

An overview of the supply chain structure of major trade entities

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Abstract

While global supply chains have traditionally been understood as a driver of economic efficiency along with globalization in the past decades, the interdependence therein has also introduced vulnerabilities to production. This article aims to map out the supply chain structure of the three biggest trade entities in the world, namely the Mainland, the US and the EU, and explores the potential impact of the disruptions in international trade on global supply chains arising from demand and supply shocks like the current pandemic.

概述主要貿易實體的供應鏈結構

摘要

隨著全球化的發展，全球供應鏈在過去數十年一直被認為在提高經濟效率上扮演重要角色，但當中引申的國際生產線相互依賴也令生產易受衝擊。本文旨在概述全球三大貿易實體（即內地，美國和歐盟）的供應鏈結構，以探討如當前疫症大流行等需求和供應衝擊造成的國際貿易干擾，對全球供應鏈可能產生的影響。

The views and analysis expressed in this article are those of the author and do not necessarily represent the views of the Office of the Government Economist.

I. INTRODUCTION

1. Global supply chains improve economic efficiency, but also introduce unpredictable vulnerabilities. This article aims to map out the trade flows of the three biggest trade entities in the world, namely the Mainland, the US and the EU, in order to cast light on the potential impact of the disruptions in international trade on the global supply chains from demand and supply shocks like the current pandemic.

II. DATA AND METHODOLOGY

2. Trade flows of goods, particularly intermediate goods, could largely reflect the extent to which the production process in each economy would rely on global supply chains. To analyse such trade flows, we have to find a database which can categorize goods traded by their end-use categories. As such, the OECD's Bilateral Trade Database by Industry and End-use¹ (BTDIxE) is used. This database enables users to look into the structure of the international trade of goods by end-use and identify the dependence of each economy on global production networks and supply chains. As the vast majority of economies² have been covered in the database, users can get quite a clear picture of global trade flows.

3. This article first looks into the general trade pattern of the world for different end-uses for the Mainland³, the US and the EU⁴. We then focus on the trade of intermediate goods of these three entities to see how downstream activities would be affected when their production is disrupted. We use the trade flows of 2019 as a reference for the sake of data integrity.

¹ The OECD's BTDIxE provides data on bilateral trade flows of intermediate goods for industries based on the International Standard Industrial Classification, Revision 4 (ISIC Rev.4). It consists of estimates of imports and exports of goods, broken down by reporting and partner economies. The trade flows are divided into nine categories of goods, for three main end-uses: capital goods, intermediate inputs and consumption.

² The database covers 34 OECD member economies and a wide range of non-OECD economies. Nearly 200 economies are covered in the database for more recent years.

³ For trade with the Mainland, the role of Hong Kong as a re-export centre is taken into account. Given the fact that Hong Kong is not an industrial base and the definition of intermediate goods used in BTDIxE is not the same as the one used by C&SD, and the great majority of Hong Kong's re-exports are related to the Mainland (as either the country of origin or the country of consignment), all intermediate goods exported from or imported to Hong Kong are assumed to be imported to or exported from the Mainland.

⁴ As trade flows of 2019 are used, United Kingdom is included as part of the EU in the analysis.

III. KEY FINDINGS

Overall trade pattern

4. The merchandise trade of the three biggest selected trade entities together accounted for 34.9% of the world's total in 2019. Amongst them, the relative importance of the Mainland increased most significantly over the years. Since it became a member of the World Trade Organization (WTO) in December 2001, its share in the world's total trade increased notably from 4.0% in 2001 to 12.0% in 2019, and it has become the largest trade entity in the world. As for the US and the EU, their share dropped more notably from 2000s to 2010s, but held relatively stable over the past nearly two decades (**Table 1**).

Table 1: Share of world merchandise trade (%)

