

Research on Global Value Chains: Some Emerging Themes

Zhongxiu Zhao, Xiuxiu Zheng*

Abstract: This paper seeks to define emerging themes for research on global value chains (GVCs) by investigating the challenges they face in the current global economic environment, and China's performance in relation to these obstacles. First, we discuss the impact of uncertainties such as the COVID-19 pandemic, geopolitical conflicts, and rivalry between major powers on global value chains. Second, we explore the relationship between global value chains and national security, focusing on the resilience and reconfiguration of industrial chains, and the role of industrial subsidy policies. Third, we discuss the impact of the structural transformation of energy, decarbonization goals, as well as digital and intelligent technologies on global value chains. Fourth, we suggest that there is still potential for further classical international trade theory-oriented research on issues such as the transmission of trade barriers along global value chains and its welfare implications. Finally, we highlight the crucial role of global value chains in boosting global economic growth and development. Short-term global economic policy uncertainties may challenge its development, while high-level development goals such as mitigating climate change and enhancing environmental governance may necessitate adaptations. However, there will not be any fundamental reversals.

Keywords: Global Value Chains(GVCs), International Trade, International Division of Labor, Uncertainty, Trade Barriers

I. INTRODUCTION

As an important manifestation of deepened economic globalization and

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international division of labor, global value chains (GVCs) have become the center of public attention and discussion. This paper seeks to define emerging themes for research on GVCs by investigating their current challenges, and China's performance. It covers increasing uncertainties in international politics, rivalries among major powers, national security and "decoupling", digitization and green development, and other important topics. However, there is still potential for further research integrated with classical economic theories, especially the international trade theory, on issues such as the transmission of trade barriers along GVCs and its welfare implications. This paper is intended to inspire in-depth discussion on these issues to gain a more accurate understanding of global economic development within the context of economic globalization and international division of labor.

II. IMPACTS OF GEOPOLITICAL CONFLICTS, THE COVID-19 PANDEMIC, AND OTHER INCREASING UNCERTAINTIES ON GVCs

A. Geopolitical Conflicts: Increasing Global Economic Uncertainties Due to the Russia-Ukraine Conflict and Other Factors

Generally speaking, global economic uncertainty has been rising within the past several years. As shown in Figure 1, the Global Economic Policy Uncertainty Index (GEPU) demonstrated a wavelike upward trend from 2007 to 2013. It remained high even after a fall from high levels during the past three years. The Russia-Ukraine conflict at the end of February 2022 is the major factor that has contributed to the elevated amount of global economic policy uncertainties after the COVID-19 pandemic.

Economic sanctions come along with the Russia-Ukraine conflict and the impacts may have spread throughout the industrial chains. The United States (US), the European Union (EU), and other economies have changed their indiscriminate sanctions against Russia to targeted sanctions on specific industries, products, or individuals partly out of concern that full sanctions would severely impact the European economy. The scale of EU's trade and investment with Russia is substantially greater than that between US and

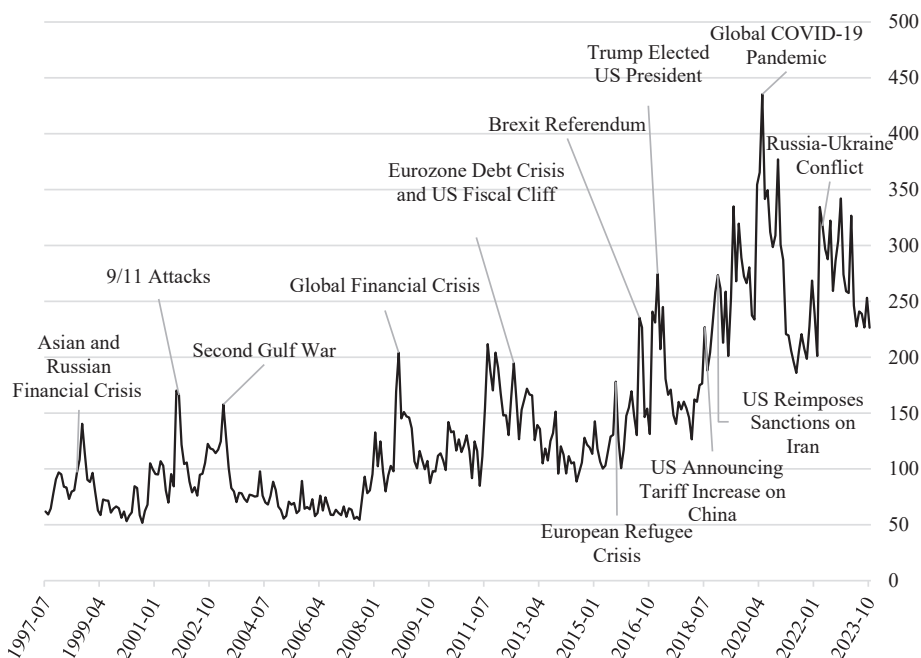


Figure 1: Global Economic Policy Uncertainty Index (1997–2023)

Source: Calculated by the authors based on data from the GEPU database.

Note: The gross domestic product (GDP) of the relevant economies accounts for over two-thirds of global GDP, ensuring their representativeness.

Russia. The EU's goods trade with Russia is 8 times greater than that between the US and Russia, and the EU's foreign direct investment (FDI) in Russia is almost 25 times greater than that of the US.¹ As a matter of fact, EU was faced with deteriorated terms of trade and inflation before the Russia-Ukraine conflict, which was mainly induced by a mounting in the price of imported energy.

Russia is the EU's major supplier of oil (27%), coal (47%), and natural gas (41%).² As shown in Table 1, Hungary, Slovakia, Moldova, Latvia, Austria, Lithuania, Germany, Bulgaria, and Italy are more reliant on natural gas imports from Russia. Unlike oil and coal, the transportation of natural gas depends

1 Peterson Institute for International Economics, Will Tough US Sanctions Deter Russian Aggression in Ukraine? <https://www.piie.com/blogs/realtime-economic-issues-watch/will-tough-us-sanctions-deter-russian-aggression-ukraine> (Last Visited on December 1, 2023).

