LATIN AMERICA IN THE NEW GEOMETRY OF **GLOBAL SUPPLY CHAINS**

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Executive Summary[§]

This paper assesses Latin America and the Caribbean's (LAC) preparedness to take advantage of potential shifts in the structure of global value chains (GVC). We start by unpacking and examining the main drivers of change in global trade and investment flows, focusing on technology, sustainability, and geopolitics. In each area, the paper analyzes the likely implications for investment and sourcing decisions in the context of GVCs, identifying several channels through which each broad driver is likely to shape GVCs in the future. This discussion highlights diverse and, in some cases, countervailing impacts on global trade, adding nuance to existing debates over deglobalization or nearshoring. Drawing on this conceptual framework, we develop a new set of preparedness indicators for GVC participation and compare LAC's performance to the Organization for Economic Co- operation and Development (OECD) and Association of Southeast Asian Nations (ASEAN). The region lags behind on technology-related indicators but appears to be well positioned to take advantage of sustainability and geopolitical drivers.

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INTRODUCTION

The evolving landscape of the global economy brings a myriad of challenges and opportunities for the developing world and Latin America and the Caribbean (LAC). An unprecedented surge in globalization characterized the world economy during most of the post-WWII period, notably accelerating from the mid 1980s until the onset of the Global Financial Crisis (GFC) in 2008. This surge is evident in various metrics, such as the significant increase in the ratio of world trade to world GDP, which has more than doubled since the 1970s, culminating in a phase of "hyper-globalization" between 1986 and 2008. This latter period, notably, was characterized by the rise of global value chains (GVCs)—or the cross-border separation of production tasks within industries—as well as a sharp rise in the participation of developing countries in global manufacturing output. Since 2008, however, the world economy has entered a period of "slowbalization," marked by a deceleration in cross-border trade, financial flows, multinational activity, and the importance of GVCs trade in global trade.

The hyper-globalization and rise of GVCs in the 1990s and 2000s occurred in a highly supportive technological, political, and trade policy environment. Rapid advances in information and communications technology (ICT)—especially the Internet—facilitated the emergence of cross-border production networks by significantly reducing the cost of coordinating complex tasks across large distances (Baldwin 2016). On the political front, the disintegration of the Soviet Union and the rise of liberal reforms in many developing economies created strong support for global economic integration in previously protectionist economies. This led, in turn, to major reductions in tariff levels in regions such as Latin America and Asia, a sharp increase in bilateral and regional integration agreements, and an important expansion of the multilateral trading system.

In the aftermath of the GFC, however, many of these drivers of globalization appear to have lost steam, or perhaps even changed direction. The global economy has weathered a series of cumulative shocks, ranging from trade disputes between the United States and China, the United Kingdom's exit from the European Union, the unprecedented impact of the COVID-19 pandemic, as well as the outbreak of armed conflicts in Europe and the Middle East. These events have caused major disruptions to supply chains and injected growing uncertainty into global geopolitics. The growing imperative to reduce carbon emissions, meanwhile, has provided further incentives for companies and policymakers to rethink the current structure of GVCs.

Moreover, the domestic political economy landscape has shifted in developed and developing economies alike, with the rise of protectionist policies and political populism, partly stemming from the uneven effects of globalization and the absence of compensatory measures for those adversely impacted by this process. Finally, while the advance of digital technology has accelerated dramatically, new innovations such as artificial intelligence (AI), robotics, and additive manufacturing have the potential to reverse the economic logic of GVCs by making production in advanced economies more cost-effective. These recent dynamics have sparked claims that fundamental shifts in the functioning of GVCs and even a new era of de-globalization is imminent.

Governments in the world's major economies are reacting to these new trends and unexpected shocks by recalibrating their international and domestic economic policies. Major economic powers are adjusting their trade and industrial policy toolkits, ranging from the European Union's strategic autonomy to the United States' workers-centered trade policy narratives, while China is shifting towards a more inward looking and domestic centered economy. In addition, the global trade architecture is also evolving, towards a more fragmented and variable-geometry framework for trade and investment

agreements. That said, none of them point to a radical break with the past nor do they suggest that there are better policies than open trade and integration to sustain long-term growth.

These trends have major implications for regions such as LAC, as potential shifts in the structure and drivers of GVCs will shape opportunities to leverage global economic integration to boost productivity and reduce poverty. The challenge for governments and firms in the region is to adopt policies and business strategies that respond to the new challenges and opportunities arising from the changing global economic landscape.

But, what policies and strategies are needed to thrive in the current global economic context? This paper aims to help answer that question by examining the defining features and drivers of a potential reorganization of GVCs and the likely implications for LAC. We acknowledge that considerable uncertainty remains over the scope and timeframe of this reorganization, and many debates around it are not new. Still, policymakers and firms in LAC need to anticipate potential changes or else risk missing out on possible large development opportunities from a new phase of globalization.

Although LAC has undergone a substantive process of trade liberalization since the 1990s, its involvement in GVCs falls behind other regions like the European Union and Asia. Figure 1 illustrates that LAC not only exhibits lower participation in backward and forward linkages compared to the European Union and Asia but also demonstrates reduced contributions from intraregional links. This indicates a relative weakness in the development of regional value chains within LAC (IDB 2019). In contrast, deep GVC linkages in Asia and Europe drove rapid improvements in productivity, global manufacturing market share, and poverty reduction in many economies during this period.

However, recent trends point to the potential for relocation of GVC activity, with important opportunities for LAC. First, geopolitical trends have led to a decline in direct U.S. sourcing from China, with a corresponding increase in import share from other low-wage economies, like Vietnam, or neighboring countries such as Mexico. While the extent of U.S.-China de-coupling remains subject to debate (Freund et al. 2023; Alfaro and Chor, 2023; Baldwin et al. 2023), the growing U.S.-China rivalry will continue to create incentives for investments in geopolitically friendly jurisdictions, and many LAC countries have long standing political, economic, diplomatic and cultural linkages to the United States. In addition, concerns over sustainability and mandates to reduce carbon emissions are increasingly shaping global investment decisions. In this context, LAC's relatively low-carbon energy matrix and abundance of renewable natural resources and critical minerals can increase its attractiveness for manufacturing investment. Finally, new digital technologies will likely open up new opportunities for GVC participation, potentially unlocking new comparative advantages for LAC in global services trade.

Figure 1. GVC Participation in Latin America and the Caribbean, European Union and Asia: Intra and Extra Regional Linkages, 2015, as Percentage of Domestic Foreign Exports
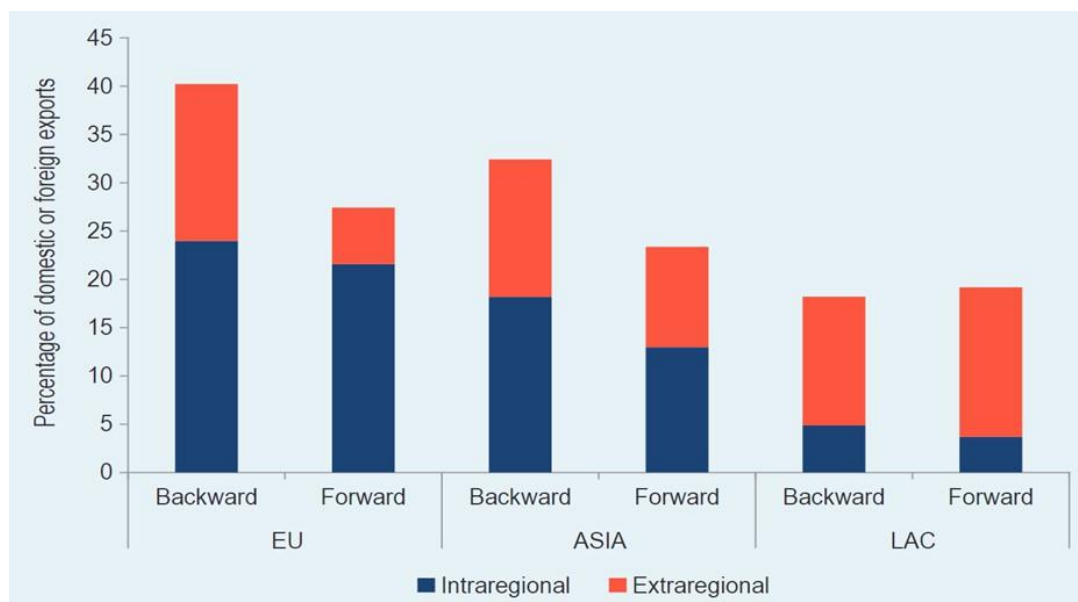
Source: Blyde and Trachtenberg (2019) as reproduced in IDB (2019)

To capitalize on emerging opportunities, LAC's policy response must take into account new drivers of shifts in GVCs along these three dimensions—technology, sustainability, and geopolitics. This will likely imply a new set of policies and strategies encompassing digital innovation and data issues, energy infrastructure and integration, and diplomatic and national security positions. However, this does mean that the region should discard the traditional integration agenda. LAC must deepen market access, procure world-class inputs and technologies, invest in high-quality infrastructure, modern logistics, and adopt sound regulatory practices to attract foreign direct investment (FDI). At the same time, addressing rising income inequality due to trade opening remains crucial. In this regard, the recommended response is not to halt growth through protectionist measures but to fortify safety nets and compensation mechanisms, aligning with the increasing demand for inclusive trade policies in recent LAC elections, all while integrating climate change and sustainability goals into this policy agenda (IDB 2019, CAF 2021).

