Globalization and International Value Chains: 2000-2021 By Guy F. Erb and Scott Sommers

The disruptions in international supply chains that occurred during the COVID-19 pandemic and the escalation of economic and political tensions between the U.S. and China have given rise to claims that globalization has died or is at least moribund. In this note we will address three questions concerning the evolution of globalization from 2000 through 2021:

- 1. Did globalization decline during that period?
- 2. To what extent did North America and China decouple their supply chains?
- 3. Did regionalization ("nearshoring") increase?

In its broadest sense, the term "globalization" captures the interaction of national economies through the movement of people, ideas, capital, technology, goods, and services. Globalization so defined has already crossed a threshold from which it will likely never return, barring a global conflict or a failure to respond adequately to climate change. Indeed, individuals across the world today are more connected than ever before. Consider, for example, that almost two-thirds of the world's population owns a smartphone, or that the estimated number of international tourists in 2023 exceeds 1 billion. Such human interconnectivity will only increase over time as communication and transportation-related technologies continue to advance. There has also been rapid growth in services trade, and especially in intermediate services.¹ When observed through this broad lens, globalization remains deeply rooted and change is one of its enduring characteristics.

Among the many facets of globalization, our focus is on international trade, and on global value chains (GVCs) in particular. The volume of trade flows in goods and services has withstood significant challenges in the past, and stands to do the same in the future, even as patterns of trade flows change. Already, many of the negative impacts of the COVID-19 pandemic and increased geopolitical tensions have been met with creative workarounds, demonstrating the resilience of international trade and global supply networks. Changes in the patterns of cross-border trade in goods and services do not indicate a decline in globalization. Our quantitative analysis provides strong evidence that value-added trade supporting the production of goods and services did not recede during 2000-2021, nor was there evidence of a global trend toward reshoring. Instead, the evidence suggests that 2021 was a high mark for the global exchange of goods and services as measured by international value-added production linkages. Regarding the question of whether there has been a decoupling between North America and China, our analysis finds no evidence of decoupling of value-added production linkages. In fact, we find that China and North America increased their value-added production linkages between 2017 and 2021, implying significantly greater linkages than those that could be estimated using gross trade statistics.

¹ Richard Baldwin, "The peak globalisation myth: Part 4 – Services trade did not peak," VoxEU.org, September 3, 2022, <u>https://cepr.org/voxeu/columns/peak-globalisation-myth-part-4-services-trade-did-not-peak</u> Accessed February 13, 2023; ADB et al., Beyond Production: Global Value Chain Development Report, 2021.

Our analysis utilizes the GVC Indicators database created by the University of International Business and Economics (UIBE) in Beijing. The GVC Indicators database breaks down value added into that which flows through GVCs, and that which does not.² See the appendix for a description of the data and methodology. In the charts that follow, the term "forward GVC participation" captures the degree to which a country's domestic value added is exported through global value chains. "Backward GVC participation" captures the extent to which a country's final production includes value added that is imported from global value chains. For each measurement, a higher percentage indicates greater relative importance of value added that is imported or exported through GVCs compared to value added sourced domestically. Thus, higher levels of backward and forward GVC participation indicate greater global integration of production networks.

We concentrate on the world's three major trading entities: China, the European Union (EU), and North America, defined as the three nations in the USMCA (Canada, Mexico, and the United States). Our calculations for the EU in all years include GVC activity for the 27 member countries as of 2021, and therefore exclude the United Kingdom. Value added originating from China, the EU, and North America accounted for 54% of worldwide value added involved in GVCs in 2021, and final production by the three entities accounted for 57% of GVC-involved final production. Other significant GVC trading nations in 2021 which are not included in our main analysis include India, Japan, Russia, and the United Kingdom.³ In our analysis, we address reshoring within North America and the EU while considering how each bloc's linkages with China have evolved over time.

Figure 1 shows trends in forward and backward GVC participation for each region at intervals during 2000-2021. For purposes of comparison with China and to avoid overstating the degree of international production linkages for North America and the EU, we only consider only the external trade of those two blocs when measuring GVC-related activity. As can be seen in Figure 1, Panels a and b, in 2021 both backward and forward GVC participation in goods production stood at or near all-time highs for each region.⁴⁵ Panels c and d show that the same holds true within the service sector, except for Chinese forward GVC participation. It is likely that the decline in China's forward GVC participation in services reflects the effects of structural change in the Chinese economy. The service sector's share of Chinese GDP grew from 39.8% to 53.3% from 2000 to 2021, growth that our analysis indicates came largely from domestic value chains. In other words, Chinese demand for intermediate services produced domestically outpaced foreign demand for Chinese intermediate services from 2000 to 2021. This caveat aside, Panels a through d provide evidence that the involvement of these three major blocs in global value chains stood near

² We also utilized an earlier UIBE GVC Indicators database in Erb and Sommers (2020a) and Erb and Sommers (2020b).