2 Peterson Institute for International Economics, Europe's Economic Response to the Russia-Ukraine War Will Redefine Its Priorities and Future, <https://www.piie.com/blogs/realtime-economic-issues-watch/europes-economic-response-russia-ukraine-war-will-redefine-its> (Last Visited on December 1, 2023).

Table 1: EU's Reliance on Russian Natural Gas

Major European Economies	Reliance on Russian Natural Gas
Hungary	28.5%
Slovakia	28.2%
Moldova	26.6%
Latvia	23.1%
Austria	21.8%
Lithuania	16.4%
Germany	13.2%
Bulgaria	12.9%
Italy	12.4%
Serbia and Montenegro	10.3%
Poland	10.2%
Czech Republic	9.8%
Macedonia	8.5%
Estonia	8.4%
Finland	6.3%
Croatia	5.0%
Slovenia	5.0%
Greece	3.6%
Romania	1.9%
France	1.2%
Belgium	1.0%
Netherlands	0.6%
Spain	0.1%
Portugal, UK, Ireland, Denmark	<0.1%
Other European Regions	Not Included

Note: The reliance of each economy on Russian natural gas is calculated by the percentage of its natural gas imports from Russia to the total natural gas imports, weighted by the proportion of the net natural gas imports to the total domestic energy consumption in 2019.

on pipelines and other fixed infrastructure, which makes it difficult to change the source seamlessly on both the demand and supply sides. If Russia stops exporting natural gas to the EU, the EU will lose about 40% of its natural gas supply, which is a lose-lose situation. The EU must implement large-scale adjustments of its infrastructure deployment if replacing its natural gas imports

from Russia, which will further undermine its original industrial chains. Since the interconnection system within the EU still requires further improvement, a considerable amount of construction funding will be needed. However, the EU's post-pandemic financial status is not strong enough to support this solution.

B. Pandemic Outbreak: Impacts of the Global Outbreak of COVID-19

The social distancing policy intended to prevent the spread of COVID-19 may have long-standing influences on the population flow in China and could affect its labor-intensive industries. The author analyzed the population flow before and after the COVID-19 pandemic by referencing the Baidu Qianxi database. The results are depicted in Figure 2. Looking at the peak period from January to April in each year, the population flow in Wuhan on non-holiday days in 2021 and 2022 did not recover to its level in 2019.

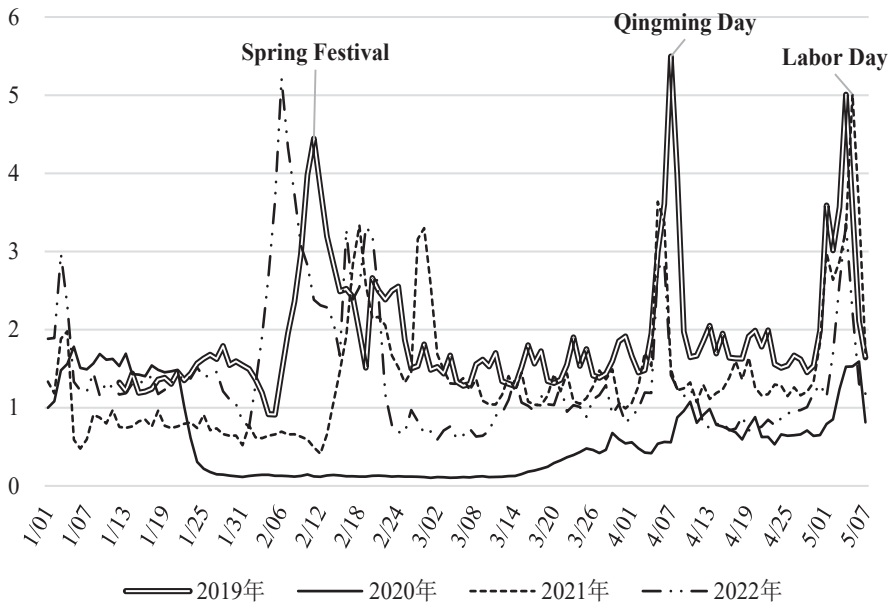


Figure 2: Population Inflow of Wuhan (2019–2022)

Notes: Calculated by the authors based on data from the Baidu Qianxi database. The index value was normalized. The index value of January 1, 2020 was set as 1 to compare the index value in different years.

When analyzing China's exports, this paper selected the monthly export

data of 31 provinces, autonomous regions, and municipalities in China at the product-destination dimension to build a fixed effect empirical model and using Ordinary Least Squares estimation method to estimate the impacts of the pandemic on exports. The results showed that, conditional on other variables unchanged, the growth in the number of confirmed cases in a region has a significant negative impact on export growth, particularly notable two months later, especially in products that are highly substitutive, from industries that are hard to transition to remote work, located downstream in the industry, as well as on final goods. Meanwhile, the severity of the pandemic in the export destination is negatively correlated to China's export growth to that economy.

Observations are by year-month-province-product (HS4-digit)-destination level, from January to April, and from October to December from 2019 to 2021. The dependent variable in all the columns is the log difference in the variable of interest from the same month a year ago. The infection shock as the independent variables in 2019 is set to be 0, assuming that there were no COVID-19 related shocks from 2018 to 2019. Changes in 2019 correspond to the pre-treatment period, and after 2020 to the treatment period after the COVID-19 outbreak in China (in Wuhan) was announced. The interaction terms of product heterogeneous are dummy variables that take the value 1 if the HS4-digit product is an input (not belonging to capital or consumption goods), according to the UN BEC classification; or if the upstreamness index, provided by Antràs et al. (2012),³ is above the median across HS2-digit categories; or if the remote work index, provided by Dingel and Neiman (2020),⁴ is above the median across HS 3-digit categories; or if the import demand elasticity, provided by Broda and Weinstein (2006),⁵ is below the median across HS3-digit categories, and zero otherwise. The above results indicated that both supply and demand influence the impacts of the global pandemic on bilateral trade. Downstream industries or complex global value chains involving multiple

3 Antràs P., Chor D., and Fally T., Measuring the Upstreamness of Production and Trade Flows, *American Economic Review*, Vol. 102, No. 3, 2012, pp. 412–416.