The objective of this paper is to assess opportunities and challenges for LAC in the current global economic context and understand how LAC can recalibrate its policies and private sector strategies to adapt. Considering all the recent backlash against trade and integration, the region should base its policies and actions on sound economic analysis and robust empirical evidence. The paper is organized in the following sections. Section 2 examines the three broad drivers of potential changes in globalization,technology, sustainability, and geopolitics, attempting to assess their most likely impact on the structure of GVCs. In section 3 we propose our own integrated conceptual framework for understanding potential shifts in GVCs, first, by identifying specific channels through which the three drivers (technology, sustainability, and geopolitics) can impact GVCs and, second, assessing the potential implications of these channels on the overall structure of GVCs. Section 4 shifts the focus to LAC by developing a set of indicators to assess the region's preparedness to take advantage of the shifts in GVCs, compared to the OECD economies and the ASEAN region. In section 5, we conclude by outlining some policy recommendations for the region.

DRIVERS OF CHANGE IN THE GLOBAL ECONOMY

In recent years, major geopolitical, sustainability, and technological shifts, playing out in the context of the recovery from COVID-19 and global shocks, hold the potential to change the structure and pattern of GVCs. This is by no means a new development, as these three broad drivers have been central to the evolution of global commerce in the twentieth century and shaped the period of hyper globalization between the mid 1980s and the GFC. What is novel, however, is the pace of change occurring simultaneously across these three dimensions and, in some cases, the direction of travel—that is, their potential impact on global economic integration. This section provides an overview of how technology, sustainability, and geopolitics have shaped international trade and GVCs in the recent past and the likely impacts of the current shifts on the future of global commerce. The goal is to generate more precise expectations, drawing on empirics and theory, for how and why value chains will adapt to changes in these three dimensions.

TECHNOLOGY AS A DRIVING FORCE OF GLOBALIZATION.

Technological change has been intricately linked to the deepening of international trade and the emergence of GVCs in the last several decades. Advances in transportation and information and communication technologies (ICTs), including steam power, container shipping, and the adoption of the Internet, have been a main driver of the plummeting trade costs that facilitated specialization of

production and, in recent decades, the geographic separation of production tasks through GVCs (Pascali, 2017; Bernhofen et al., 2016). The growing adoption of a new generation of digital technologies— including artificial intelligence (AI), advanced robotics, additive manufacturing, Internet of Things (IoT) and big data analytics—will increasingly shape the economics of location decisions in existing GVCs while opening new opportunities for the trade of goods and services.

Figure 2. From Hyperglobalization to Slowbalization: Main Drivers
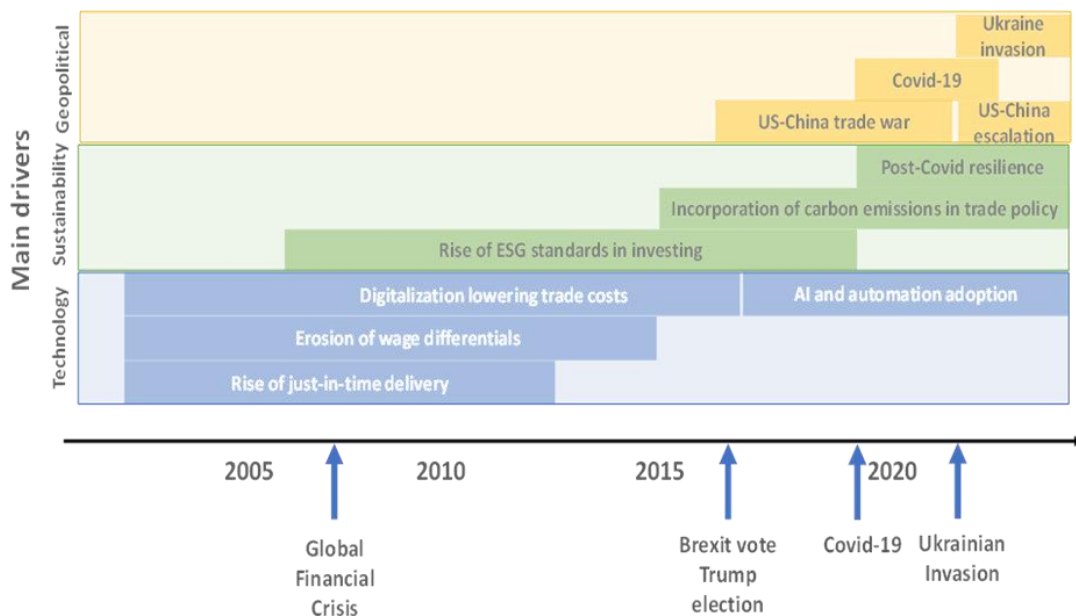
Source: Authors' own work

Economic theory views the decision to offshore as a function of the gains from lower production costs in third jurisdictions versus the additional trade and coordination costs that separation imposes. As Baldwin and Freeman (2022) argue, the new cohort of digital technologies affects both sides of this equation.

Most clearly, the automation of production tasks via technologies such as artificial intelligence, industrial robots, and additive manufacturing have the potential to significantly lower the costs of manufacturing in advanced industrial economies, eroding the gains from offshoring. In a context of declining wage differentials between advanced industrial economies and key developing economies for offshoring,with some exceptions such as Mexico, these dynamics have the potential to undermine the economic rationale for offshoring.

At the same time, emerging digital technologies will reinforce incentives to offshore by lowering coordination and trade costs, just as previous waves of ICT technologies such as the internet created the conditions for the first wave of offshoring starting in the 1980s. There is significant potential to lower informational, logistical, and regulatory compliance related costs through e-commerce platforms, automated supply chain monitoring, blockchain, and other applications (Estevadeordal et al 2020).

In addition, digital technology can contribute to supply chain resiliency by enabling end-to-end visibility across the value chain; optimizing warehouse, inventory, and logistics systems; embedding lean manufacturing to improve flexibility to adapt or scale though real-time monitoring and adjustments; and improving resilience to disruptions in manufacturing processes (WEF 2023). These applications have helped assuage lingering concerns about supply chain disruptions in the post-pandemic context. In theory then, the impact of digital technology on GVCs hinges on whether production costs in home economies fall faster than coordination costs of GVCs.

In addition, other authors have suggested that automation of production tasks and offshoring are in fact complementary (Antras 2021). By driving productivity gains and increasing firms' optimal scale, automation could increase demand for imported inputs upstream in the value chain, even if automation leads some tasks to be re-shored. Recent empirical evidence provides some support for this intuition, showing a positive relation across industries between automation in advanced economies and imports from developing countries (Artuc et al 2018, WB World Development Report 2020).

The salience of these diverse channels will likely vary across industries, jurisdictions, and even firms, such that the net impact on globalization is difficult to project. Still, certain broad sector-level trends can already be observed. For one, digital technologies have enormous potential to lower trade costs for many services that have until now seen limited GVC development. This has occurred over the past decade for some, mainly low-skilled, business services such as business processing and other back-office tasks (De Backer and Miroudot, 2013), and will likely spread more broadly to higher-skilled services such as finance, engineering, and medicine among others. As Baldwin and Freeman (2022) and others have pointed out, digital technologies such as AI, virtual reality, and advanced robotics could spur a new wave of offshoring, this time of service sector jobs, to the benefit of developing economies. Another implication of digitalization, for which we are already seeing evidence, is the servicification of manufacturing, which refers to the growing share of services value added in manufacturing value chains, a reflection in turn of the increasing incorporation of digital technologies in production tasks (Baldwin and Freeman 2021, 24). In both cases, it is important to highlight that the evidence is not necessarily consistent with the deglobalization-slowbalization narrative of shortening GVCs but rather potential shifts in the geographical division of tasks within existing value chains or the creation of new ones.