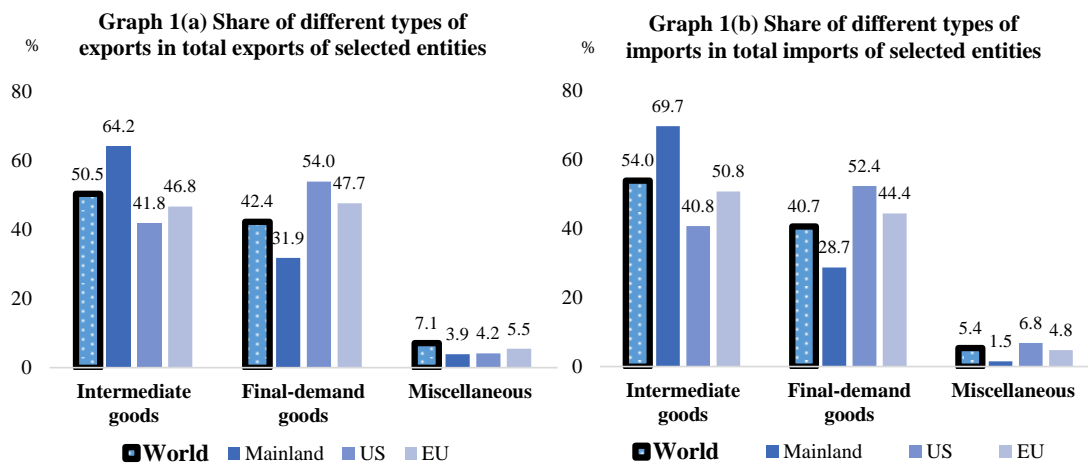
Year	Mainland			US			EU		
	<i>Total trade</i>	<i>Exports</i>	<i>Imports</i>	<i>Total trade</i>	<i>Exports</i>	<i>Imports</i>	<i>Total trade</i>	<i>Exports</i>	<i>Imports</i>
2001	4.0	4.3	3.8	15.1	11.8	18.0	13.9	14.2	13.6
2010	9.7	10.3	9.0	10.6	8.4	12.8	12.5	12.4	12.6
2019	12.0	13.2	10.8	11.0	8.7	13.3	11.9	12.6	11.3

Source: WTO.

5. In more recent years, trade of intermediate goods consistently comprised slightly more than half of world total trade, and its share is roughly around 10 percentage points higher than that for final-demand goods, which include household consumption goods, capital goods and mixed-use goods like cars and computers (**Graphs 1(a) and 1(b)**).

6. For the three selected trade entities, the Mainland plays the most prominent role in the trade of intermediate goods. The Mainland's exports and imports of intermediate goods comprised around two-thirds of its total exports and imports (64.2% and 69.7% respectively) in 2019, notably higher than the world averages of 50.5% and 54.0%, suggesting the Mainland's important role in global supply chains. Conversely, the share of its exports and imports of final-demand goods (31.9% and 28.7% respectively) are significantly lower than the world average (42.4%) and comprise less than one-third of its total exports and imports. As for the US, it has all along been the largest consumer market in the world, and its share of imports of final-demand goods in its total imports is higher than the world average by nearly 12 percentage points. Lastly, prior to Brexit, the EU consisted of 28 economies, which have different comparative advantages. However, the EU as a whole is more balanced in terms of production and consumption as compared with the Mainland and the US. The two shares of final-demand goods and

intermediate goods in its total exports are very close, implying that the EU has not only a big consumer market but also its own strong manufacturing capacity.



Sources: OECD’s BTDIxE, author’s calculation.

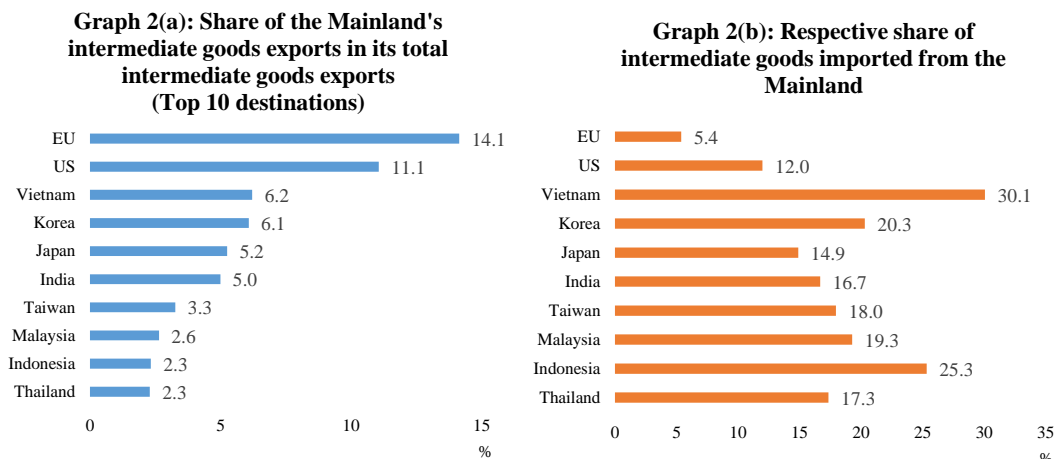
Notes: “Miscellaneous” mainly refers to confidential trade, unclassified goods and statistical anomalies. “World” refers to the nearly 200 economies included in the BTDIxE database.