³ Final production from India, Japan, and the United Kingdom combined accounted for 11% of worldwide value added involved in GVCs in 2021. Value added originating from Japan, Russia, and the United Kingdom combined accounted for 10% of worldwide final production involved in GVCs in 2021.

⁴ The decrease in China's backward and North America's forward GVC participation indices from 2013-2017 seen in Panels a and b are largely attributable to fluctuations in value-added trade in the "Mining and quarrying" sector, as classified by the ADB ICIO tables.

⁵ The increase in China's backward GVC participation from 2017-2021 is driven primarily by increases in value-added imports in the following sectors: 1) "Mining and quarrying" 2) "Electrical and optical equipment", 3) "Wholesale trade and commission trade, except of motor vehicles and motorcycles", and 4) "Renting of machinery and equipment; other business activities". The increase in North America's forward GVC participation from 2017-2021 is then driven primarily by increases in value-added exports in the "Pulp, paper, paper products, printing, and publishing" sector, followed by increases in the "Agriculture, hunting, forestry, and fishing" and "Chemicals and chemical products" sectors.

or at a historic high, and that globalization had not declined through 2021. While the data that we employ in our analysis only extends through 2021, we note that with the volume of world trade hitting a record estimated at \$32 trillion in 2022, it is likely that the trend seen in Figure 1 continued and globalization had still not declined as of the beginning of 2023.⁶



Source: All figures are based on the UIBE GVC indices derived from the Asian Development Bank (ADB) MRIO tables (see appendix).

Note: Forward GVC participation is calculated as a country's domestic value added that is exported along global value chains, as a percentage of the country's total domestic value added. Backward GVC participation measures the value added that is imported from GVCs and embedded in a country's final production (for consumption or export processing), as a percentage of the country's final production.

Regarding the questions on the decoupling of North American and Chinese supply chains and reshoring, most of the recent commentary on the state of global trade paints a picture of a trading system in flux. This picture is marked by a reordering of bilateral trade flows triggered by rising geopolitical tension between the U.S. and China, and the desire to diversify trading

⁶ Council on Foreign Relations Global Trade Tracker, https://www.cfr.org/tracker/global-trade-

tracker?utm_source=steilfriends&utm_medium=email&utm_campaign=CFR%20Global%20Trade%20Tracker%20January%202023%20Update& utm_term=FriendsSteil Accessed February 2, 2023.

partners in the wake of the Covid-era supply chain crisis. Part of the reshuffling of supply chains has involved manufacturers currently operating in China deciding to shift some of their production processes to nearby Asian nations and to Mexico to avoid U.S. tariffs and hedge themselves against the risks posed by being overly reliant on China. Many point to this as evidence of decoupling between China and the U.S., noting that the recent reordering of supply chains has led to a surge in trade flows between China and its non-U.S. trading partners, and in trade between the U.S. and its other trading partners. Specifically, when looking at gross trade in goods (as most articles have done, as this data is the most widely available and easiest to analyze), Chinese customs data show that Chinese gross trade in goods with the world excluding the U.S. by 18 percentage points from 2017-2021, and by 4 percentage points from 2021-2022. Likewise, U.S. customs data shows that U.S. trade in goods with the world excluding China outpaced trade with China by 18 percentage points from 2017-2021.

While it is true that over the period 2017-2021 direct linkages as measured by gross bilateral trade have declined between the U.S. and China relative to their trade with other countries, gross trade statistics do not tell the entire story. The complexity of modern-day supply chains implies that much of the value added embedded in U.S. imports from its trading partners other than China still originates from China. The same can be said of Chinese imports from its other trading partners, with embedded value added originating in the U.S. Therefore, quantifications of the decoupling of the U.S. and China that use gross trade statistics almost surely overestimate the degree of decoupling, as the two nations still have very strong indirect value-added trade linkages that are not apparent in gross trade statistics. Our analysis sheds light on this discrepancy: we find that China and North America increased their value-added production linkages between 2017 and 2021.