SUSTAINABILITY AS A NEW FACTOR SHAPING TRADE AND INVESTMENT DECISIONS.

The rapid evolution of clean energy and other low-carbon technologies, combined with growing decarbonization mandates at the national and global levels, will increasingly shape global trade and investment flows by affecting the costs and benefits of producing in different jurisdictions. The relationship between trade and sustainability issues has received less attention in academic literature and, until recently, has been on the margins of policy discussions. Still, multilateral institutions have for several decades recognized the role that different levels of environmental standards can play in shaping production costs and therefore the pattern of trade between countries. This led to international trade rules, for example, validating the use of tariffs to offset the cost advantage of weaker environmental rules in some jurisdictions to avoid a regulatory race to the bottom. However, these rules proved controversial, pitting developing countries with generally lower standards against developed countries, which the former accused of using environmental concerns as a pretext for protectionism.

The growing decarbonization mandate, embodied in the increasing number of government commitments to net zero emissions as well as a proliferation of corporate and multistakeholder standards, points to a future in which trade and sustainability will grow ever more interconnected. The effects of the decarbonization push on trade and supply chain decisions will occur through various channels. First, carbon emissions are being directly incorporated into trade policy regimes, as in the case of the EU carbon border adjustment mechanism (CBAM). The mechanism implies border taxes to account for the carbon-intensiveness of imports and avoid carbon leakage whereby production shifts to jurisdictions with less stringent emissions policies. This dynamic mirrors early trade-and-environment disputes driven by concerns of trade diversion to low enforcement jurisdictions. Beyond border adjustment taxes and other trade policy mechanisms, there will be indirect impacts on sourcing decisions from mandates,both governmental and through multi stakeholder initiatives, to reduce scope 3 emissions, that is emissions generated by the purchase and use of inputs from suppliers. Companies will increasingly face incentives to source from low-emissions producers, potentially opening up new opportunities for GVC participation for jurisdictions with relatively clean energy matrices and low emissions in the transportation sector (World Bank 2022).

Finally, efforts to ramp up green investment to meet global decarbonization goals will likely encourage new capital flows directed at ecosystem services, forest conservation efforts, and decarbonization technologies. The growing policy focus in developed economies on sustainable finance, which includes investments in renewable energy, green technology, as well as the voluntary carbon market (VCM), suggests that these types of investments will increasingly be incentivized by the main sources of global capital, including the United States, the European Union, and China. In 2022, developed economies, led by the European Union, introduced more than 50 measures dedicated to sustainable finance, according to the United Nations Conference on Trade and Development (UNCTAD) (2023 UNCTAD), which encompass policy incentives for investment in clean energy and other decarbonization technologies.

In this way, the interaction of decarbonization mandates and trade and investment flows will have implications for the structure of GVCs, making carbon competitiveness an increasingly relevant factor in location decisions (WEF 2023a). These factors imply, in principle, several different types of shifts in GVCs, which do not map neatly onto either a deglobalization or slowbalization narrative. First, there will be incentives for a relocation of some tasks in existing GVCs to low-emissions jurisdictions, driven by sourcing decisions of lead firms who aim to reduce scope 3 emissions and reduce direct

trade costs associated with carbon border taxes. Second, decarbonization mandates will likely drive the creation of new value chains for emerging decarbonization technologies, for example new electric vehicle batteries, carbon capture technology, among others. According to the World Economic Forum (WEF) (2023a), under an optimistic scenario of trade cooperation, trade in environmental goods could reach 15% of total global manufactured trade by 2030. Finally, voluntary carbon markets (VCM) will be a growing source of capital flows via investments in Nature-based Solutions (NbS) such as REDD+ and other carbon credit mechanisms. More than 40% of carbon credits available through VCMs are linked to NbS in developing countries (WEF 2023b).

GEOPOLITICS AND THE STRUCTURE OF GLOBAL TRADE

Geopolitical tensions between the United States and China have in recent years accelerated the weakening of the multilateral trading system and ushered in a new paradigm characterized by strategic trade policy and a resurgence of industrial policy in the world's major economies. These developments, while occurring at a pace that has surprised many observers, fit with a historical pattern in which structural changes in global power have had direct implications for the international trade and investment regime (Cohen 2018). The relative decline in the early twentieth century of Great Britain, whose global empire undergirded the expansion of international commerce during the first wave of globalization in the nineteenth century, contributed to the governance and coordination failures of the Great Depression.

The subsequent rise of the United States as the dominant global power after World War II created the geopolitical scaffolding for the Bretton Woods institutions that governed global trade and investment flows for the subsequent decades. The relationship between the structure of global power and international economic stability was formalized in Charles Kindleberger's Hegemonic Stability Theory, which holds that a stable global economic order requires a single dominant global power, or hegemon, willing to assume the costs of maintaining and enforcing rules, act as lender of last resort, and absorb imports from the rest of the world.

The current geopolitical moment is characterized by heightened tensions, great power rivalry, ascendant middle powers, and shifting alliances. These dynamics are symptoms of a broader transition from a unipolar global system, with the United States a hegemon, to a multi or bipolar system. This is the first major geopolitical shift since the proliferation of GVCs in the 1980s, meaning the potential for economic disruption is greater. Global trade as a share of GDP stood at around 24% during the Cold War compared to around 60% today. In addition, the current dynamics, unlike the bipolar competition of the Cold War, involve rising tensions and potential conflict between two highly integrated economies (Gopinath 2023). It remains to be seen whether this latter factor, which raises the costs of fragmentation, will serve as a check on the escalation of conflict.

Geopolitical tensions have manifested initially in the major shift in U.S. trade policy under the Trump administration, when the United States introduced extensive tariffs affecting around 18% of all imports. This sparked retaliation by China covering 11% of imports. The tit-for-tat tariff war increased trade costs for around two-thirds of dutiable goods in the United States (Fajgelbaum et al 2023). These trends in the world's two largest economies were mirrored at the global level with the frequency of restrictive trade policies, including traditional trade measures such as tariffs and quotas as well as local content rules, subsidies, procurement restrictions and other trade-distorting domestic policies, rising more than five-fold between 2017 and 2022 (Global Trade Alert 2023).

Studies of the U.S.-China trade war between 2018 and 2019 confirm that China's market share in the United States for products subject to tariff hikes and other restrictions did

decline significantly. The main winners of the shift of U.S. imports away from China were other developing Asian economies, especially Vietnam, India, and Taiwan, while Mexico and the European Union also saw their shares of U.S. imports increase in various sectors including vehicles, computers, electronic devices, transport equipment and machinery, and electrical equipment and machinery (Bekkers et al, 2020, UNCTAD 2019 and Nicita, 2019). However, there is emerging evidence that even those companies that relocated from China to other Asian markets to avoid tariffs continue to source heavily from China, underscoring the challenges of decoupling (Freund et al 2023; Qiu, Shin, and Zhang 2023).

In Latin America, meanwhile, the gains so far appear to have been minimal outside of Mexico. Mexico's gains in U.S. market share have been especially pronounced, moreover, in sectors characterized by high trade costs and significant preferential treatment NAFTA (Mesquita Moreira et al 2022), suggesting that the ability of many LAC countries with higher trade costs to benefit will be limited in the short term.

Policies affecting U.S.-China trade have evolved under the Biden administration towards more targeted measures, including export controls and investment restrictions, affecting strategic sectors such as high technology, critical minerals, and electric vehicles. Preliminary evidence on these measures suggests that the impact on China's participation in U.S. supply chains in strategic sectors has been limited. The share of U.S. imports of ICT, energy, critical minerals, and health goods, the four broad product categories targeted for friendshoring under U.S. Executive Order 14017 of 2021, have mostly remained stable over the past two years after falling in the wake of the Trump trade war (Niels and Rashid, 2023). For some products, including telecom equipment, personal protective equipment (PPE), and especially large capacity batteries, that is those used in electric vehicles and stationary electricity storage, and certain critical minerals, this share has increased steadily since 2021. On the other hand, incentives for clean energy and semiconductor investment in the administration's Inflation Reduction Act (IRA) have led to a surge in new projects in the United States in recent years. The emerging U.S. trade and investment policy framework, undergirded by bipartisan political support, will likely continue to influence investment location decisions in GVCs over the next several years.

