

Global Supply Chains Connectivity: Current Dynamics and Policy Responses

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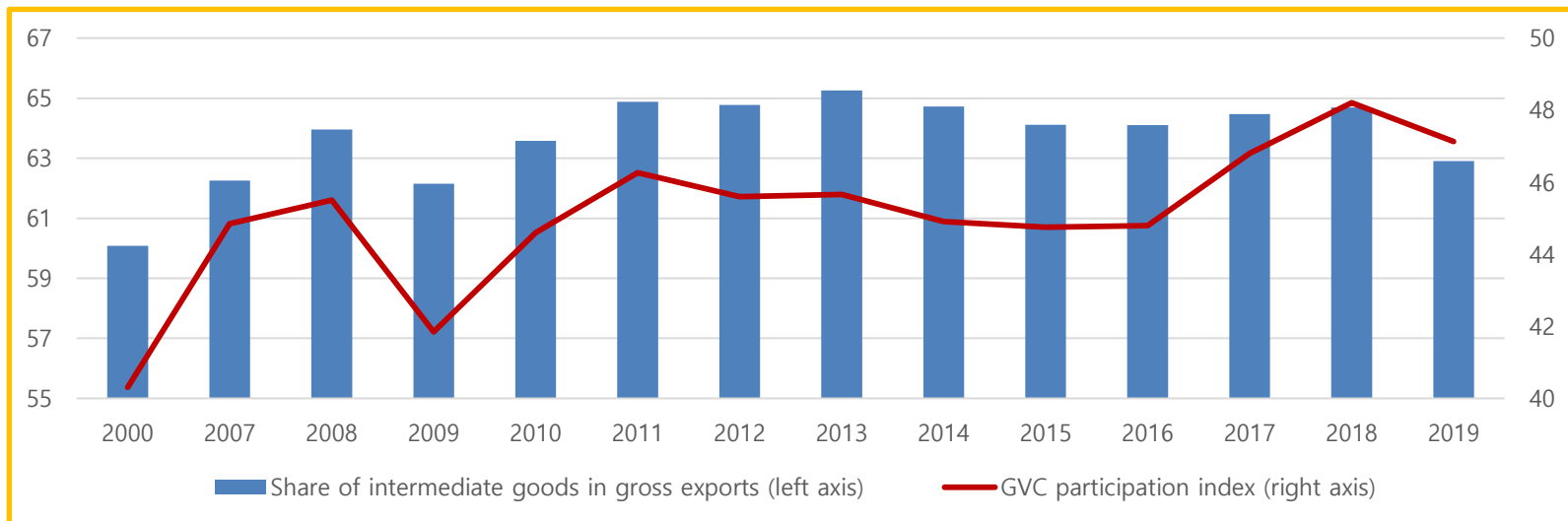
I. Evolution of Global Value Chains

I. Evolution of Global Value Chains: GVC Participation Index

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- ❖ Global value chains (GVCs) are characterized by an increasing share of intermediate goods in total gross trade value, which results in decreasing share of domestic value added in total value added in exports.
- When we analyze the ADB Multi-Region Input-Output (MRIO) database between 2000 and 2019, the shares of intermediate goods in total export values turn out to increase from 60.1% in 2000 to 62.9% in 2019. In addition, the GVC participation index increased except the periods of global financial crisis (2008-2009) and global trade slowdown (2012-2016). (Figure 1)

<Figure 1> GVC participation and share of value added in exports taken by intermediate goods



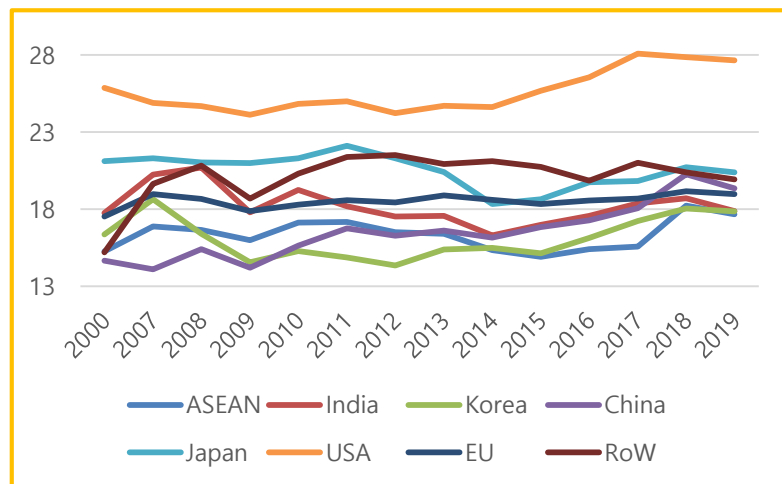
Source: Author's calculation using the ADB MRIO database.