Turning to our second question, we examine whether North America and China had decoupled (that is, reduced their linkages in global value chains) by 2021. Panels a and b in Figures 2 and 3 break down the GVC participation indices reported in Figure 1 by partner country or region. This allows us to quantify the contribution by each of the three blocs to one another's forward and backward GVC participation indices in the goods sector and show which of the three drove major changes in GVC participation.⁸

Figure 2 shows that the contribution of North America and China to one another's backward GVC participation indices grew from 2017-2021. Looking at North American backward GVC linkages, Panel b shows that the share of total value added embedded in North American final goods production that originated from China and was imported through global value chains increased slightly, from 2% to 2.2%, during 2017-2021. For China, Panel a shows that backward GVC participation grew overall from 12.1% to 16.3% during the four-year period. In other words, of the total value added embedded in Chinese final goods production, the share imported from global value chains grew by over 4 percentage points. Further, the share of total value added embedded in Chinese final goods production that originated from North America and was imported through

⁷ U.S. and Chinese customs data is reported on a nominal basis, and therefore are not adjusted for inflation.

⁸ We focus on the goods sector specifically due to limitations in the data for the service sector.

global value chains almost doubled (from 1% to 1.96%), thus representing almost one fourth of the growth in total Chinese backward linkages. By comparison, in terms of gross trade statistics, we estimate that growth in gross imports from North America accounted for only 5% of China's total import growth from 2017-2021.⁹ We conclude that the growth in Chinese backward GVC linkages through 2021 was largely driven by increased linkages with North America, a result that signifies that little or no decoupling occurred over the period 2017-2021, and that estimates utilizing gross trade statistics greatly overestimate the degree of decoupling.



final production.

⁹ Authors' estimate: China's bilateral trade with Mexico is not publicly reported in Chinese customs data.

Figure 3 breaks down forward GVC linkages in the goods sector by partner bloc. Panel b shows that from 2017-2021, North America's forward GVC participation increased overall from 12% to 14.3%, a shift toward greater participation in foreign production. Our breakdown indicates that the forward participation index capturing North American value added that was ultimately embedded in Chinese final goods production increased from 1.1% to 2.4%. This indicates that over half of the growth in North America's forward GVC linkages from 2017-2021 can be attributed to increased forward linkages with China. Panel a shows that overall Chinese forward participation grew during the same period but leveled off with North America.



percentage of the country's total domestic value added. Backward GVC participation measures the value added that is imported from GVCs and embedded in a country's final production (for consumption or export processing), as a percentage of the country's final production.

Together, Figures 2 and 3 show that China and North America maintained indirect linkages in goods production during 2017-2021. Further, growth in North American forward linkages with China exceeded growth in its forward linkages with other regions, and Chinese backward linkages with North America exceeded growth in Chinese backward linkages with other regions. As described earlier, growth in direct linkages between North America and China as measured by gross trade has indeed slowed during this time frame. Our findings are not intended to rebut this fact. Instead, we highlight the need to analyze both direct and indirect trade and production linkages when estimating the extent of decoupling between North America (or the U.S. in particular) and China. Specifically, our results imply that despite the potential for further decoupling in direct linkages, indirect linkages remained strong in 2021.

Finally, we consider whether there is evidence that nearshoring increased between 2017 and 2021. To do so, we focus on intra-regional production linkages, with a particular emphasis on North America and the EU. Recall that in our first two analyses, we limited our measurement of GVC activity in North America and the EU to external linkages only. In Figure 4 we quantify the contribution of countries within each region to changes in the region's aggregate GVC participation. For example, North America's intra-regional forward GVC index is now calculated as the sum of all value added contributed by Canada, Mexico, and the U.S. that flows through global value chains and is ultimately embedded in Canadian, Mexican, or U.S. final production, as a share of aggregate North American value added.¹⁰ Increases in intra-regional forward or backward GVC indices imply stronger regional production linkages and therefore an increase in nearshoring.

Figure 4 shows the intra-regional GVC participation indices for North America and the EU, limited to goods production during the period of 2000-2021. The trend that stands out over this time frame is the increase in GVC linkages within the EU, although this increase occurs entirely from 2000-2017, and then flattens out from 2017-2021. Specifically, intra-regional forward GVC participation increases from 14% to 21.1% for the EU from 2000-2017 and recedes slightly to 21% in 2021. Intra-regional backward GVC participation increases from 12.8% to 17.6% for the EU from 2000-2017, and increases slightly to 17.7% in 2021. For North America, a slight increase in intra-regional GVC linkages occurs from 2009-2017, but we see no increase in the last four years of the sample. We conclude that reliance on regional production as measured by GVC linkages in value added did not increase in 2020 or 2021, although this issue warrants continued attention.¹¹ There are many frictions involved in the uprooting or reshuffling of global value chains, and it very possible that post-pandemic decisions by producers to regionalize supply networks will take years to materialize in a way that is visible in data on GVC linkages.

¹⁰ Similarly. North America's intra-regional backward GVC index is calculated as the sum of all value added contributed by Canada, Mexico, and the U.S. that flows through global value chains and is ultimately embedded in Canadian, Mexican, or U.S. final production, as a share of aggregate North American final production.