4 Dingel J. I., and Neiman B., How Many Jobs Can Be Done at Home? *Journal of Public Economics*, Vol. 189, 2020, 104235.

5 Broda C., and Weinstein D. E., Globalization and the Gains from Variety, *The Quarterly Journal of Economics*, Vol. 121, No. 2, 2006, pp. 541–585.

border crossings are even more vulnerable.⁶

Table 2: Quantitative Analysis of the Impacts of COVID-19 on China's Exports

Model No.		(1)	(2)	(3)	(4)
Heterogeneous Dummy Variables		Remote Work More Easy	Lower Elasticity of Substitution	BEC Intermediate	Higher Upstreamness
Coefficient Estimate	Variables	$\Delta \ln(1+\text{Export Value})$			
B1	New Confirmed Cases (Time Lag of One Month)	-0.0944*** (0.016)	-0.0756*** (0.004)	-0.1104*** (0.007)	-0.0947*** (0.004)
B2	New Confirmed Cases (Time Lag of One Month) * Heterogeneous Dummy Variable	0.0292 (0.024)	0.0066 (0.006)	0.0732*** (0.013)	0.0564*** (0.009)
B3	New Confirmed Cases (Time Lag of Two Months)	-0.0545*** (0.017)	-0.0318*** (0.005)	-0.0326*** (0.006)	-0.0170*** (0.006)
B4	New Confirmed Cases (Time Lag of Two Months) * Heterogeneous Dummy Variable	0.0586** (0.026)	0.0383*** (0.004)	0.0467*** (0.012)	0.0195 (0.012)
B5	$\ln(1+\text{Export Value})$ (Time Lag of One Month)	-0.5026*** (0.013)	-0.4992*** (0.013)	-0.4995*** (0.013)	-0.4995*** (0.013)
	Constant	5.6932*** (0.145)	5.6578*** (0.142)	5.6578*** (0.142)	5.6576*** (0.141)
	Sample Size	7 092 349	7 348 420	7 412 024	7 421 733
	R ²	0.298	0.297	0.297	0.297
	"Province-Year" Fixed Effect	Yes	Yes	Yes	Yes
	"Year-Month-Destination" Fixed Effect	Yes	Yes	Yes	Yes
	"HS4-Destination" Fixed Effect	Yes	Yes	Yes	Yes
	Joint Significance of B1+B2	-0.0652***	-0.0690***	-0.0372***	-0.0383***
	Joint Significance of B3+B4	0.0041	0.0065	0.0142	0.0025

Note: *** and ** indicate significance at the 1% and 5% levels respectively. Standard errors clustered by province are reported in parenthesis.

6 Heiwai Tang and Xiuxiu Zheng, How did China's Zero COVID Policy Affect Its Exports? *Review of International Economics*, Vol. 32, No. 2, 2023, pp. 545–573.

C. Rivalry among Major Powers: Sino-US Rivalry and Diversified Restrictions

A tariff war is being waged between China and the US. The Trump administration imposed tariffs on imports from China at the rate of 10%, 25%, and 15% since 2018. China has taken tariff countermeasures as described in Figure 3. As of January 2023, the US tariffs covered 66.4% of US imports from China, and 58.3% of China's imports from the US were also under tariffs, as illustrated in Figure 4. This trade war has led to a sharp rise in China's recent trade policy uncertainty, which is depicted in Figure 5. Davis (2016)⁷ defined economic policy uncertainty in the GEPU database. This was measured by considering China's official policy documents published in the *People's Daily* and the *Guangming Daily*.

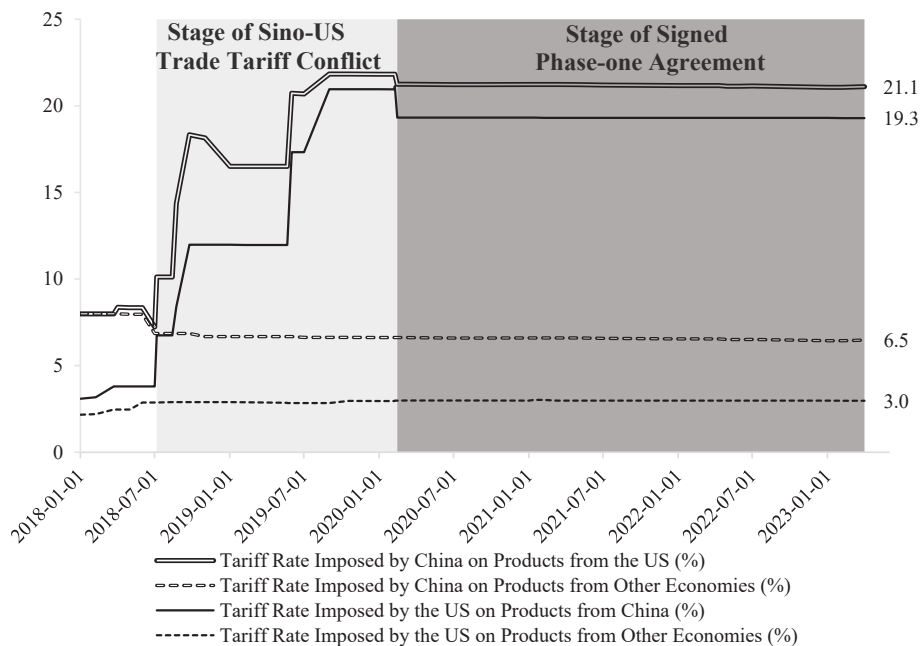


Figure 3: Comparison of Trends in Import Tariff Rate Changes between the Sino-US and with Rest of the World (ROW) (2018–2023)

Source: Peterson Institute for International Economics, Sino-US Trade War Tariffs: An Up-to-date Chart, <https://www.piie.com/research/piie-charts/us-china-trade-war-tariffs-date-chart> (Last Visited on December 1, 2023).