I. Evolution of Global Value Chains: Forward and Backward Participation

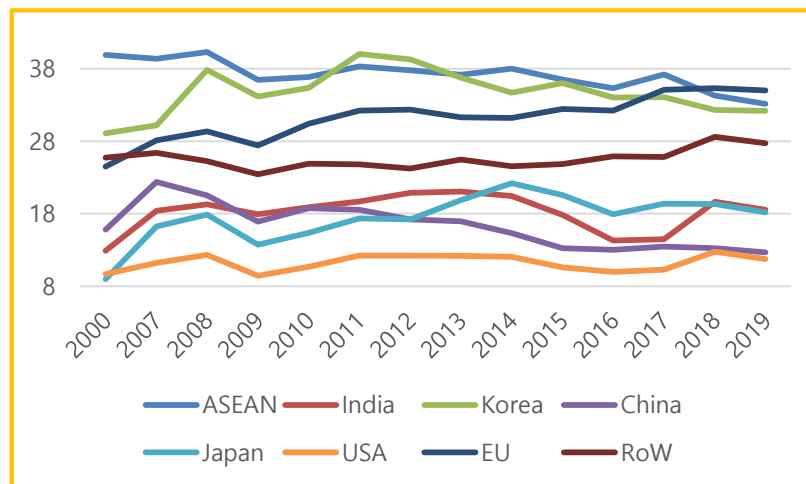
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- ❖ Backward GVC participation index shows how much countries participate in GVCs by importing foreign inputs to produce the goods and services they export, while forward GVC participation index indicates how much they export domestically produced inputs to partners.
- ❖ Forward GVC participation indexes of ASEAN, India, and Korea turn out to be lower than those of the US, Japan, and the Rest of the world, but backward GVC participation indexes of ASEAN, Korea, and EU are higher than that of the Rest of the World. (Figure 2 and 3)
- Forward GVC participation index (2019): ASEAN(17.7), India (17.9), Korea (17.9), China (19.4), Japan (20.4), USA (27.7), EU (19.0), and RoW (19.9)
- Backward GVC participation index (2019): ASEAN (33.1), India (18.6), Korea (32.2), China (12.7), Japan (18.2), USA (11.8), EU (35.0), and RoW (27.7)

<Figure 2> Forward GVC participation index



<Figure 3> Backward GVC participation index



Source: Author's calculation using the ADB MRIO database.

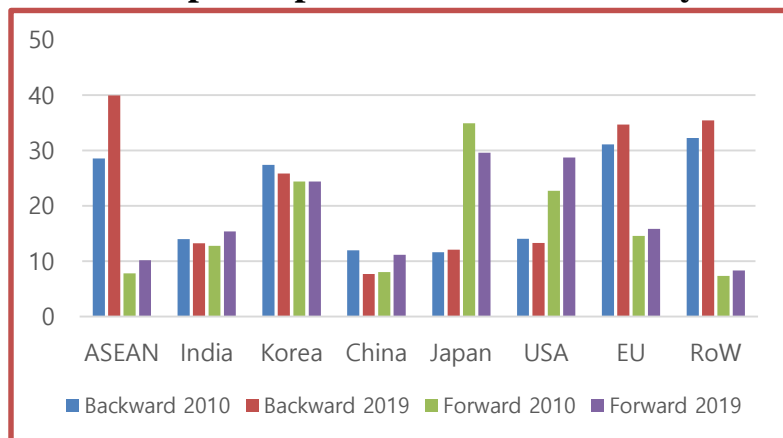
I. Evolution of Global Value Chains: GVC Participation Index by Industry

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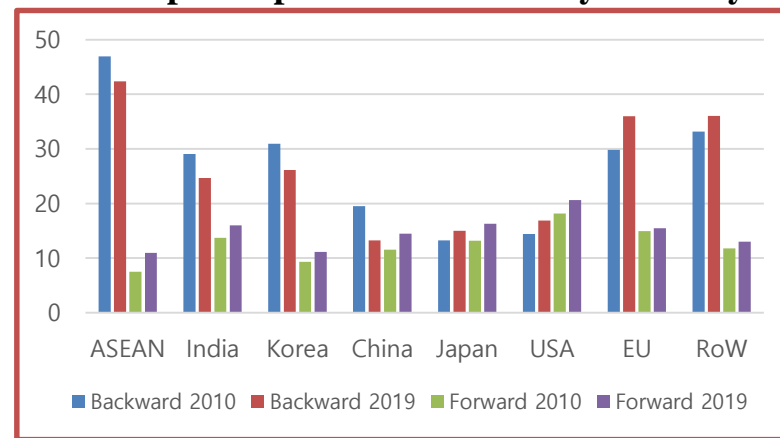
- ❖ We investigate GVC participation of textile and clothing, machinery, electrical equipment, and transport equipment industries which are characterized by GVC network structure.
- Generally speaking, backward GVC participation indexes 2019 of the ASEAN industries turn out to be relatively high, but forward GVC participation indexes 2019 are relatively low compared with other countries.
- ❖ For example, backward GVC participation index 2019 of the textile and clothing industries in ASEAN (39.9) turns out to be higher than those of other countries including India (13.2), Korea (25.8), China (7.7), Japan (12.1), USA (13.3), EU (34.7), and RoW (35.4).
- On the other hand, forward GVC participation index 2019 (10.2) turned out to be very low, compared with India (15.4) and China (11.2), among others.