Flow of global supply chains

7. To understand the possible impact of production disruptions arising from any black swan events, like the current pandemic, on global supply chains, we focus on the trade of intermediate goods of the three selected entities.

• *The Mainland*

8. The EU and the US are by far the two largest destinations of the Mainland’s exports of intermediate goods, accounting for 14.1% and 11.1% of the total respectively, and remarkably more prominent than the remaining destinations in terms of the value of intermediate goods exports (**Graph 2(a)**). But from the perspective of importers of the Mainland’s intermediate goods, the US imports only 12.0% of its intermediate goods from the Mainland, while the EU imports even less (5.4%). By contrast, the role of the Mainland as a supplier is far more critical to its Asian neighbours, providing at least 15% of most partners’ total intermediate goods imported (**Graph 2(b)**). As such, any production disruptions in the Mainland should have a significant impact on its Asian neighbours.



Sources: OECD's BTDIxE, author's calculation.

9. Indeed, the less-developed Asian neighbours of the Mainland are even more dependent on the imports of intermediate goods from the Mainland (**Table 2**), as they are picking up industries like textiles, garments and apparel that are being handed off by the Mainland as it moves up the value chain from being a low-end manufacturing centre to an advanced manufacturing powerhouse.

Table 2: Neighbouring economies of the Mainland with over 20% of their intermediate goods imported from the Mainland

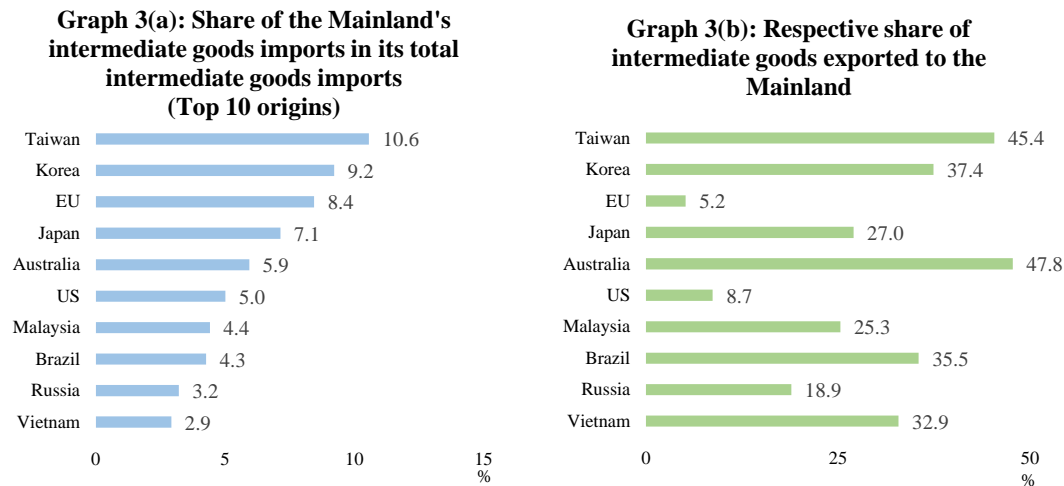
Economies	Share of the Mainland's total intermediate goods exports (%)	Share of intermediate goods imported from the Mainland (%)
Cambodia	0.5	52.8
Mongolia	0.1	52.4
Myanmar	0.6	48.2
Laos	0.1	35.9
Kyrgyzstan	0.1	35.3
Vietnam	6.2	30.1
Indonesia	2.3	25.3
Philippines	1.8	24.0
Pakistan	0.9	23.3
Korea	6.1	20.3

Sources: OECD's BTDIxE, author's calculation.

Note: There are no import data from Bangladesh and Sri Lanka.

10. While the Mainland is the largest importer of intermediate goods in the world, its suppliers are very diversified and none of them comprised more than one-ninth of the Mainland's total intermediate goods imports (**Graph 3(a)**). The Mainland's intermediate goods suppliers include both high-tech suppliers like Korea, Taiwan, Japan and the US, and resource exporters like Australia, Brazil and Malaysia. By major origin, the top three Asian economies accounted for nearly 30% of the Mainland's imports of intermediate goods.