⁷ Davis S. J., An Index of Global Economic Policy Uncertainty, NBER Working Paper, 2016, No. 22740.



Figure 4: Percent of Sino-US Trade Subject to Trade War Tariffs (2018–2023)

Source: Calculated by the authors based on data from the UN Comtrade database.

Furthermore, the US implemented restrictions on Chinese exports and investments in high-tech industries. According to the Semiconductor Industry Association (SIA), the US only had approximately 12% of the global semiconductor manufacturing capacity in 2021. US policymakers attempted to restrict China's development in semiconductors and other key technologies by implementing stricter export controls, investment review, foreign direct product rules (FDPR) and other policies. In 2012, the House of Representatives declared Huawei and ZTE as national security threats of the US.⁸ In 2016, the Obama administration announced export restrictions on ZTE. ZTE was removed from the Entity List after signing a settlement agreement, but its

⁸ China News, The United States Designates Huawei and ZTE as Security Threats; China Urges the United States to Abandon Biases, <https://www.chinanews.com/gn/2012/10-08/4231365.shtml> (Last Visited on December 1, 2023).

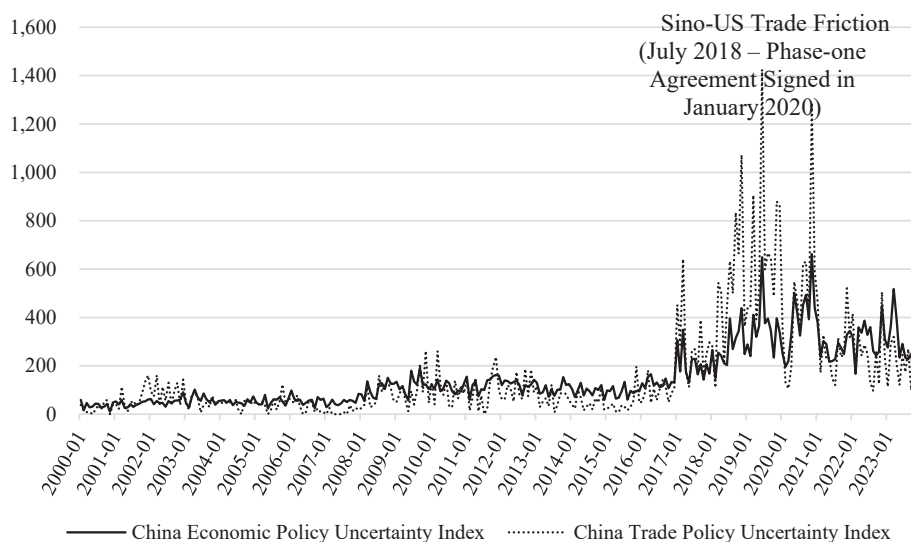


Figure 5: China Economic and Trade Policy Uncertainty Index (2000–2023)

Source: Calculated by the authors based on data from the GEPU database.

share price decreased. In 2019, Huawei was added to the Entity List. After the inauguration, the Trump administration expanded the FDPR to cover products manufactured outside the US and without parts made in the US but with US technology or software, which further negatively impacted Chinese companies' ability to obtain advanced chips. In the context of the international division of labor, the upstream and downstream supply chains of Chinese manufacturing are not limited to its domestic territory, and it has many other trade and investment partners. These restrictions may have a ripple effect and could change the international supply and demand of chips and the downstream industrial chain.

III. THE DISCUSSION OF DEEPENING GVCS AND SAFEGUARDING NATIONAL SECURITY

A. Review of the Industrial Chain's Security and Resilience after the Global Pandemic

The global pandemic made some economies concerned about their control

over industrial chains. Some developed economies have chosen to enact manufacturing reshoring, nearshoring, friendshoring and other strategies for global suppliers, such as the China+1 policy,⁹ to enhance industrial chain resilience. These measures are implemented not only for the industrial chain of chips but also that of raw materials, such as iron ores and agricultural products. If established as a national policy, economic nationalism will create further barriers for the cross-border flow of labor, capital, information and technology, which will not contribute to global economic development and will increase development imbalance. For this topic, this paper intended to answers two questions: What is a resilient industrial chain? What should be advocated to maintain industrial chain resilience within the GVCs framework?

Most researchers believe that economic resilience is the ability of an economy to adapt to external shocks as well as restore and maintain stable operations. Industrial chain resilience may refer to supply chain resilience, geographical resilience, technological resilience, and product resilience, which is based on different dimensions of understanding. For example, the stable supply of raw materials and parts during the manufacturing process reflects supply chain resilience. If several suppliers from different regions complete certain processes, when an emergency or a disaster occurs in certain regions, the capacity in other regions may recover these losses. This is supply chain resilience that is built by the geographical dispersion of suppliers. Technologically resilient companies often respond flexibly to technological changes by quickly adjusting their R&D or production process to improve their product resilience. The emergence of the COVID-19 pandemic highlighted the need for appropriate restrictions on the international flow of labor and products to contain its spread. This situation exacerbated the existing disconnection between supply and demand, as producers and sellers were situated in different geographical regions affected by international division of labor. Therefore, it seems reasonable to equate geographical diversification with the maintenance of supply chain resilience.

⁹ Economic Daily, Foreign Media: "China+1" Is Hard to Get Through and China Is Still the World's Factory, <http://sg.mofcom.gov.cn/article/sxtz/zgyshj/202106/20210603109658.shtml> (Last Visited on December 1, 2023).