<Figure 4> GVC participation index by industry

<GVC participation of Textile Industry>



< GVC participation of Machinery Industry >



Source: Author's calculation using the ADB MRIO database.

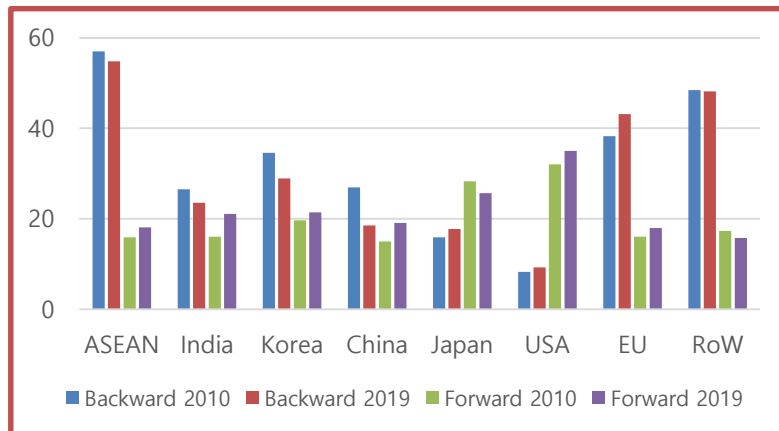
I. Evolution of Global Value Chains: GVC Participation Index by Industry

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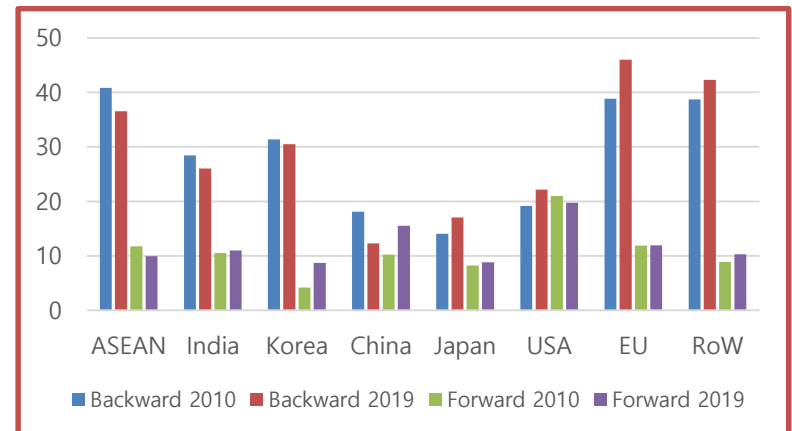
- ❖ When we review the results for the US and Japan, forward GVC participation indexes 2019 are higher than backward GVC participation indexes in textile, machinery, and electrical equipment industries.
- In the case of transport equipment industries, forward GVC participation index 2019 is slightly lower than backward GVC participation index.
- ❖ This result indicates that ASEAN countries import more intermediate goods than other countries including China, Japan, and Korea in the Asian region, thereby assembling the parts and components to export as final goods to foreign countries.

<Figure 4> GVC participation index by industry (continued)