In addition to U.S.-China tensions, the Russian invasion of Ukraine in February 2022 created both short and likely longer term impacts on global trade. The ongoing conflict continues to pose barriers to Ukraine's access to global markets, as cargo ships access to its main Black Sea ports remains precarious. In addition, the conflict provoked an extensive, coordinated effort to sanction companies linked to the Russian government, energy sector, and financial institutions. These actions, and the threat of further sanctions, disrupted global energy markets, and shifted trade flows for petroleum and gas, forcing the United States and Europe to search for new supply sources, while deepening Russia's trade relations with partners such as India, China and others not aligned with the United States and Europe's geopolitical stance. The growing push to tighten sanctions and related restrictions against Russia and others will reinforce incentives for trade and investment among geopolitical allies, contributing to global economic fragmentation.

More recently, the expanding conflict in the Middle East threatens to unleash similar dynamics. While disruptions to global trade have so far been moderate, these developments reinforce broader concerns over geopolitical risk as a driver of business decision making. The growing salience of these issues is evident in a spike in mentions of geopolitical risk in corporate earnings calls between 2022 and 2023 (IMF 2023).

There is already evidence that these concerns are impacting global trade and investment flows, leading to fragmentation of global commerce among rival geopolitical blocks. Since the Russian invasion of Ukraine, trade growth between geopolitically aligned countries has been nearly 4 percentage points slower than within blocks. In the case of FDI, growth of flows between blocks declined by around 1 percentage point more than within blocks, although investments in non-aligned economies,which make up a far larger share of the global economy than during the Cold War, have increased since 2022 (IMF 2023).

TOWARDS A MULTIDIMENSIONAL FRAMEWORK FOR UNDERSTANDING SHIFTS IN GLOBAL VALUE CHAINS

In this section, we build on the conceptual discussions in Section 2 to propose a new analytical framework for understanding likely changes to the structure of GVCs and their implications for developing regions such as LAC. We start by specifying the channels through which our three main drivers, technology, sustainability concerns, and geopolitics, potentially affect trade and investment decisions in the context

of GVCs. In doing so, we aim to bring greater clarity to the mechanisms and direction through which these broad trends are likely to shift global trade patterns. Based on this exercise, we identify five different generic types of GVC transformation that emerge from these channels. These types of transformation, lengthening, shortening, relocation, redistribution of value, and new GVC creation, help underscore the complexity and diversity of the impacts of our three drivers on global trade. They serve both to better elucidate the implications, including challenges and opportunities, for LAC and identify potential sector level impacts.

DIGITAL TECHNOLOGIES

As discussed above, the emergence of a new crop of digital technologies will likely shape value chains in different ways. These include automation and the incorporation of digital services in manufacturing processes, the lowering of trade costs through more seamless coordination of logistics and supply chain management and efficiency gains in the transportation sector, and by enabling both trade in new goods and services and new modalities for transmitting goods and services across borders.

We distinguish four main channels through which digital technologies will likely affect GVCs, drawing broadly on Estevadeordal et al (2020):

- **Digital infrastructure and connectivity** The rapid advance of digital technologies and their incorporation into GVCs will demand increasingly robust digital infrastructure and connectivity as a key condition for value chain integration. Digital tools will become increasingly central to the management of supply chains, where AI and other applications can reduce logistics costs, help monitor inventories, and streamline processes required to move products (Baldwin and Freeman, 2022). Digitalization also has the potential to resolve transportation bottlenecks, making inventory management more efficient and helping monitor the condition of goods in transit, which reduces the need for physical inspections and prevents damage (Estevadeordal et al 2020). Finally, digital technology has important potential to slash trade costs associated with customs clearance by automating many of the associated processes and procedures. New technologies are especially useful in making verification and certification procedures by border security officials more efficient, using AI and big data analytics (Giordani 2018). All this means that opportunities for

GVC participation will increasingly hinge on access to high-speed and secure networks to transmit vast amounts of data.

- **New technological capabilities** Technologies such as advanced robotics, AI, additive manufacturing, and IoT hold the potential to transform how manufacturing goods are produced, with major implications for GVCs. These innovations can dramatically alter the relative weight of different inputs, for example unskilled labor, skilled labor, and capital, in industrial processes and therefore the types of jurisdictions that are likely to specialize in these production tasks within GVCs. This is particularly the case with robots, AI, or 3-D printing, which can affect the opportunity cost of offshoring tasks to other countries as discussed above. With new technologies such as robotics or 3-D printing, the cost advantage of offshoring those tasks could vanish, leading to a decrease in trade in intermediates globally, or alternatively, a shift of these tasks to countries with comparative advantages in deploying industrial robots, AI, or 3-D printing. In either case, these developments suggest that factors such as the physical capital stock of emerging digital technology products, for example advanced robots, and the quality of human capital in areas such as AI will be key conditions for GVC insertion.

- **Digitally enabled trade** Digital technologies have major potential to reduce barriers to entry in GVCs , especially for small firms. E-commerce and business to business (B2B) platforms help overcome informational barriers, which have been shown to be an important and traditionally underappreciated source of trade costs (Carballo et al 2022; UNCTAD 2019). In addition, digital technology opens new options for the transmission of goods and especially services across borders. Streaming, which refers to the transmission of music, videos, books, and other content encoded as data streams,represents an entirely new form of trading entertainment products across borders. The rapid advance and since the pandemic, rapid adoption of video conferencing technology as well as language translation software, and potentially virtual reality applications can similarly facilitate the delivery of increasingly complex service exports. Finally, technology is opening up opportunities for trade in new goods and services, including the creation of new value chains for products such as 3-D printers, industrial robots, and other frontier ICT goods. Services trade will likely expand to more professional services such as legal, financial, accounting, and education; and could expand into medical services, allowing doctors to attend to patients in other countries using a suite of digital tools (Baldwin 2016, Baldwin and Freeman 2022).

- **New policy drivers** The growing role of digital technologies across GVCs means that the main policy drivers for value chain insertion will also evolve. In addition to building out digital infrastructure, governments seeking to promote competitiveness will need to promote public and private investments in digital innovation, develop digital skills among the workforce, and establish an appropriate policy framework for data protection and privacy. In addition, facilitating trade in digitally delivered services will require the harmonization of regulations around licensing for professional services, which represent a key barrier to deeper cross-border trade in services.

SUSTAINABILITY

The growing emphasis on sustainability, the result of both regulatory requirements and voluntary participation in multi stakeholder initiatives, will affect GVCs in different ways.

First, the imperative to decarbonize not just companies' own operations but also their supplier and buyer networks will create incentives to change sourcing decisions to reduce emissions. In some cases, these dynamics will be reinforced by new rules that directly incorporate emissions into trade costs via carbon border taxes.

Secondly, as with digital technologies, the growth of goods and services tied to decarbonization and clean energy technologies, such as EV batteries, carbon capture and sequestration (CCS) technologies, and solar and wind panels, will spur new cross-border trade and investment flows. Relatedly, access to critical minerals and natural resources will increasingly drive investment and value chain decisions as companies and governments vie to secure key inputs for energy transition technologies. Finally, sustainability concerns will increasingly go beyond carbon emissions per se to include minimizing exposure to climate risks and natural disasters. In this way, the major channels through which sustainability concerns will likely shape GVCs include the following.

- **Emissions incorporated into trade costs**. The carbon emissions embodied in imported inputs will increasingly be a source of trade costs for companies in GVCs. This can occur both due to direct policy measures such as carbon border taxes as well as through mandates to reduce scope 3 or supply chain emissions, which increase the costs of sourcing from high-emissions suppliers by forcing companies to make greater investments to offset these emissions elsewhere. This will create incentives to relocate some tasks in existing GVCs to low-emissions jurisdictions, as firms attempt to limit these direct and indirect costs. In some cases, efforts to reduce carbon emissions in supply chains may also lead to reshoring certain production tasks back to firms' home market.

- **Trade in energy transition goods and services.** The development of new technologies to advance the energy transition and mitigate climate change will also be a driver of change in GVCs. Emerging technologies such as new EV batteries and carbon capture and storage (CCS) systems will lead to the development of new value chains that create new trade and investment opportunities. According to the WEF (2023a), under an optimistic scenario of trade cooperation, trade in environmental goods could reach 15% of total global manufactured trade by 2030. In this regard, openness to trade in energy transition goods, including via competitiveness in these emerging industries and the avoidance of protectionist measures, will be an important channel for GVC participation.