Another question is what should be advocated to maintain the industrial chain resilience within the GVCs system. Is it the right remedy for an economy to ensure the security and resilience of the industrial chain — manufacturing reshoring, nearshoring, and friendshoring? This paper argues otherwise. Each economy's participation in highly specialized international division of labor, based on its comparative advantages, is unlikely to be fundamentally reversed. Although short-term uncertainties may challenge this trend, high-level development goals, such as mitigating climate change and enhancing environmental governance, may necessitate adaptations, the fundamental logic of the global arrangement of production and sales to maximize profits remains unchanged, serving as the core driving force of the GVCs. The root cause of the current wave of manufacturing reshoring, nearshoring and friendshoring of developed economies is primarily driven by the influence of international politics and diplomatic relations, as well as the long-ignored diseases and health issues impacting the global layout of production, operation, and sales. It is safe to say that costs of these non-economic factors have reached a peak within the near two decades.

All things considered, this paper argues that decoupling of major powers is not practical, but some economies may take de-risking measures against rising uncertainties, which will tend to influence the layout of the GVCs. But deglobalization is temporary; win-win cooperation is a long-term trend. From an economic perspective, under the influence of economies of scale and economies of scope, multinational corporations usually seek more cost-effective product portfolios and production locations on a global basis. Under the premise that there have been no fundamental changes in production technology, the current issues of shorter cross-border supply chains and geographic concentration reflect a change in the number and weight of economies represented in multinational companies' global production layouts, indicating an adjustment in the configuration of global value chains. However, the fundamental logic of the global layout of corporations focused on maximizing profits will not change. In this sense, globalization remains a dominant trend, whereas the move toward shorter supply chains may reflect a short-term reaction to heightened external uncertainties.

B. Spiraling Upgraded Industrial Subsidies of All Economies

The rules of the WTO oppose export subsidies, but industrial subsidies are mounting. The US Chips and Science Act¹⁰ and the European Chips Act,¹¹ among other legislation, have established a mount of policies for subsidies. The US intends to allocate \$39 billion for semiconductor manufacturing and the direct subsidies account for about 5% to 15% of the capital expenditures. The EU will raise €43 billion in public and private funds to double their share in the global semiconductor market to 20%. In the competition among major economies, there is a growing trend of “spiral escalation” in industrial subsidies. Since the fundamental goal of enterprises is to maximize profits, industrial subsidy policies of various economies significantly influence the strategic layout of multinational firms in relevant industries, thereby reshaping the global production sharing pattern within those sectors.

C. China’s Changing Participation in GVCs

The manner and manifestation of China’s participation in the GVCs have inevitably changed. In the early days after joining the WTO, China participated in international circulation primarily leveraging its comparative advantage of low labor costs, but now it has incorporated technology, capital, and data into it. As China is expanding its opening-up, its policymakers need to place greater emphasis on the foreign investment of Chinese companies. To better participate in the global value chains, efforts can be made in establishing the new development paradigm: On the one hand, it could build a unified national market and remove the barriers of existing local protectionism to release the potential of its domestic market, including its production capacity on the supply side and the appeal of the hyperscale market on the demand side. On the other hand, it could continue to uphold free trade externally and promote a higher level of opening-up. It could also ease market access in trade and investment to

10 The White House, Fact Sheet: In Asia, President Biden and a Dozen Indo-Pacific Partners Launch the Indo-Pacific Economic Framework for Prosperity, <https://www.whitehouse.gov/briefing-room/statements-releases/2022/05/23/fact-sheet-in-asia-president-biden-and-a-dozen-indo-pacific-partners-launch-the-indo-pacific-economic-framework-for-prosperity/> (Last Visited on December 1, 2023).

11 European Parliament, The EU Chips Act: Securing Europe’s Supply of Semiconductors, <https://www.europarl.europa.eu/RegData/etudes/BRIE/2022/733596/EPRS-Briefing-733596-EU-chips-act-V2-FINAL.pdf> (Last Visited on December 1, 2023).

foster positive interactions of domestic and international dual circulation.

IV. CLIMATE CHANGE, DIGITAL ECONOMY, AND GVCS

A. Responsibilities of Economies Regarding Global Carbon Reduction

The Carbon Border Adjustment Mechanism (CBAM), the world's first "carbon border tax", initiated trial operations on October 1, 2023, and its trial phase will last until December 31, 2025. It will come into force from January 1, 2026, and reach its full force by 2034. However, the fairness and effectiveness of such regulatory mechanisms remain controversial. Meanwhile, in recent years, developed economies represented by the EU and the US have repeatedly doubted China's carbon emission levels. However, carbon emission is essentially a global challenge.

Firstly, from an economic development perspective (including industrialization and urbanization), globally speaking, economic and industrial development are imbalanced between developed and developing economies and even within developed economies. The latecomers in industrialization and developing manufacturing, represented by China, have contributed extensively to global economic development within the past 30-plus years. Economies with globally average economic and industrial development should not be denounced for failing to meet the carbon emission standards of developed economies.

Secondly, historically cumulative carbon emission should be considered. Industrialization in developed economies started much earlier than in China. The cumulative carbon emissions of developed economies during industrialization have substantially exceeded those of China. Energy and resources are necessary to sustain their economic development. Developing economies need to invest in energy and resources during their economic development process. At the same time, they have increasingly engaged in international division of labor within the context of economic globalization, making it difficult to avoid a certain level of carbon emissions. In terms of the responsibility to reduce carbon emissions, some developed economies emphasize the modern era and not the history. They ignore the development of

GVCs and that all economies should be considered overall in the global context of carbon reduction. It is neither fair nor reasonable to reproach China and other developing economies.