<GVC participation of Electrical Equipment>



< GVC participation of Transport Equipment>



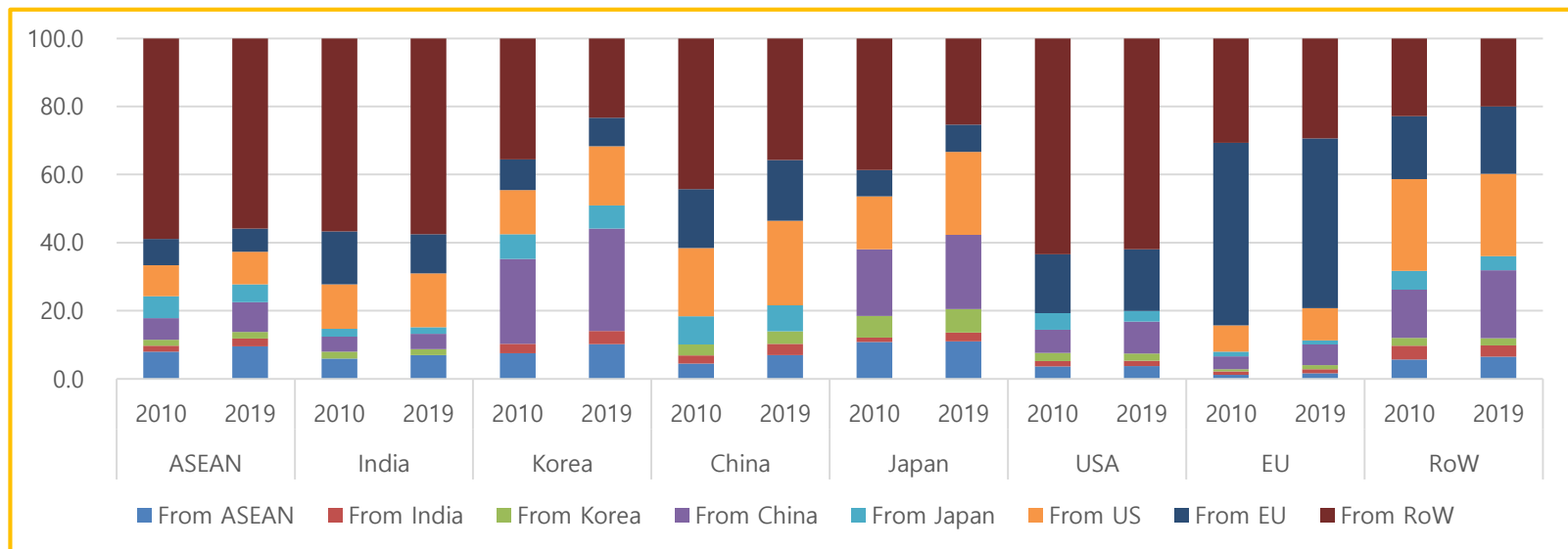
Source: Author's calculation using the ADB MRIO database.

I. Evolution of Global Value Chains: Foreign Content and Imported Inputs

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- ❖ The foreign value content of world exports in 2019 comes from ASEAN (4.8%), India (2.3%), Korea (1.8%), China (12.1%), Japan (3.1%), the US (15.8%), EU (30.4%), and the Rest of the World (29.7%).
- ❖ In the case of ASEAN, the foreign value content of world exports in 2019 comes from ASEAN (9.6%), India (2.3%), Korea (1.9%), China (8.8%), Japan (5.2%), the US (9.5%), EU (6.9%), and the Rest of the World (55.8%).

<Figure 5> Origin of foreign value-added content of exports by country, 2010 and 2019



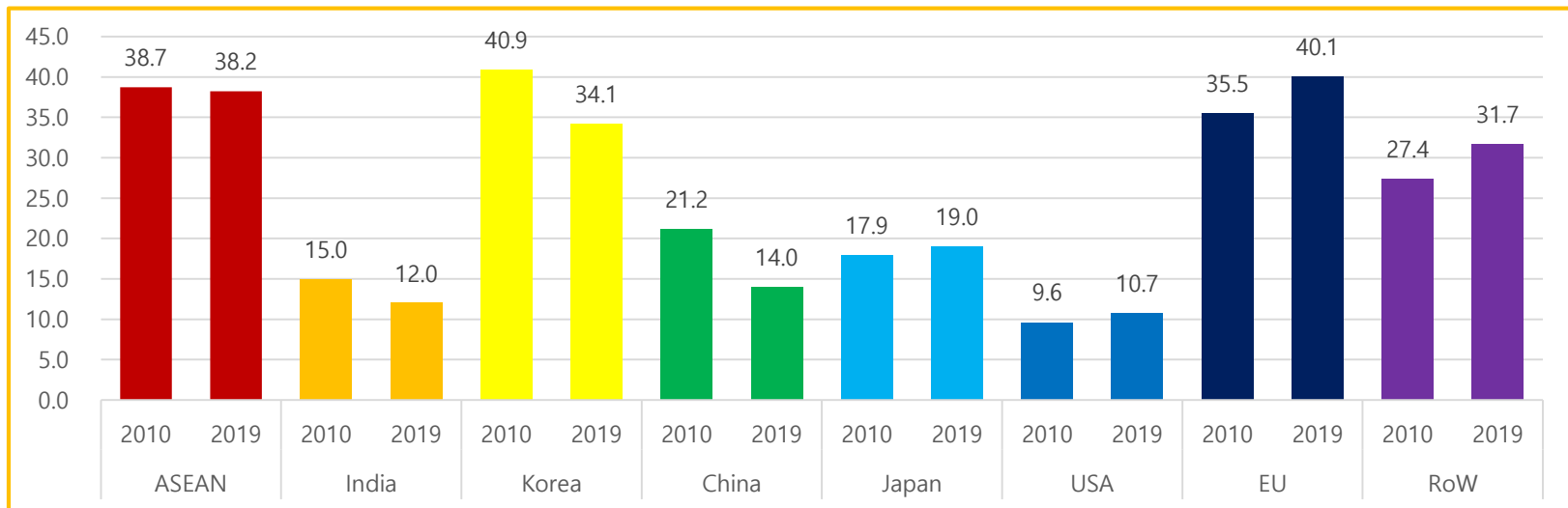
Source: Author's calculation using the ADB MRIO database.