- **Access to critical minerals and natural resources.** Global decarbonization goals will require major technological changes to the energy and transportation sectors, including a vast expansion in electricity grids, major investments in new solar and wind infrastructure, and a transition away from fuel-combustion engines. This, in turn, will generate large increases in demand for critical minerals, especially lithium, copper, nickel, cobalt, and graphite (IEA, 2023). Countries with large reserves of these minerals will enjoy growing opportunities for GVC participation, potentially including in higher-value added processing and manufacturing tasks. Beyond critical minerals, countries with abundant natural capital such as forests, water, and biodiversity can benefit from growing capital flows into NbS and payments for environmental services, that seek to reduce emissions in the context of carbon offsets and other green finance tools.

- **Avoiding climate risks and natural disasters.** The broader focus on sustainability of supply chains, including minimizing disruptions associated

with climate events and avoiding environmental affectations of operations, will incentivize companies to consider a jurisdictions vulnerability to climate events and natural disasters in their GVC decisions.

GEOPOLITICS

As discussed above, the geopolitical disruptions of the last several years have occasioned major shifts in the rules governing trade and investment, including changes at the multilateral level, in bilateral policy mechanisms, and in terms of national industrial policies, as well as the outbreak of open military conflict and rising threats of new conflicts in several major regions that are critical to global trade. To help assess the specific effects of this complex geopolitical scenario on GVCs, and therefore the implications for Latin America, we distinguish among the following main channels:

- **U.S.-China tensions.** The growing tensions between the United States and China over the past several years have had significant impacts on trade and investment flows. As discussed above, the imposition of tariffs on a range of Chinese manufacturing goods by the Trump administration starting in 2018 created incentives for companies to source from alternative jurisdictions, especially in Southeast Asia and Mexico. More recently, both the United States and China have implemented an expanding set of export and import controls, investment restrictions and other measures targeted at strategic sectors such as advanced semiconductors and clean energy technologies. Beyond these direct policy tools, the Chinese government has ramped up scrutiny of Western companies operating in the country, creating elevated perceptions of regulatory and even legal risks in China. The evidence suggests that this combination of factors, while unlikely to bring about decoupling of U.S. and Chinese companies, has affected the investment location and sourcing decisions of MNCs in many sectors, with potential implications for the future evolution of GVCs.
- **War and national security risks.** Recent geopolitical shocks have put war risks back on the radar of MNCs. The Russian invasion of Ukraine and a new outbreak of fighting in the Middle East have forced companies to reconsider the vulnerability of their supply chains to the operational disruptions and security risks stemming from armed conflict. Beyond the immediate impacts of war, trade, and investment flows are being increasingly shaped by the escalating sanctions regime imposed by the United States and Europe against their geopolitical rivals. These actions have significantly raised the risks for companies of investments and commercial relations,including indirect ones, with partners from highly sanctioned jurisdictions, leading to shifts in trading relations and the structure of value chains in the most affected industries, such as energy. Underscoring the relevance of these trends, a recent study by McKinsey found that 83% of executives surveyed consider geopolitical tensions to be a major factor in investment decisions (McKinsey Global Institute 2023).
- **Political alliances.** Rising geopolitical tensions also mean that trade and investment relations will likely be increasingly shaped by political and diplomatic affinity. On the one hand, governments including in the United States, Europe, Japan, and China have rolled out strategies, policy incentives, and alliances aimed at strengthening value chains among like minded partners, especially in areas such as critical minerals, energy transition products, and high-tech. These efforts include provisions in the U.S. Inflation

Reduction Act (IRA) and Creating Helpful Incentives to Produce Semiconductors (CHIPS) act that incentivize value chain investments in

- **U.S. FTA partners, as well as the EU Critical Minerals Strategy.** Beyond government actions, companies looking to minimize existing and potential future risks will also increasingly take into account issues such as the geopolitical alignment of host governments in their GVC locations decisions.
- **Socio-political stability.** Geopolitical trends will also interact with and potentially exacerbate risks related to social and political stability. The impact of geopolitical shocks and resulting economic disruption, for example, will be magnified in jurisdictions with weak governance and high levels of social fragmentation. This has been evident in widespread protests, marked by episodes of violence, that erupted in countries such as Bangladesh, Ecuador, Peru, Sri Lanka, Suriname, and others in response to elevated global food and energy prices in 2022. These episodes create major operational and political risks for businesses. In this context, companies will likely increasingly prioritize political and social stability as a factor in GVC location decisions.

TYPES OF GVC TRANSFORMATION

The channels identified above have potentially different implications for GVCs. Their overall impact on global trade and investment will undoubtedly be more nuanced and complex than the one dimensional metric of whether globalization is slowing down, speeding up, or going into reverse. The literature on GVCs already provides useful reference points for conceptualizing different shifts in GVCs, including the concepts of modularity (Thun et al, 2022). In addition, Qiu, Shin, and Zhang (2023) introduce a measure of value chain distance based on the number of supplier relationships or links along a value chain. Based on this, they provide evidence that many GVCs have lengthened in recent years, especially those linking suppliers in China to final customers in the United States. This has occurred because their goods now pass through intermediary jurisdictions, likely to avoid U.S. tariffs against Chinese direct imports.

We build on these ideas and introduce additional ways in which technology, sustainability, and geopolitical trends may be reconfiguring GVCs. Many of the channels we discuss above suggest that new factors will emerge as key determinants of value chain investments and sourcing decisions while others imply that the nature of certain tasks within the existing value chain will be transformed. Finally, there is considerable potential for new value chains to develop, driven by emerging technologies. We therefore propose a typology of changes in GVCs that aims to capture the diverse effects arising from current technological, sustainability, and geopolitical trends. Our approach considers changes in different dimensions of GVCs, including the overall geographic distance linking all suppliers, the location of jurisdictions participating in the value chain, and the distribution of value added across the different tasks within the value chain.

- **Shortening.** We understand GVC shortening as a reduction in the total geographic distance connecting all the suppliers within a given value chain. This definition differs slightly from that of Qiu, Shin, and Zhang (2023) but it is more relevant to our purposes, given that overall geographic distance (rather than number of supplier linkages) is more relevant to sustainability issues and to opportunities for new countries to participate in GVC, two central concerns of our paper. Shortening of GVCs thus implies a retrenchment of existing value chains such that, on the whole, more production occurs closer to the destination market and its overall geographic extension is reduced. This shift is consistent with both nearshoring and reshoring and, again, can be driven by technological, sustainability, or geopolitical factors. The automation

of certain production tasks, or the adoption of new technologies such as additive manufacturing, clearly have the potential to drive reshoring and therefore a shortening of GVCs. In addition, both sustainability concerns and geopolitical risks can incentivize companies to reduce the overall geographical extension of their supply chains. In terms of the former, shorter GVCs will likely translate into lower overall carbon footprints given the high emissions levels inherent in transportation. In addition, GVCs that involve fewer total jurisdictions will, all else equal, entail less exposure to disruptive events such as natural disasters and episodes of unrest or political violence. Similarly, given the generalized operational risks that result from geopolitical tensions and military conflicts, as illustrated by the recent disruptions to global shipping from tensions in the Red Sea, companies may increasingly prioritize overall shorter supply chains even if they are not directly exposed to global conflict hotspots.

- **Lengthening.** In contrast to shortening, we understand GVC lengthening as an increase in the total geographic distance connecting all the suppliers within a given value chain. Lengthening thus corresponds, ceteris paribus, to an increase in overall GVC trade, although we note that in principle lengthening can occur within country borders as well, in contrast to the expectations of nearshoring, reshoring, or slowbalization narratives. As Freund et al (2023) and Qiu, Shin, and Zhang (2023) show, shifts in value chains in response to U.S. tariffs and other policy measures, for example through friendshoring investments in Vietnam, Mexico, and other jurisdictions, have not excluded Chinese suppliers from these supply chains. Instead, these production tasks continue to depend heavily on Chinese inputs especially in the IT and other manufacturing industries. However, lengthening is also consistent with strategies aimed to increase overall GVC resilience to shocks, in line with broader sustainability concerns, through the diversification of suppliers.