11. Reciprocally, the exports of intermediate goods of Taiwan, Korea, Australia, Brazil and Vietnam to the Mainland accounted for over 30% of their total intermediate exports, implying that upstream manufacturers in these economies have very a high reliance on the Mainland as a manufacturing powerhouse downstream (**Graph 3(b)**).



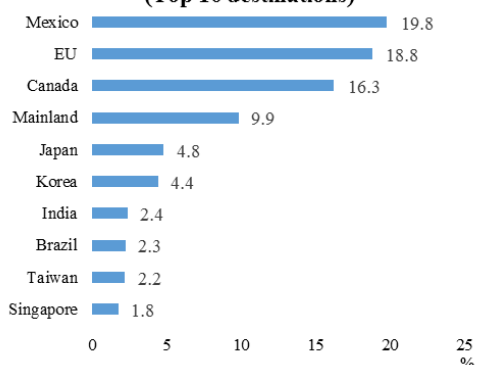
Sources: OECD's BTDIxE, author's calculation.

- **The US**

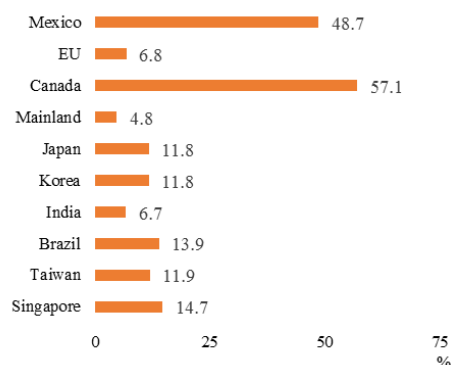
12. Mexico and Canada are two of the largest destinations of the US' intermediate goods exports (**Graph 4(a)**). Indeed, as about half of Mexico's and Canada's intermediate goods imports are from the US (**Graph 4(b)**), any disruption of US production would substantively affect manufacturing activities in Mexico and Canada. Except for these two cases, the US is not a dominant supplier of intermediate goods to other large economies. For the EU, while it is the second largest destination of US intermediate goods exports, the share of its intermediate goods imports from the US is only 6.8% of its total imports of intermediate goods. The close trade ties of the US, Mexico and Canada suggest that the North American Free Trade Agreement (NAFTA) should have driven unprecedented integration and shaped supply chains in this region⁵.

⁵ The United States-Mexico-Canada Agreement (USMCA) entered into force on 1 July 2020 to replace NAFTA. Conceivably, the new trade agreement may affect the trade patterns between the three economies in the future.

Graph 4(a): Share of the US' intermediate goods exports in its total intermediate goods exports (Top 10 destinations)



Graph 4(b): Respective share of intermediate goods imported from the US



Sources: OECD's BTDIxE, author's calculation.

13. Besides Canada and Mexico, some relatively small Central American or Caribbean economies are also dependent on intermediate goods from the US, partly because of their relatively small economic size and locational proximity (**Table 3**).

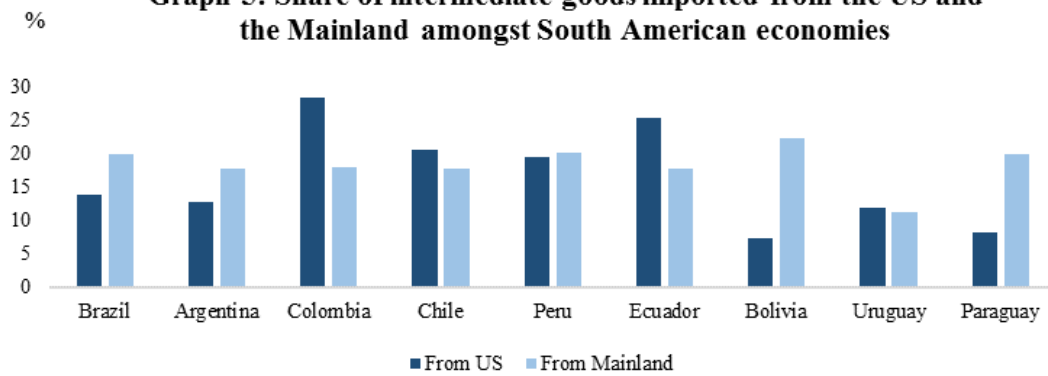
Table 3: Neighbouring economies of the US with the largest shares of their intermediate goods imports from the US