I. Evolution of Global Value Chains: Foreign Content and Imported Inputs

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- ❖ Imported intermediate inputs are re-exported after being processed in the production of goods and services. (Figure 6)
- Export competitiveness depends more than ever on obtaining high-quality inputs from the most efficient source. (OECD, 2013)
- ASEAN: 38.7% → 38.2%; India: 15.0% → 12.0%; Korea: 40.9% → 34.1%
China: 21.2% → 14.0%; Japan: 17.9% → 19.0%; USA: 9.6% → 10.7%
EU: 35.5% → 40.1%; RoW: 27.4% → 31.7%

<Figure 6> Re-exported intermediates as a percentage of intermediate imports



Source: Author's calculation using the ADB MRIO database.

II. Challenges in the Post-COVID-19 Era

II. Challenges in the Post-COVID-19 Era: Disruption of Global value Chains

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- ❖ Global lockdown measures to combat the spread of Covid-19 led to the sharp decline in trade volume.
- World merchandise exports decreased by 15% in Q2. All regions recorded declines, with exports falling most sharply in North America (-24.5%). South & Central America and Asia's exports fell the least (-5.3% and -6.1%) as Asia began to re-emerge from imposed lockdowns and demand for its inputs rose.
- As a result of global lockdown measures, global value chains (GVCs) based on seamless connectivity ended up being almost frozen.

<Table 1> Quarter-over-quarter growth, %, seasonally adjusted

	Exports				Imports			
	2019Q3	2019Q4	2020Q1	2020Q2	2019Q3	2019Q4	2020Q1	2020Q2
World	0.4	-0.8	-2.8	-15.0	0.2	-1.4	-2.5	-13.6
North America	0.4	-0.4	-1.5	-24.5	0.3	-2.4	-2.2	-14.5
South & Central America	-2.3	0.7	-1.6	-5.3	-0.1	-3.5	-1.1	-13.7
Europe	0.2	0.6	-4.3	-21.8	-0.3	-1.7	-2.9	-19.3
Asia	1.4	-2.2	-1.7	-6.1	0.2	-0.9	-0.7	-7.1
Other	-0.1	-2.6	-3.3	-2.6	1.7	0.4	-8.7	-9.1

Source: WTO-UNCTAD

II. Challenges in the Post-COVID-19 Era: Disruption of Global value Chains

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- ❖ Global value chains have tendency to magnify risks from the exposure to economic crises and natural disasters in terms of frequency and magnitude.
 - Any unnecessary dwell time in a segment of GVCs creates a substantial impact on whole production processes because intermediate goods tend to cross borders many times until a final good is assembled.
- ❖ Differently from previous disasters, Covid-19 is not specific to any country or industry, but a pandemic that affects the global connectivity of goods and services.
 - Furthermore, the so-called bullwhip effect aggravates the negative impacts from the demand shock, where an initial demand shock tends to be magnified as one moves upstream.
- ❖ The contraction of GVCs will be accelerated by reshoring and diversification of the offshored production facilities.
 - US President Biden plans to ensure that the future is “made in all of America” by all of America’s workers, and proposes a tax incentive for reshoring and a tax penalty for offshoring.
 - China declares a dual circulation strategy to establish self-reliant supply chains by relying less on global integration and more on expanding domestic commerce (May 2020).