- **Relocation.** Relocation refers to shifts in the structure of existing GVCs whereby certain tasks are relocated to new jurisdictions in response to either technological, geopolitical, or sustainability pressures. This type of change does not therefore entail a decrease in GVC trade or, necessarily, a shortening or lengthening of GVCs but rather a shift in their geographical pattern. GVC relocation is likely to arise under each of the main drivers discussed above. The transfer of certain tasks or supply relationships to the geopolitically safe jurisdictions,whether to take advantage of specific policy incentives or to avoid generalized geopolitical risk, or low-emissions suppliers are examples of such shifts. As these examples underscore, relocation is likely to reflect the emergence of new factors, for example, geopolitical alliances or clean energy sources, as increasingly important factors in firms' locations and sourcing decisions in GVCs, potentially displacing to some extent traditional drivers such as low labor costs. In terms of industries most likely to experience relocation effects, the shift of production to geopolitically friendly jurisdictions will be most likely in strategic industries such a high technology manufacturing and strategic industries for energy transition technologies as. critical minerals, EVs, and clean energy components. These sectors, along with, to a lesser extent, certain health sector products, have been explicitly targeted through the friendshoring strategies of the United States and the European Union. Relocation of GVCs for sustainability concerns, meanwhile, appear most likely in manufacturing GVCs that are energy intensive and therefore may be especially sensitive to the incorporation of carbon emissions in trade costs. These include sectors such as metals, chemicals, and industrial inputs.

- **Redistribution of value.** Redistribution of value refers to the potential for technological, sustainability, and possibly geopolitical forces to transform the economics of production such that opportunities to add value to final products are redistributed among the production tasks in existing value chains. The traditional model of value added along manufacturing value chains envisions a u-shaped distribution in which the highest value-added activities are located at the extreme upstream, for example, design, engineering, and extreme downstream, for example marketing, advertisement segments. By contrast, midstream activities, including the production of materials, inputs, and component parts and assembly of final goods, generally capture less value added. While this model admittedly does not fit all industries and is probably most applicable to low and medium technology manufacturing sectors, it helps illustrate how the channels discussed here can open opportunities for greater value added at new parts of the value chain. The first factor is technological change, whereby the incorporation of digital services into production tasks, that is the servicification of manufacturing, through tools such as automation, AI, and potentially additive manufacturing, means that manufacturing processes will increasingly depend on knowledge intensive inputs that capture more final value. Similarly, as sustainability mandates put a growing premium on clean energy inputs, raw materials,which have generally occupied the lowest value-added stages of GVCs, have the potential to capture more value as to the extent that they embody lower emissions. In this way, raw materials may take on characteristics of differentiated products, based on increasingly sophisticated technologies employed to reduce carbon intensity. An illustrative example is the potential use of green hydrogen, derived from renewable sources, to produce chemical and other industrial inputs that have generally added limited value in manufacturing GVCs. These shifts are most likely to occur in manufacturing industries that are energy and natural resource intensive such as metals, chemicals and other materials. In the case of technology driven redistribution, capital intensive manufacturing industries likely offer the most opportunities to add value by incorporating digital services into production.
- **Creation of new value chains.** Finally, new technologies and growing sustainability mandates will likely drive the creation of new GVCs, which can arise in three ways: i.) when new goods and services are produced through cross-border production chains; ii.) when new innovations currently produced within companies' home markets are unbundled; and iii.) when technology enables cross-border production of existing goods and services currently produced within one market. Examples of new products associated with digital technologies include 3-D-printers, industrial robots, and equipment for new generation ICT networks among others. In the case of sustainability, frontier technologies such as EV batteries and CCS equipment will likely forge new cross border production networks as innovation advances. Finally, technology-enabled digital trade will create new opportunities for knowledge intensive services to be delivered via cross- border networks.

Table 1 summarizes the various channels for GVC change, their respective drivers, and the corresponding type of GVC transformation discussed in this section. Several preliminary conclusions can be drawn. First, a review of all the drivers and channels shows that GVC relocation, that is, the relocation of offshored tasks in existing GVCs to different jurisdictions, is the most anticipated change in GVCs. This result suggests that the changes affecting the global economy are unlikely to produce a deglobalization or even necessarily a continuation of the slowbalization trend in

recent years. Instead, the channels identified here are more consistent with shifts in the factors determining investment and sourcing decisions along GVCs. This is especially evident in the shifts associated with the sustainability driver, where each of the four channels implies relocation of GVC activities in response to new and emerging considerations shaping the structure and geography of value chains. In the domain of geopolitics, similarly, the overarching trend appears to be a relocation of GVCs in light of geopolitical tensions rather than a secular trend of GVC retrenchment. Finally, within the technology channels, we observe a diverse range of impacts, which in some cases have countervailing implications for GVCs: digital technologies that reduce task costs through automation, for example, can simultaneously create incentives to shorten, reshore previously offshored tasks due to shifting input costs, and to lengthen value chains if efficiency gains create growing demand for imported inputs.

Table 1. Overview of Proposed Drivers, Channels, and Implications for GVC Structure

Driver	Channel	Main implication for GVCs	Example
Technology	Digital infrastructure and connectivity	• Relocation • Lengthening	• Importance of digital infrastructure and connectivity in investment location decisions • Continued relevance of traditional logistics services
	New technological capabilities	• Shortening • Lengthening • Redistribution of value	• AI / 3-D printing / robots in manufacturing / Internet of Things (IoT) • Servicification of manufacturing tasks
	Digitally enabled trade	• New GVCs • Lengthening	• Digital trade in goods and services (for example, streaming, e-books) • E-commerce platforms / digital customs facilitating GVC entry by new suppliers. • Services trade enabled by digital technology (for example, e-medicine) • Policy framework to facilitate digital trade
	New policy drivers	• Relocation • Lengthening	• Supportive policy framework for innovation • Data protection and privacy framework
Sustainability	Carbon emissions incorporated in trade costs	• Relocation • Redistribute of value	• EU carbon border adjustment mechanisms
	Trade in decarbonization technologies	• Relocation • New GVCs	• Cross border imports and exports of clean energy • New value chains associated with EV batteries and other decarbonization technologies
	Access to critical minerals and natural resources	• Relocation • New GVCs	• Increased demand for key inputs for energy transition technologies • New goods and products based on natural / biodiverse inputs

Driver			
	Minimize exposure to natural disasters / climate risks	• Relocation • Shortening	• Increased relevance of exposure to natural disasters in investment location decisions
Geopolitical	U.S.-China de-risking	• Relocation • Lengthening	• Tariffs and other trade barriers, investment screening, export controls, heightened security of foreign firms in China leading to investments in new jurisdictions. • Lengthening will occur when backward linkages to China persist
	Physical and national security risks	• Relocation • Shortening	• Heightened operational and security risks in conflict hotspots. • Exposure to fines or reputational damage from commercial relations with sanctioned entities
	Political alignment	• Relocation • Lengthening	• Provisions in U.S. IRA that extend subsidies to EVs sourced from FTA partners. • Lengthening will occur when backward linkages to China persist
	Sociopolitical stability	• Relocation • Shortening • Lengthening	• Increased relevance of social and political stability in investment location decisions • Diversification of supply relationships to include new jurisdictions

Table 2. Industries Most Affected by Potential GVC Shifts Along Different Drivers

Driver	Shortening	Lengthening	Relocating	New GVCs	Redistributing Value
Technology	**Labor intensive manufacturing** (automation of tasks in textile, apparel, toys, furniture) **Low technology manufacturing** (3D printing in rubbers, plastics)	**Capital intensive manufacturing** (servicification of manufacturing value chains creating new supplier linkages)	**Land intensive industries** (shifting comparative advantage for agriculture)	**Knowledge intensive services** (technology enabled trade in professional services such as medicine, law, finance)	**Capital intensive manufacturing** (servicification of manufacturing value chains)
Sustainability	**Emissions intensive industries** (transportation services) **Trade intensive industries** (automobiles, transport equipment, electronics, textiles, and apparel that are vulnerable to shocks)	**Trade intensive industries** (automobiles, transport equipment, electronics, textiles, and apparel that are vulnerable to shocks)	**Natural resource based manufacturing** (metals, chemicals, industrial inputs **Labor intensive manufacturing** (textiles, food, and beverages with elevated social risks)	**Natural resource based / primary sectors** (value chains based on new alternative energies like green hydrogen)	**Natural resource based / primary sectors** (moving downstream tasks to clean energy sources or capturing more value with low carbon energy sources)

Geopolitical	Medium tech manufacturing (reshoring/ nearshoring of automobile, electronics, machinery GVCs)	High tech manufacturing (friendshoring of semiconductor production)	High tech manufacturing (friendshoring of semiconductor production) Strategic natural resource based sectors (critical minerals, EVs, clean energy components) Public health sectors (pharmaceuticals, PPE)		Strategic natural resource based sectors (geopolitically motivated investments in processing of strategic minerals)

This analysis, in turn, highlights that even at the level of individual channels, impacts on GVCs are likely to vary across industries. As discussed above, the specific characteristics of different sectors and their existing value chains, including the insensitivity of different types of inputs and the current structure of GVC relationships, will shape their responsiveness to the different channels discussed here. Table 2 attempts to map the different potential GVC shifts onto specific industries for each driver. The exercise is based both on existing empirical studies of the characteristics of GVCs across different industries and their exposure to different types of shocks (see, for example, McKinsey Global Institute 2019 and 2022) as well as deductive reasoning based on the dynamics discussed above. Some broad trends emerge, which clearly underscore the importance of sector level analysis of the impacts of our drivers and channels on GVCs: the sustainability related channels, for example, are particularly relevant to industries that use energy and other natural resource inputs intensively. In addition, the geopolitical channels are clearly most relevant to the specific industries at the center of strategic competition, such as high technology products and critical minerals, among others. These sectors have been explicitly targeted by policy incentives aimed at building value chains among geopolitically allied countries.