Economies	Share of the US' total intermediate goods exports (%)	Share of intermediate goods imported from the US (%)
Canada	16.3	57.1
Bermuda	<0.1	55.4
Mexico	19.8	48.7
Barbados	<0.1	45.8
Antigua and Barbuda	<0.1	43.3
Saint Vincent and the Grenadines	<0.1	41.4
Costa Rica	0.3	40.4
Aruba	<0.1	38.2
Jamaica	0.1	38.0
Saint Lucia	<0.1	37.9

Sources: OECD's BTDIxE, author's calculation.

14. Trade links between the US and South American economies are not as strong as those between the US and NAFTA economies. Most South American economies imported less than one-fifth of their intermediate goods from the US, somewhat on par with the Mainland despite the US' geographical proximity (**Graph 5**). This to some extent reflects the importance of regional trade agreements to the supply chain structure.

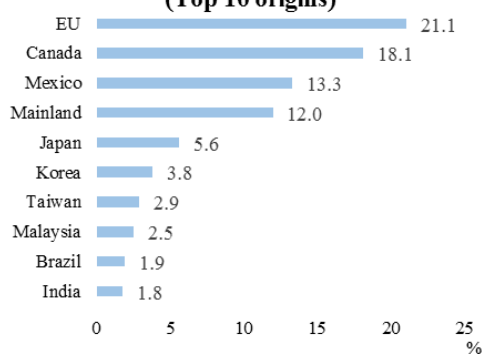
Graph 5: Share of intermediate goods imported from the US and the Mainland amongst South American economies



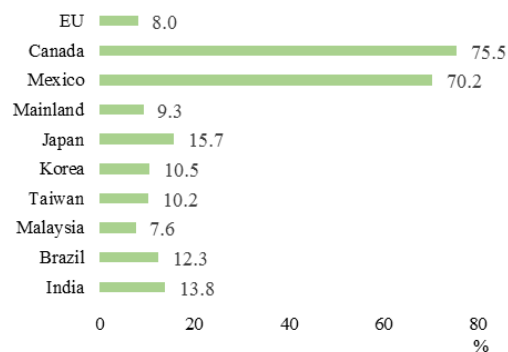
Sources: OECD’s BTDixE, author’s calculation.
Note: 2018 data is used for Bolivia.

15. On the flip side, nearly two-thirds of the US’ imports of intermediate goods are from the EU, Canada, the Mainland and Mexico. Any production disruptions in these economies would significantly affect manufacturing activities in the US (**Graph 6(a)**). From the perspective of exporters of intermediate goods to the US, Mexico and Canada are highly reliant on the US market (**Graph 6(b)**). The US is not only a dominant supplier to, but also a major buyer of intermediate goods of Canada and Mexico, suggesting deep upstream to downstream supply chain integration in the region.

Graph 6(a): Share of the US' intermediate goods imports in its total intermediate goods imports (Top 10 origins)



Graph 6(b): Respective share of intermediate goods exported to the US



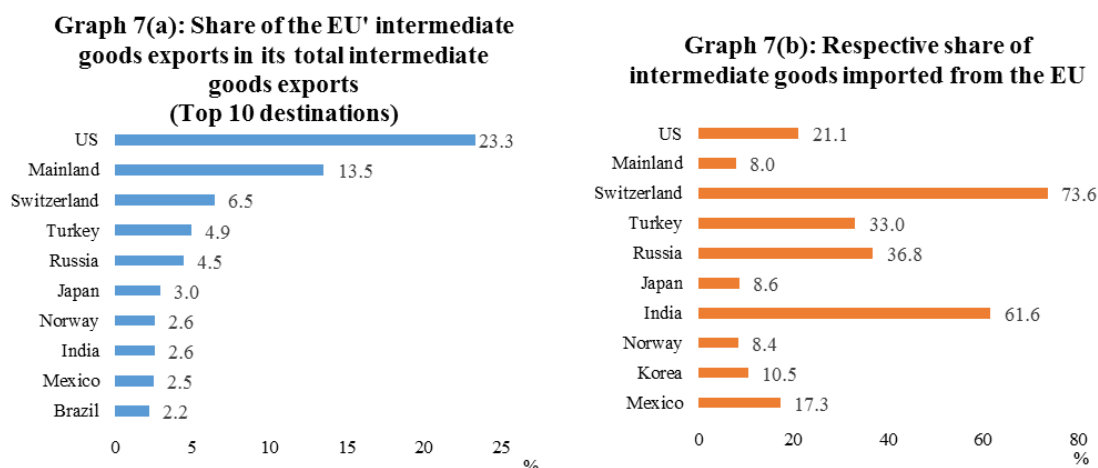
Sources: OECD’s BTDixE, author’s calculation.