II. Challenges in the Post-COVID-19 Era: US-China Trade War and Protectionism

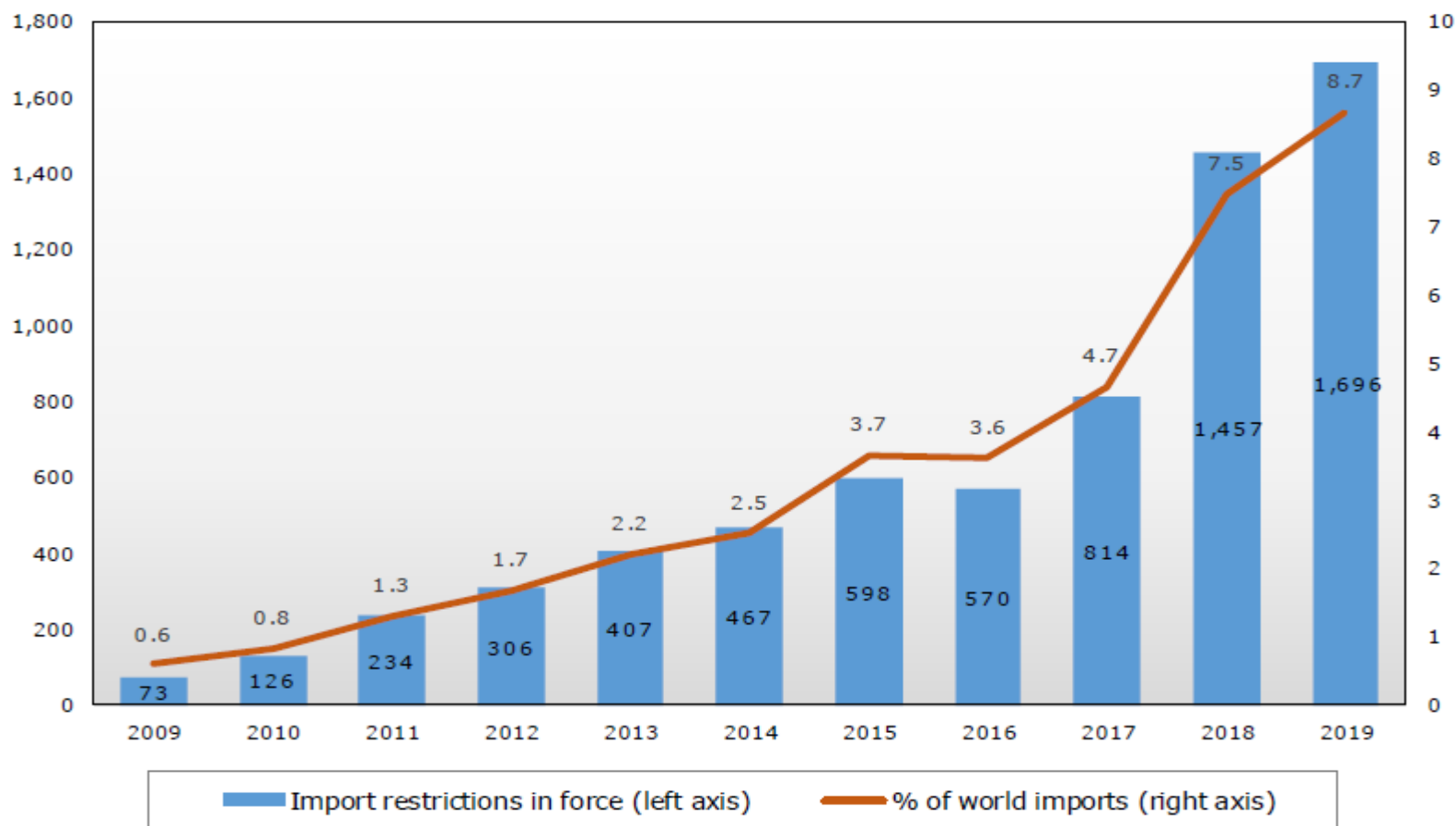
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- ❖ US-China Trade War Issues: Chinese state capitalism, government subsidy programs for state-owned enterprises, violations against the US intellectual property rights, and enforced technology transfer
- The US-China trade war is not just about tariffs. It's more about the economic system and institutional framework.
- ❖ The declining relative importance of the US in the world economy may have diminished the need to reassure trading partners by committing to a rules-based system (Matoo and Staiger, 2019).
- China will not modify its party-state system → Thucydides's trap?
- ❖ The US-China trade disputes may be intensified thereby causing competitive protectionism (Figure 7).
- Global protection measures have increased recently but the current dispute settlement system is not operating efficiently.

II. Challenges in the Post-COVID-19 Era: US-China Trade War and Protectionism

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<Figure 7> Cumulative trade coverage of WTO import-restrictive measures
(USD billion and % of world merchandise imports)



Note: The figures do not include trade remedy measures. COVID-19 trade and trade-related measures are not included.
Source: WTO

II. Challenges in the Post-COVID-19 Era: Deepening RTAs and Failing WTO

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- ❖ The recent trade agreements can possibly serve as stepping stones for multilateral agreements in that they are not only complementary to the multilateral rule-making in such areas as ROO, SPS and standards but they are also consistent with the GATT Article XXIV.
 - For example, the CPTPP introduced the cumulative rules of origin, thereby upgrading the Asia-Pacific area into a more coordinated form of production network.
- ❖ The recent trade agreements have deepened regional integration by improving trade rules already covered by the WTO agreements and by including new rules which are not addressed in the WTO agreements.
 - Boffa et al. (2019), Laget et al. (2018), Ruta (2017), Bickwit et al. (2017), Rubínová (2017), Orefice and Rocha (2014), Antras and Staiger (2011) indicate a positive relationship between deep regional trade agreements and global value chains.
- ❖ WTO multilateral negotiations have been stalled by the conflicting interests among major players.
 - The DSB system has not functioned efficiently since last December.

II. Challenges in the Post-COVID-19 Era: The 4th Industrial Revolution

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- ❖ The fourth industrial revolution is the on-going industrial revolution driven by intelligence information technology.
- The digital innovations related to artificial intelligence, big data analysis, cloud computing, and the internet of things have driven hyper-connection between all products and services through global networks, thereby advancing the data-driven economy.
- ❖ The digital transformation has been accelerated by market needs such that the mass production system of the established industries needs to be changed into a personalized production system.
- The digital transformation has disruptive effects on the product, production processes, and business models of the established industries.
- ❖ Although digital transformation contributes to the expansion of world trade, increased world trade could be concentrated at countries and/or sectors that lead digital innovations.
- According to the OECD (2017), the digitalization of production may become the biggest game-changer for the future of GVCs.