¹¹ See Shannon K. O'Neil, The Globalization Myth: Why Regions Matter, Yale, 2022 and "Mexican Industrial Hubs Grow", Wall Street Journal, https://www.wsj.com/articles/mexicos-industrial-hubs-grow-as-part-of-trade-shift-toward-nearshoring-11675257070 Accessed February 2, 2023

a. Intra-Regional Forward GVC Participation, Goods Production

Source: All figures are based on the UIBE GVC indices derived from the Asian Development Bank (ADB) MRIO tables (see appendix).

Note: Intra-regional forward GVC participation is calculated as the sum of a region's domestic value added that is exported along global value chains and ultimately embedded in the region's final production, as a percentage of the region's total combined domestic value added. Intra-regional backward GVC participation is calculated as the sum of a region's domestic value added that is exported along global value chains and ultimately embedded in the region's final production, as a percentage of the region's total combined that is exported along global value chains and ultimately embedded in the region's final production, as a percentage of the region's total combined final production.

Overall, our findings echo the conclusions reached in the recent academic literature addressing questions relating to deglobalization, nearshoring, and decoupling. For example, Adam Tooze recently cited the "feverish talk of deglobalisation and decoupling ...while the statistics show an inertial continuity in trade and investment patterns."¹² Pol Antràs (2020) rejected claims that that the world had begun a period of deglobalization. Specifically, he notes that due to the existence of high sunk fixed costs that are involved with offshoring, there is significant "stickiness" hampering reshoring of production activities. This is particularly true when offshoring takes place along GVCs, as sequential production processes imply that stage-specific production decisions are interdependent, and it is therefore often unprofitable to reshore some production activities but not others. Our Figures 1 and 2 provide strong evidence of the "stickiness" of GVCs. Regarding decoupling, Eppinger et al. (2023) use a quantitative trade model to assess the welfare effects of decoupling from GVCs, as defined by increased barriers to international trade in inputs. Their study finds that the welfare losses from decoupling far exceed benefits associated with reduced shock exposure. Our finding that there was no significant evidence in 2021 of decoupling of GVCs is consistent with Eppinger's conclusion that firms should be mindful of the high costs that can come with decoupling.

¹² Adam Tooze, "Three Ways to Read the 'Deglobalization' debate," Financial Times, January 30, 2023, https://www.ft.com/content/b3f41263-88d9-4012-aafc-145f0327678f?desktop=true&segmentId=7c8f09b9-9b61-4fbb-9430-9208a9e233c8#myft:notification:daily-email:content Accessed February 2, 2023.

In conclusion, recent developments including the COVID-19 pandemic and the increased political tensions between the U.S. and China have heightened the fear of a reversal in the pace of globalization and have led to predictions of a significant rise in nearshoring and decoupling between the U.S. and China. Our analysis considered whether significant nearshoring or decoupling occurred during 2017-2021. After examining value-added linkages along GVCs, we found no evidence supporting deglobalization, nearshoring, or decoupling during that period. We acknowledge that gross trade flows show that some decoupling and nearshoring has occurred since the onset of the pandemic. However, our analysis has shown that both direct linkages in gross trade flows and indirect value-added linkages through GVCs must be considered in any quantification of the extent of decoupling and nearshoring that may occur in the future. Analyses limited to gross trade linkages will overstate the degree of either decoupling or nearshoring. Moreover, the frictions involved in the reshuffling of GVCs and the corresponding "stickiness" of GVCs imply that globalization in its current form is deeply entrenched. Changes in GVCs will come gradually. While we believe "deglobalization" to date has been more talk than reality, the war in Ukraine, geopolitical tensions between the U.S. and China, and industrial policies in North America and the EU may yet lead to increased nearshoring and an increase in the regional component of globalization.

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Appendix

Our analysis utilizes the University of International Business and Economics (UIBE) GVC Indicators database, which decomposes GVC production activities using the Multi-regional Input-Output (MRIO) Tables constructed by the Asian Development Bank. This database offers global coverage of 62 nations from 2000-2021 (excluding years 2001-2006), across 35 industries, decomposing value added into that which flows through global value chains, and that which does not. Value added that crosses at least one national border prior to final production occurring is classified as a GVC activity. Forward GVC participation captures a country's domestic value added that is exported along global value chains, as a percentage of the country's total domestic value added. Backward GVC participation then captures the value added that is imported from GVCs and embedded in a country's final production (for consumption or export processing), as a percentage of the country's final production (for consumption or export processing), as a percentage of value added that is imported or exported along GVCs, compared to value added sourced from domestic production chains. For the most recent report on global value chains see Beyond Production: Global Value Chain Development Report 2021.