Thirdly, the factor of resource and energy endowment should be considered. The differences of economies in relation to resource and energy endowment are the inherent reasons for the differing levels of difficulty they face during energy structure adjustment and decarbonization transformation. China and the US are relevant examples. China has one of the world's largest coal reserves, and coal is the cornerstone of its energy consumption. In contrast, the US is rich in oil and gas. Shale gas and other natural gases are fossil fuels but have a much smaller carbon emission coefficient than coal. Nevertheless, China has become the major contributor to current carbon reduction efforts, while developed economies are responsible for the rebound of carbon emissions. The International Energy Agency (IEA) argued that the global carbon emissions from industrial sectors and constructions in 2021 rebounded to its 2019 level because of the increased emissions of developed economies and emerging markets. China's carbon emissions from industrial sectors have been kept below their 2019 level for two consecutive years due to its efforts to promote lower coal use.¹²

It should be noted that some Western researchers pointed out that each economy's responsibility for carbon reduction should not be confined to industrial carbon emissions but must also include those from "land use, land-use change and forestry (LULUCF)".¹³ The carbon emissions of the EU, the US, and other developed economies during agricultural modernization and urbanization can be traced far back which is unfair to ignore. China must meet the demand of more than 1/5 of the world's population, and it is the biggest exporter of agricultural products. Production and daily living activities related to land-use change are indispensable. Excessive criticism of carbon emissions from urbanization may deprive developing economies of the right of development because developed economies already fulfilled the objectives of the same level of urbanization. To ensure fairness, there should be a more

12 International Energy Agency, *Global Energy Review: CO₂ Emissions in 2021*, <https://www.iea.org/reports/global-energy-review-co2-emissions-in-2021-2> (Last Visited on December 1, 2023).

13 Publications Office of the European Union, *CO₂ Emissions of All World Countries*, https://edgar.jrc.ec.europa.eu/report_2022/%20vis=pop#emissions_table (Last Visited on December 1, 2023).

reasonable approach to measure carbon emission, which can protect the right of developing economies to develop in terms of urbanization, industrialization, and living standards.

B. Role and Responsibilities of Multinational Corporations in Carbon Reduction

While the international division of labor continues to deepen, the carbon emissions underlying the global production layout of multinational corporations, a phenomenon of economic globalization, should also be emphasized in decarbonization plans. For example, China's per capita carbon emissions rose suddenly in 2001,¹⁴ the same year it joined the WTO. It became the global manufacturing center shortly thereafter. The volume of its processing trade subsequently exceeded 30% of the total export volume. Instead of its blaming others, China continues to uphold the principles of openness, development, and responsibility to address climate change, enabling it to undertake the responsibilities of a great power.

C. Conflict between Economic Development and Energy and Environmental Protection

The conflict between economic development and energy and environmental protection is a widespread issue. Some EU members have compromised the objectives of carbon neutrality or delayed its implementation. For example, Denmark declared that it will not reach its 2025 commitment as scheduled.¹⁵ Germany also adjusted its original 2035 objectives in its carbon reduction plan to state-level carbon neutrality by 2045.¹⁶ On the one hand, in terms of climate change, the scheduled course of global carbon reduction may be delayed as a result. On the other hand, from an economic viewpoint, larger-scale industrial transformation featuring green technological innovation may also be postponed, indirectly exacerbating potential adverse effects.

¹⁴ The author made the calculation based on the indicators of "Our World in Data-CO₂ Emissions Per Capita", <https://ourworldindata.org/grapher/co2-per-capita-marimekko> (Last Visited on December 1, 2023).

¹⁵ The Paper, Copenhagen of Denmark Has Given Up the 2025 Carbon Neutrality Target, https://www.thepaper.cn/newsDetail_forward_19646760 (Last Visited on December 1, 2023).

¹⁶ The Paper, Germany Canceled the 2035 Carbon Neutrality Target, Retrogressive Policy of "Environmental Vanguard"? https://www.Thepaper.cn/newsDetail_forward_19012624 (Last Visited on December 1, 2023).

D. Profound Impacts of Digital Economy on GVCs

The influence of digital economy on GVCs is and will remain an important topic. Artificial intelligence, digitalization, and automation technology will bring a new round of revolutionary impact on production and service, affecting production efficiency or breaking the constraints of factor endowment on the participation of economies in international trade.

The authors found in a recent working paper¹⁷ that China's Belt and Road Initiative (BRI) has significantly promoted the purchase of industrial robots by medium- and low-income economies along the BRI route, thereby enabling them to integrate into the global value chains from the downstream stages. With the help of intelligent production technologies, non-labor-intensive economies may eliminate the constraints of traditional production factors under the classical trade pattern, which can aid them to participate in the broader international division of labor activities. Those economies import industrial robots not only from China but also from Japan, the EU, and other developed economies. It proves that the BRI is a beneficial way of advancing South-North cooperation and attaining shared development.

V. QUESTIONS TO BE DISCUSSED FROM THE PERSPECTIVE OF CLASSICAL INTERNATIONAL TRADE THEORY AND GVCs

A. Transmission of Trade Barriers (Tariff and Non-tariff Barriers) along GVCs

First, the average level of global tariffs has been decreasing. However, there has been a trend of deglobalization and the tariff war between economies has attracted significant public attention. Moreover, the total additional non-tariff restrictions have been imposed on trade in goods (See Figure 6). The non-tariff import restrictions on trade in goods peaked in 2022 (See Figure 7). Trade protectionism is sweeping across the world. Meanwhile, services trade restrictions are also on the rise, especially for the service mode of commercial

¹⁷ Qing Liu, Lu Liu and Xiuxiu Zheng, Shared Development: "Belt and Road" Initiative and Artificial Intelligence Progress in Member Economies – Evidenced by Imports of Industrial Robots, Working Paper.

presence. These restrictions are closely related to the international trade in goods and foreign direct investment under the GVCs framework (See Figure 8). The concept of GVCs was proposed in 1990s,¹⁸ but global production division underpinning cross-border investment started long before that time.¹⁹ Existing studies explored the influences of tariff and vertical specialization on trade growth²⁰ and the accumulation and transmission effects of tariffs under multiple border crossings.²¹ However, the transmission effects of non-tariff barriers under the GVCs framework is less frequently discussed.