III. Policy Responses

III. Policy Responses: Build More Stable and Resilient Production Networks

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- ❖ ASEAN countries need to build more stable and resilient production networks through various programs to reshore and diversify the offshored production facilities.
- It is also desirable to expand domestic production capacities for essential goods (such as key medical supplies and food etc.).
- ❖ In addition, an efficient system of supply chain risk management could be possibly coordinated through close cooperation between ASEAN countries as well as voluntary cooperation on the part of multinational enterprises.
- Specifically, confidential information on relevant value chains, weak links, and potential policy bottlenecks can be shared and protected through block-chain technology.
- ❖ Transactions in the global production networks need to be more stable and resilient against shocks than other types of transaction. (Kimura, 2013; Goh, 2013)
- When a negative shock affects part of the production networks, it will necessarily influence the whole system.
- Examples: East Japanese earthquake, massive flooding in Thailand

III. Policy Responses: Build More Stable and Resilient Production Networks

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- ❖ Correlation matrices of percentage change in gross exports between 2001 and 2019 indicate that the trade relations among major regions have changed during the 2010s.
- Percentage changes in ASEAN's exports have been strongly correlated with those of other regions including Korea, USA, and the EU during the 2010s. Percentage change in gross exports in the case of China and Japan were highly correlated with those of other regions between 2001 and 2010, but the correlation coefficients substantially decreased during the same period. (Table 2)

<Table 2> Correlation Matrices of Percentage Change in Gross Exports

<2001-2010>

	ASEAN	India	Korea	China	Japan	USA	EU	RoW
ASEAN	1.00	0.87	0.96	0.90	0.98	0.94	0.73	0.93
India	0.87	1.00	0.85	0.85	0.82	0.88	0.84	0.95
Korea	0.96	0.85	1.00	0.89	0.97	0.86	0.71	0.85
China	0.90	0.85	0.89	1.00	0.89	0.82	0.77	0.89
Japan	0.98	0.82	0.97	0.89	1.00	0.90	0.72	0.88
USA	0.94	0.88	0.86	0.82	0.90	1.00	0.75	0.93
EU	0.73	0.84	0.71	0.77	0.72	0.75	1.00	0.86
RoW	0.93	0.95	0.85	0.89	0.88	0.93	0.86	1.00

<2011-2019>

	ASEAN	India	Korea	China	Japan	USA	EU	RoW
ASEAN	1.00	0.87	0.95	0.83	0.79	0.94	0.95	0.91
India	0.87	1.00	0.81	0.79	0.53	0.86	0.92	0.77
Korea	0.95	0.81	1.00	0.83	0.68	0.89	0.87	0.93
China	0.83	0.79	0.83	1.00	0.39	0.94	0.77	0.72
Japan	0.79	0.53	0.68	0.39	1.00	0.65	0.72	0.74
USA	0.94	0.86	0.89	0.94	0.65	1.00	0.90	0.85
EU	0.95	0.92	0.87	0.77	0.72	0.90	1.00	0.86
RoW	0.91	0.77	0.93	0.72	0.74	0.85	0.86	1.00

Source: Author's calculation using the UN COMTRADE Database

III. Policy Responses: Upgrade in Global Value Chains

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- ❖ ASEAN countries have adopted their development strategies to establish specialized production blocks and participate in some segments of global value chains.
- The backward GVC participation indexes turn out to be relatively high while the forward GVC participation indexes are low in case of textile, machinery, electrical equipment, and transport equipment industries.
- This result reveals that the import content of exports in ASEAN countries is relatively large while domestically-produced intermediates are not used in third countries' exports as much as in other countries.

- ❖ ASEAN industries need to capture more value added through GVC participation as the GVC smile curves are expected to deepen further in the post-COVID-19 era.
- ASEAN industries need to achieve functional upgrading through strengthening their competitiveness in upstream segments including R&D, design, and logistics.
- The ability of firms to upgrade is determined by improving workers' skills, improving firms' absorptive capacity and technology, and increasing productivity in existing tasks. (Engel and Taglioni, 2017)

III. Policy Responses: Create a Conducive Regulatory Environment

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- ❖ ASEAN countries need to create a conducive regulatory environment which is not a source of additional, policy-related, risk. (OECD, 2020)

- ❖ Specifically, removal of NTMs can further enhance GVC trade flows for East Asian economies.
 - According to Ing and Cadot (2016), ATIGA (ASEAN Trade in Goods Agreement)'s ROO have substantial trade-inhibiting effects, with recent research putting their ad-valorem equivalent (AVE) at about 3.40%.
 - This means that ROO inhibit ASEAN's trade by an amount roughly equivalent to one quarter of its MFN tariffs.