Taken together, these dynamics have important implications for the ability of emerging regions like Latin America to participate in GVCs. On the one hand, the potential shifts summarized in Table 1 imply that new country level characteristics will gain importance as determinants of GVC activity while others that have driven activity in recent decades may lose relevance. In addition, as Table 2 underscores, the drivers, and channels of GVC change have different implications across industries, which will also shape the array of opportunities and challenges for policymakers and firms in LAC in adapting to the new configuration of GVCs. The next section delves more into these implications for the region, by constructing a novel index that measures LAC's preparation to participate in GVCs that will be increasingly shaped by technology, sustainability, and geopolitical drivers. We also identify several emerging areas of potential comparative advantage for LAC based on the results of the indicator and the conceptual discussion above.

LAC PREPAREDNESS TO TAKE ADVANTAGE OF RECONFIGURATION OF GLOBAL VALUE CHAINS

How well positioned is the LAC region to take advantage of these potential shifts in GVCs? In this section, we present a new index to assess LAC's preparedness and capability to benefit from the various channels affecting the structure of GVCs identified above. The index has three main subcomponents, which align with our three main drivers of potential change in GVCs (geopolitics, sustainability, and technology). Within each subcomponent, we identify variables that measure LAC's preparation to benefit from each of the channels identified above (see Table 3). The data presented here compares LAC's performance on these indicators to that of the OECD, excluding LAC, and ASEAN,

which represent, respectively, global benchmarks and LAC's main competitor region to attract investment. The structure of the index is summarized in Table 3. This exercise seeks to build on recent work analyzing the likely impact of changes in the global economy on LAC such as Pietrobelli et al (2023) and IDB (2023).

INTERREGIONAL COMPARISONS

This section compares LAC to the OECD and ASEAN countries in each of the three subcomponents: technology, sustainability, and geopolitics. The graphs in Figure 3 shows that LAC clearly lags behind the OECD and ASEAN regions in the technology subcomponent, with sizable gaps on many of our eight preparedness variables. LAC's average distance from the leading region is especially large for variables such as digitally deliverable services trade, ICT capital goods imports, and human capital AI readiness. These results are unsurprising given the region's more limited integration into high technology value chains compared with Asia and Europe and the relative weakness of educational and training institutions in equipping the workforce with cutting edge skills. The indicators also reveal important gaps with both ASEAN and the OECD on the two variables focused on policy frameworks: cybersecurity and government promotion of investment in emerging technologies. This points to relevant policy tasks for governments looking to deepen participation in digital technology value chains. The results for the logistics performance and mobile connectivity variables, meanwhile, reflect persistent infrastructure and logistics challenges, which constrain opportunities to take advantage of the trade facilitating potential of digital technology. We note, however, that LAC's performance is close to that of ASEAN on these metrics.

Table 3. Overview of GVC Preparedness Indicators

Driver	Channel	Indicators	Source
Technology	Digital infrastructure and connectivity	Logistics performance index	World Bank World Development Indicators
		Mobile connectivity index	GSMA
	New technological capabilities	ICT Capital goods imports index	UN Comtrade
		Human capital - AI Readiness index	Oxford Insights Index
	Digitally enabled trade	Digital services trade restrictiveness index	OECD
		Digitally delivery services index	WTO
	New policy drivers	Government promotion of investments in emerging technologies index	Oxford Insights Index
		Global cybersecurity index	
Sustainability	Carbon emissions incorporated in trade costs	Low carbon intensity index	World Bank World Development Indicators
		Renewable energy consumption index	U.S. Energy Information Administration
	Trade in decarbonization technologies	Trade in energy transition goods index	UN Comtrade
		Protectionism in energy transition goods index	
	Access to critical minerals and natural resources	Critical Minerals Index	US Geological Survey data
		Biodiversity-habitat-environmental performance index	Yale Environmental Performance Index
	Minimize exposure to natural disasters / climate risks	Exposure to natural disaster index	Ruhr-University Bochum World Risk Report
		Vulnerability to natural disasters index	
Geopolitics	U.S.-China de-risking	Export similarity with China index	UN Comtrade
		Exposure to U.S. and China trade bans, restrictions and licenses index	Global Trade Alert
	Physical and national security risks	Security index	Security Apparatus-Fragile State Index Fund for Peace
		Trade with sanctioned countries index	UN Comtrade and U.S. Office of Foreign Asset Control (OFAC)
	Political alignment	Political closeness to trading partners index	UN Comtrade and Freedom House data
		Nonalignment in UN voting index	United Nations General Assembly Data (Erik Voeten)
	Sociopolitical stability	Ethnic cohesion index	Ethnic Power Relations dataset (Cederman, Min, Wimmer)
		Working age population index	World Bank World Development Indicators

On the positive side of the ledger, the region is close to the OECD frontier and in fact outperforms ASEAN on the digital trade restrictiveness index. This result underscores the region's mostly liberal approach to issues such as cross border data flows and data localization requirements and the participation of several LAC countries in bilateral and

regional agreements on digital trade. Chile for example is part of the Digital Economy Partnership Agreement (DEPA), a pioneering digital integration arrangement with New Zealand, Singapore, and Hong Kong. Even so, there are still complementary policies on issues such as domestic services regulations that governments should tackle to further promote digital trade (see Section 5). In addition, we note that several countries are currently debating more restrictive regulations around data protection and localization rules.

The results of the sustainability subcomponent, by contrast, indicate clear comparative advantages for the region (see Figure 4). LAC shows the strongest performance of all regions on variables such as share of renewable energy consumption and our critical minerals index and is very close to the OECD countries on share of trade in energy transition goods and carbon emissions per GDP. This confirms LAC's significant potential to reap benefits from the growing imperative to reduce emissions and transition away from fossil fuels, due to its relatively clean energy matrix and abundance of critical minerals. In fact, our results highlight that the region is already taking advantage of these opportunities, reflected in its relatively high share of exports of products related to the energy transition.

At the same time, the results point to some pending challenges and obstacles to fully realizing this potential. First, LAC has the highest levels of tariffs on energy transition goods among the three regions, which could pose a barrier to the future development of green industry value chains, especially in higher value added segments. In addition, while the region currently has low levels of economy-wide carbon emissions relative to total economic output, LAC lags well behind Europe and major Asian economies in the electrification of the transport sector. This gap could threaten to erode the region's relative advantage as a low emissions investment destination as EV adoption advances rapidly elsewhere in the world. This points to another clear policy priority for LAC governments and development partners. Finally, the region lags behind the OECD on the vulnerability to natural disaster variable, which measures the preparedness and capability of governments to respond to floods, droughts and other climate events.

The third subcomponent, consisting of geopolitical readiness variables, paints a mixed picture for LAC (see Figure 5). On the one hand, the region has been relatively shielded from some of the global economic turbulence stemming from rising geopolitical tensions. LAC has been the least exposed of the three regions, for example, to the proliferation of export and import bans, restrictions, and licensing requirements imposed by the United States and China in recent years. In addition, its share of trade with countries subject to U.S. sanctions programs is lower than the OECD (and comparable to that of ASEAN). On the other hand, LAC has a middling performance on the variables measuring diplomatic alignment and political distance to trading partners, indicators that are meant to capture the exposure of trade and investments flows to political and geopolitical shifts. Finally, the region shows a major gap with both the OECD and ASEAN on export similarity to China. While this is not surprising given LAC's traditional natural resource based export profile, the results clearly underscore that LAC will not necessarily benefit from manufacturing investments seeking alternatives to China, unless governments take more proactive policy measures, as discussed below. The exception of course is Mexico, which has already witnessed a surge of GVC investment in recent years, and to some extent smaller Central American economies.

