidity support.

⁵ This variable is extracted from Our World in Data and identifies government responses to the spread of COVID-19. It includes school closures, workplace closures, and travel bans, rescaled to a value from 0 to 100 (100 = strictest).

⁶ The foreign value added in manufacturing exports, extracted from the TIVA database for 2018. We could also use a forward-integration variable, such as the domestic value added in foreign exports as a share of gross exports, but data for the manufacturing sector is not available.

⁷ Coefficients are adjusted for heteroscedasticity.

Control variable:	
<i>Average Growth 2014-2019, in %</i>	1.2 **
<i>Number of observations⁸</i>	58
<i>R-squared</i>	0.2 ***

***, **, * significant at 1%, 5% and 10% respectively.

The results go in the same direction as our previous finding, regarding the role of integration in GVCs in explaining cross-sectional performance of manufacturing output. The findings confirm the role of demand factors, mostly foreign demand, and the evolution in REER, in explaining the differences between countries. The fiscal impulse doesn't appear to exert a significant impact on manufacturing performance⁹. Exchange rate policies affected manufacturing output in general, as 1% depreciation drives up manufacturing output by 0.3%. The economic performance in major economic partners is also favorable for the domestic industry. Elasticity is, in fact, above unity and is statistically significant at the threshold of 10%. In addition, manufacturing sectors that have witnessed dynamism in the past are more likely to rebound faster. Although backward integration negatively affects the performance of manufacturing sector, the coefficient is statistically equal to zero, suggesting that reliance on foreign inputs doesn't impede growth in manufacturing.

Current disruptions to value chains have raised the voice of those preaching against the fragmentation of productions system, and advocating for reshoring or nearshoring, wherever possible, activities located abroad, arguing that reliance on foreign inputs exposes domestic economies to external shocks and increases their vulnerability to shortages. In addition, these disruptions have raised the issue of the real contribution to domestic economies of integration of global value chains. Still, it is well documented that integration in GVCs has tremendous positive implications for local economies (Dollar, 2017). We have argued in this section that integration in GVCs has not impeded growth in domestic manufacturing sectors. The exception is the automotive sector, where a global semiconductor shortage in face of surging demand has constrained the growth of the sector. Otherwise, performance seems to depend mostly on

⁸ The sample comprises all OECD countries and some emerging and developing economies.

⁹ The model is a first attempt to pack the factors likely to impact manufacturing output growth. Further research is required to double check the findings and evaluate all the dynamics explaining diverging performances across countries.

demand factors and the structural performance of the sector before the pandemic hit the world economy.

Concluding remarks

The COVID-19 pandemic and the war in Ukraine have exacerbated trends that were already underway, rather than creating a fundamental breakthrough in the process of GVC-based industrialization. To different degrees in different sectors, the balance between efficiency and resilience to shocks may move GVC configurations towards resilience. That is most likely to be the case in high-tech and national security-sensitive industries.

Reliance on integration abroad through GVCs has not impeded post-COVID-19 crisis recoveries. The 2022 infant formula crisis in the U.S.—when the availability of baby formula was jeopardized by reliance on a single local source, which faced adverse shocks (Pathack and Gibbs, 2022)—shows how national self-containment of GVCs is not the perfect solution when it comes to resilience to shocks.

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