- ❖ It would be also desirable to review the 'noodle bowl' of ROO and formulate recommendations for its streamlining and to create an institutional mechanism to foster NTM transparency through continuous NTM data collection and dissemination. (Ing, 2017)

III. Policy Responses: Pursue Deeper Regional Integration

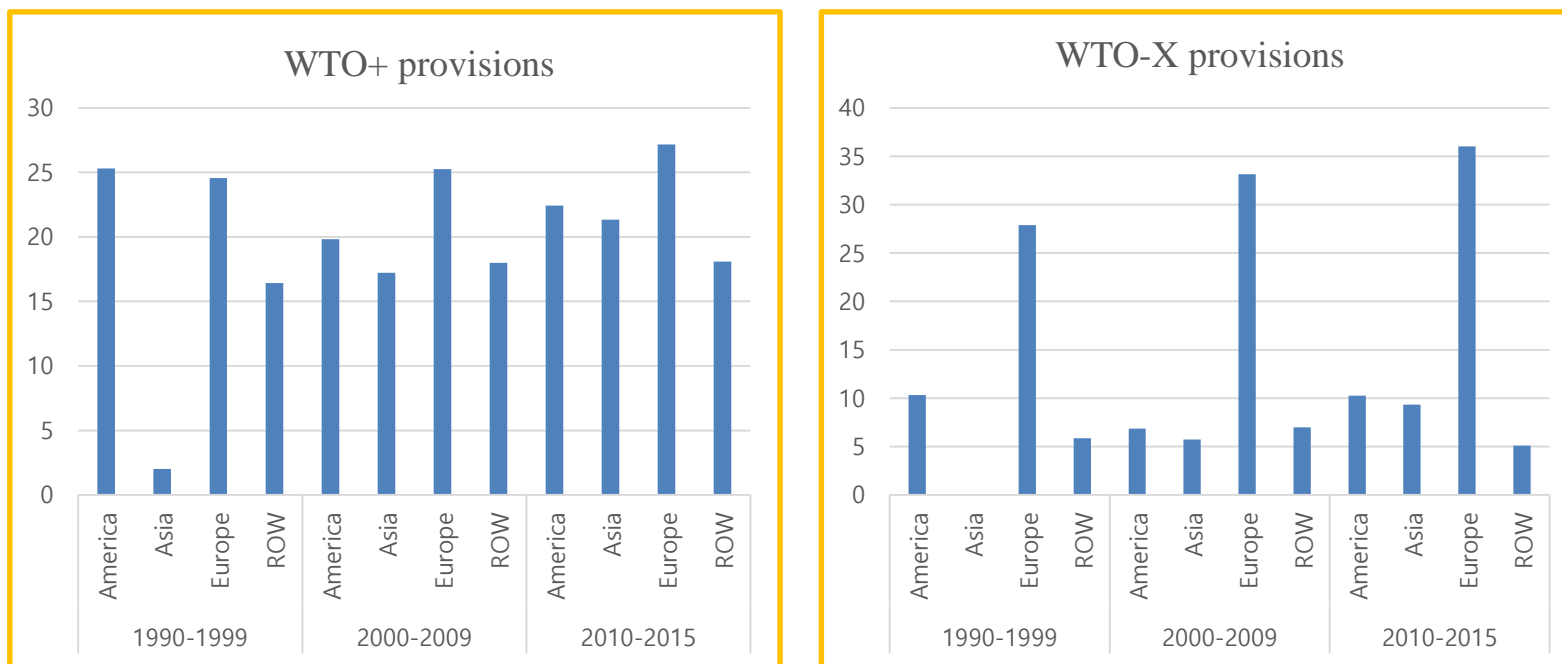
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- ❖ ASEAN countries need to pursue deep regional integration to consolidate global value chains, which have risen as new platforms for national development strategies.
- Recent trade agreements have deepened regional integration by improving trade rules already covered by the WTO agreements and by including new rules which are not addressed in the WTO agreements. (Figure 8)
- ❖ Mega FTAs such as the RCEP and CPTPP could possibly serve as stepping stones for multilateral agreements in that they are complementary to the traditional rule-making.
- Furthermore, the US-EU FTA and the “Stage Two” US-Japan FTA, if finalized sometime in the future, will strengthen their pivotal roles as the regional hubs in production networks.

III. Policy Responses: Pursue Deeper Regional Integration

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<Figure 8> Comparison of Depth of RTAs by Region



Source: Author's calculation, using the World Bank Database.

Note: Horn et al. (2010) divided 52 provisions in 279 PTAs notified at the WTO into the two groups of WTO-plus (WTO+) and WTO-extra (WTO-X). The first group represents the 14 provisions which were discussed by the current mandate of the WTO and were upgraded by the PTA partners beyond their multilateral commitments. On the other hand, the second group represents the 38 provisions which were included in the PTA agreements outside the WTO commitments.

Numbers in the table denote the average number of legally enforceable provisions per PTA during the corresponding period.