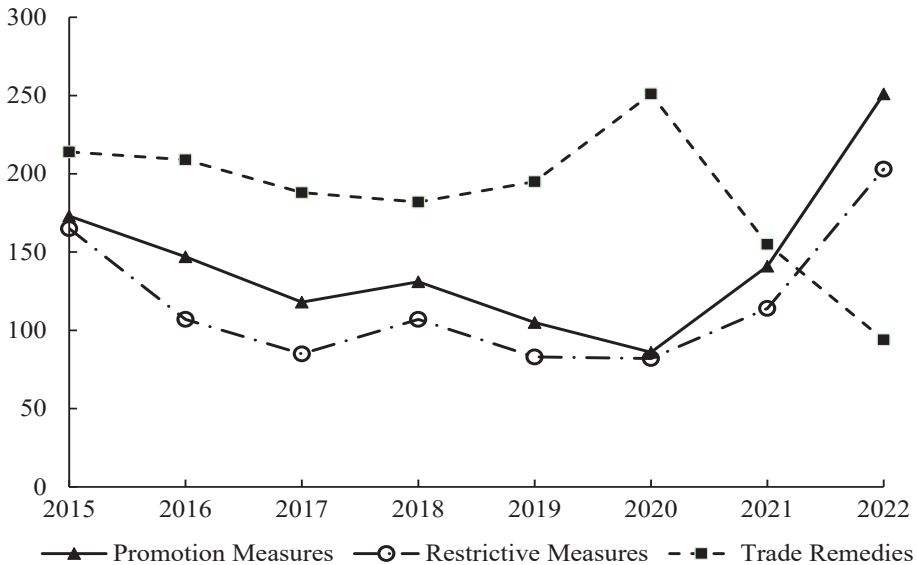


Figure 6: Number of Measures on Trade in Goods (Items) (2015–2022)

Source: Calculated by the authors based on data from the WTO database.

18 Gereffi G., and Korzeniewicz M., *Commodity Chains and Global Capitalism*, Westport, Connecticut: Praeger, 1994.

19 Baldwin R. E., and Venables A., Spiders and Snakes: Offshoring and Agglomeration in the Global Economy, *Journal of International Economics*, Vol. 90, No. 2, 2013, pp. 245–254.

20 Yi K M., Can Vertical Specialization Explain the Growth of World Trade? *Journal of Political Economy*, Vol. 111, No. 1, 2003, pp. 52–102.

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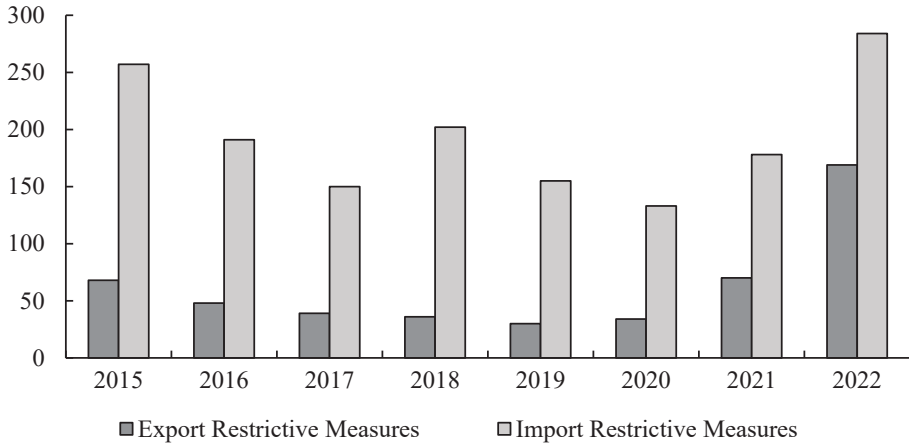


Figure 7: Number of Restrictive Measures on Trade in Goods (Items) (2015–2022)

Source: Calculated by the authors based on data from the WTO database.

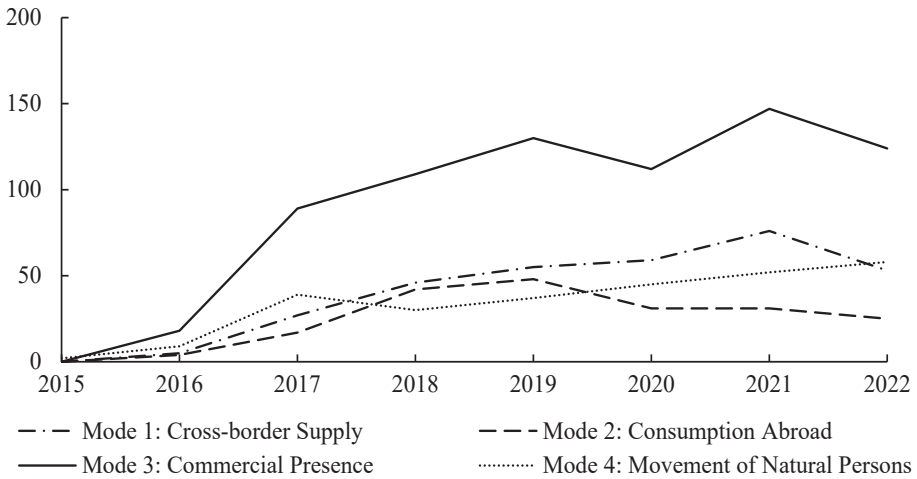


Figure 8: Number of Restrictive Measures on Trade in Services (Items) (2015–2022)

Source: Calculated by the authors based on data from the WTO database.

B. Influences of High-level Regional Trade Agreements on GVCs Development

In the context of international division of labor and GVCs, unilateral, regional,

and global opening-up are interdependent and progressive. Unilateral openness refers to measures taken by an economy to unilaterally lift restrictions on trade, investment, and intellectual property for its partners. Regional opening-up is the open collaboration of several economies in trade, investment, intellectual property, and other fields within a specific geographical area. Global opening-up refers to the openness of all economies in trade, investment, intellectual property, and other fields under a multilateral framework, and is wide-ranging, generalized and inclusive.