- **The EU**

16. Before Brexit in 2020, the EU consisted of 28 economies in Europe. As one might expect, with the free movement of people, goods, services and capital within the

internal single market, intraregional trade is predominant among EU member states⁶. In terms of intermediate goods, the trade value of intermediate goods with economies outside the EU is only equivalent to around 60% of the intraregional total. Intraregional trade aside, the US and the Mainland are the two largest destinations of the EU’s intermediate goods exports (**Graph 7(a)**). Neighboring economies like Switzerland, Turkey, Russia, and Norway also fall among the top ten destinations of the EU’s intermediate goods exports (**Graph 7(b)**).

17. Many smaller and less developed economies in the Balkans, the Baltic region and North Africa, such as Slovenia, Bulgaria, Latvia, Morocco, etc., are also highly reliant on imports of intermediate goods from the EU. Similar to the case of the Mainland and its developing neighbours, the industrial growth of these smaller and less developed economies surrounding the EU relies on picking up lower-end industries that are handed off by their developed neighbours.

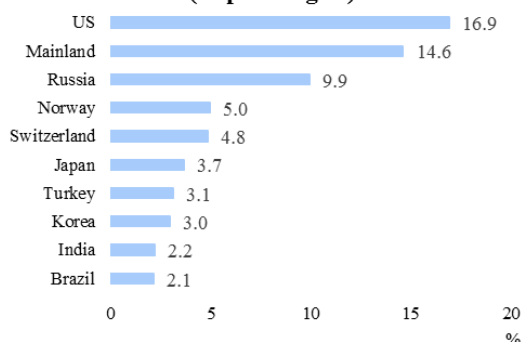


Sources: OECD’s BTDIxE, author’s calculation.

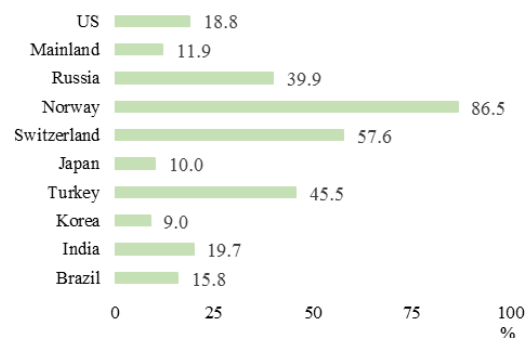
18. The pattern for the EU’s imports of intermediate goods is largely the same as that for exports, with the US and the Mainland being the two the largest origins, followed by neighboring non-EU economies in Europe. Though Switzerland, Russia, Turkey and Norway are not EU member states, they still deeply integrated into its supply chains (**Graphs 8(a) and 8(b)**).

⁶ 64.5% of EU economies’ exports of intermediate goods were to destinations within the EU and nearly 58.0% of EU economies’ imports of intermediate goods were sourced from the EU.

Graph 8(a): Share of the EU' intermediate goods imports in its total intermediate goods imports (Top 10 origins)



Graph 8(b): Respective share of intermediate goods exported to the EU



Sources: OECD's BTDIxE, author's calculation.

IV. CONCLUDING REMARKS

19. Given the interdependence of global supply chains, disruption of production in the Mainland, the US and the EU would have serious ripple effects on global supply chains through international trade. The pandemic has revealed this fragility. Major economies are keen to improve their supply chain resilience so as to withstand external shocks and decrease reliance on imports. While some of them may see de-globalisation as a possible solution, others view deeper regional cooperation a better way to resist shocks. As a case in point, the recently concluded Regional Comprehensive Economic Partnership (RCEP) will be conducive to the stabilisation and further integration of regional supply chains. In the end, since the formation of global supply chains is driven by market forces with a view to lowering production costs and maximizing profits, it remains to be seen if and how the restructuring of global supply chains will be taken forward.