First, unilateral opening-up is the keystone of the sustainable development of GVCs. Economies attract and undertake industrial transfers and production activities from other economies by formulating trade and investment facilitation policies and optimizing the business environments, thereby participating in the international division of labor and integrating into GVCs. Second, regional opening-up is an integral part that influences the development direction of GVCs. Several economies reach a consensus in specific economic fields and jointly make guidelines that help to promote regional free trade and investment and help economies to leverage their comparative advantages and promote the flow of production factors, thereby deepening regional value chains (RVCs). Its significance relies on the fact that although intra-regional value chains are a part of the GVCs, the long-term weak ties among them will slow down the development of GVCs. Third, global opening-up is the core driving force of high-quality development of the GVCs. Wide-ranging, generalized, and inclusive opening-up measures among economies and regions can contribute towards the cross-border movement of global trade and investment, deepen international division of labor and cooperation, enhance technological innovation and transfer, lead to higher production efficiency, as well as produce larger-scale and higher-level GVC development. On this basis, economies can collaboratively promote sound and healthy GVCs development and share the benefits of economic globalization only when they continuously and scientifically promote unilateral opening-up, strengthen regional coordination and cooperation, and reach a necessary consensus on global opening-up.²²

22 Xiaopeng Yin and Xiuxiu Zheng, *Status and Trend of Global Value Chain Development*, In: Institute of World Economics and Politics, Chinese Academy of Social Sciences, *World Openness Report 2023*, China Social Sciences Press, 2023, pp. 102–118.

The Asia-Pacific region that includes China is an ideal example. High-level regional trade agreements, such as the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) and the Regional Comprehensive Economic Partnership (RCEP), expedite and consolidate the establishment of the regional industrial and value chains. These agreements promote free trade and market openness, rule-based coordination, cooperation and exchanges among members, industrial division of labor, and technological innovation. However, the further concentration of upstream and downstream industrial chains within the region may also be accompanied by the dispersion and weakening of linkages between regions. The tendency is heightened by the pushing of rising external uncertainties and the pulling of internal free trade. It is worth noting that China and the US seem to go head-to-head in the high-level trade agreements they are deeply engaged in as depicted in Figure 9. The Indo-Pacific Economic Framework (IPEF) proposed by the US and the Trans-Pacific

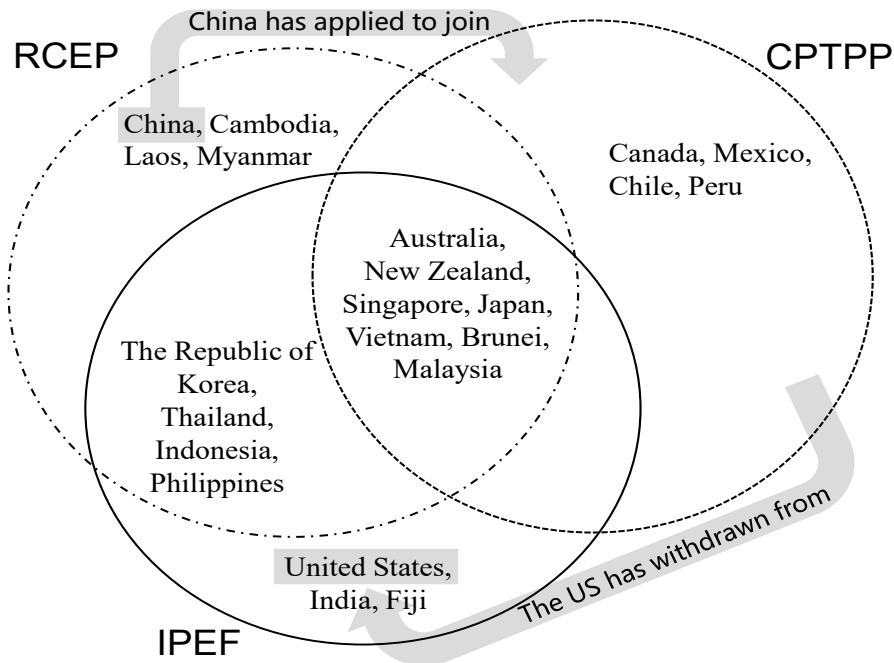


Figure 9: Overlapping Membership in CPTPP, RCEP, and IPEF

Source: Drawn by the authors.

Partnership (TPP) that was once subject to US influence have rules on labor use and are politically motivated. These agreements are aimed at consolidating the US presence in the Asia-Pacific region.

C. Systematic Analysis on the Influence of GVCS on the Macro Economy

GVCs have positive implications for the macro economy. It promotes the deep integration of global trade and industrial chains, improves production efficiency and total output, and drives global economic growth. It also creates new jobs in different production stages, increases people's income, and boosts domestic consumption. It facilitates cross-border transfer of technology and knowledge, enhances the technological level and innovation capacity of economies, and further promotes economic growth. Lastly, economies can earn a larger market share with core competitiveness such as comparative and factor advantages to improve trade complementarity. However, some aspects of GVCs development are uncertain, such as changes in industrial structures and demand of labor skills. Many other economic difficulties will occur during this period. Therefore, policy-makers should seek a balance under the GVCs framework to promote sustainable economic growth and improvement of benefits. Related policies should be rigorously grounded in economic theories.

VI. CONCLUSION

The world economy is standing at a multifaceted crossroads, where economic force serves as a crucial foundation for the interactions among economies. GVCs play a significant role in promoting global economic growth and development. Short-term global economic policy uncertainties may challenge its development, while high-level development goals such as mitigating climate change and enhancing environmental governance may necessitate adaptations. However, there will be no fundamental reversal.

As a global manufacturing center, China firmly advocates for trade liberalization and economic globalization, refusing to alter its commitment to support global economy for short-term gains. This reflects the resolve and responsibility of China, and it plays an irreplaceable role in maintaining

global economic stability. In the future, China will continue to exert significant influence on advancing the global economy and the GVCs, contributing to a more resilient, inclusive, and sustainable global economy, benefiting the world through win-win cooperation.