Figure 3. Regional Comparison of Technology Indicators
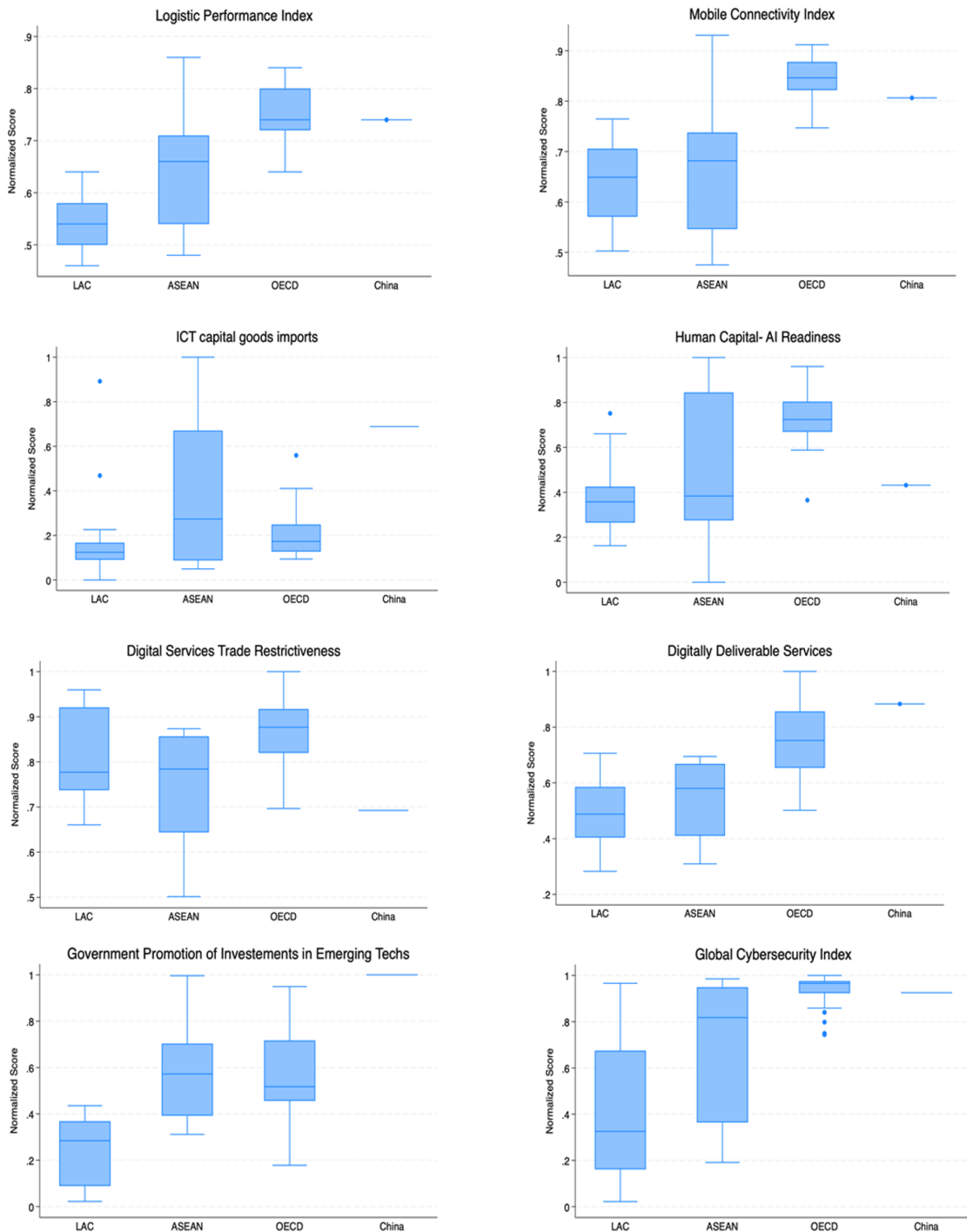
Source: Refer to the methodological annex for details on sources and methods used to construct the indicators. Note: Each variable has been constructed such that higher normalized scores correspond to better performance.

Figure 4. Regional Comparison of Sustainability Indicators
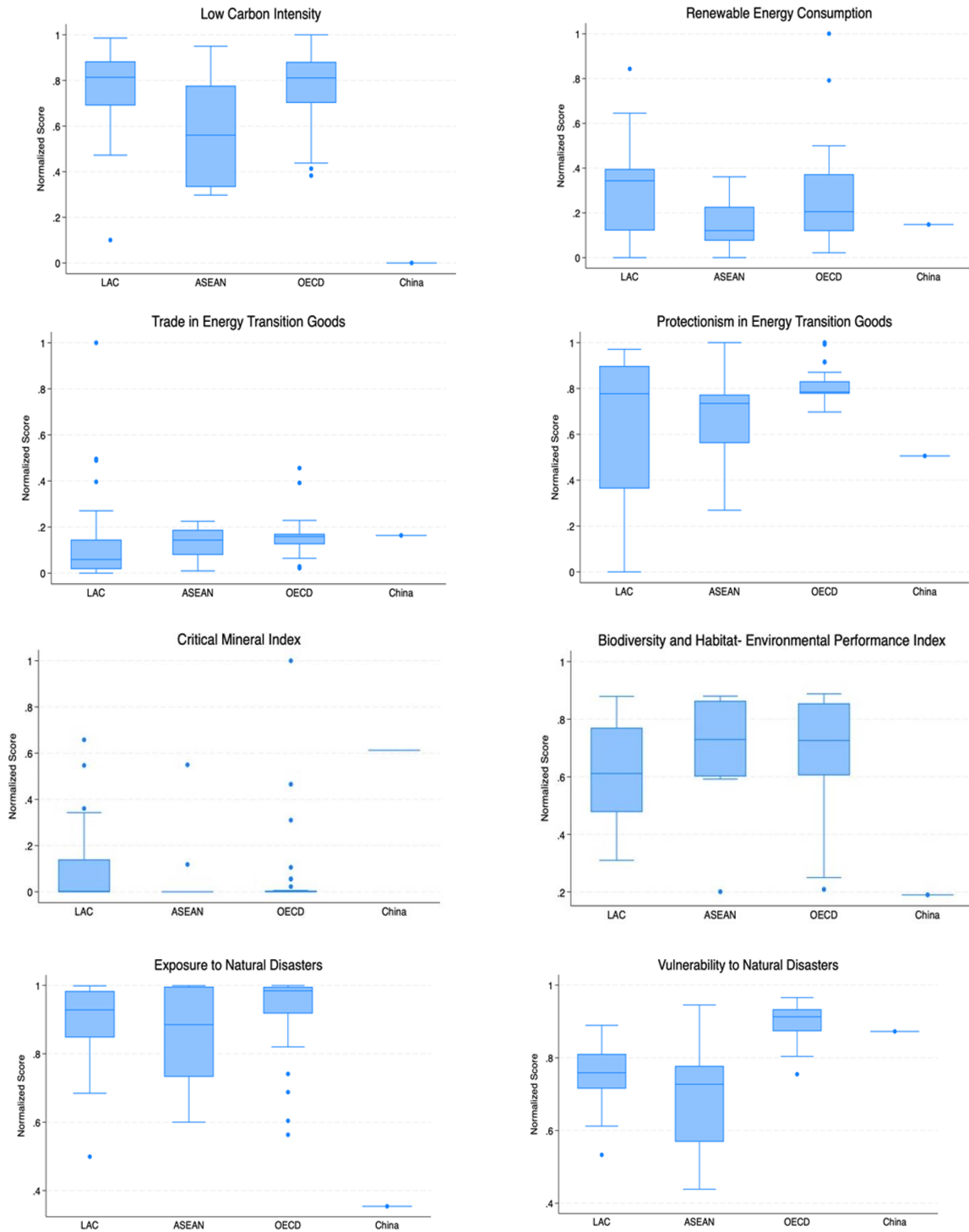
Source: Refer to the methodological annex for details on sources and methods used to construct the indicators. Note: Each variable has been constructed such that higher normalized scores correspond to better performance.

Figure 5. Regional Comparison of Geopolitics Indicators
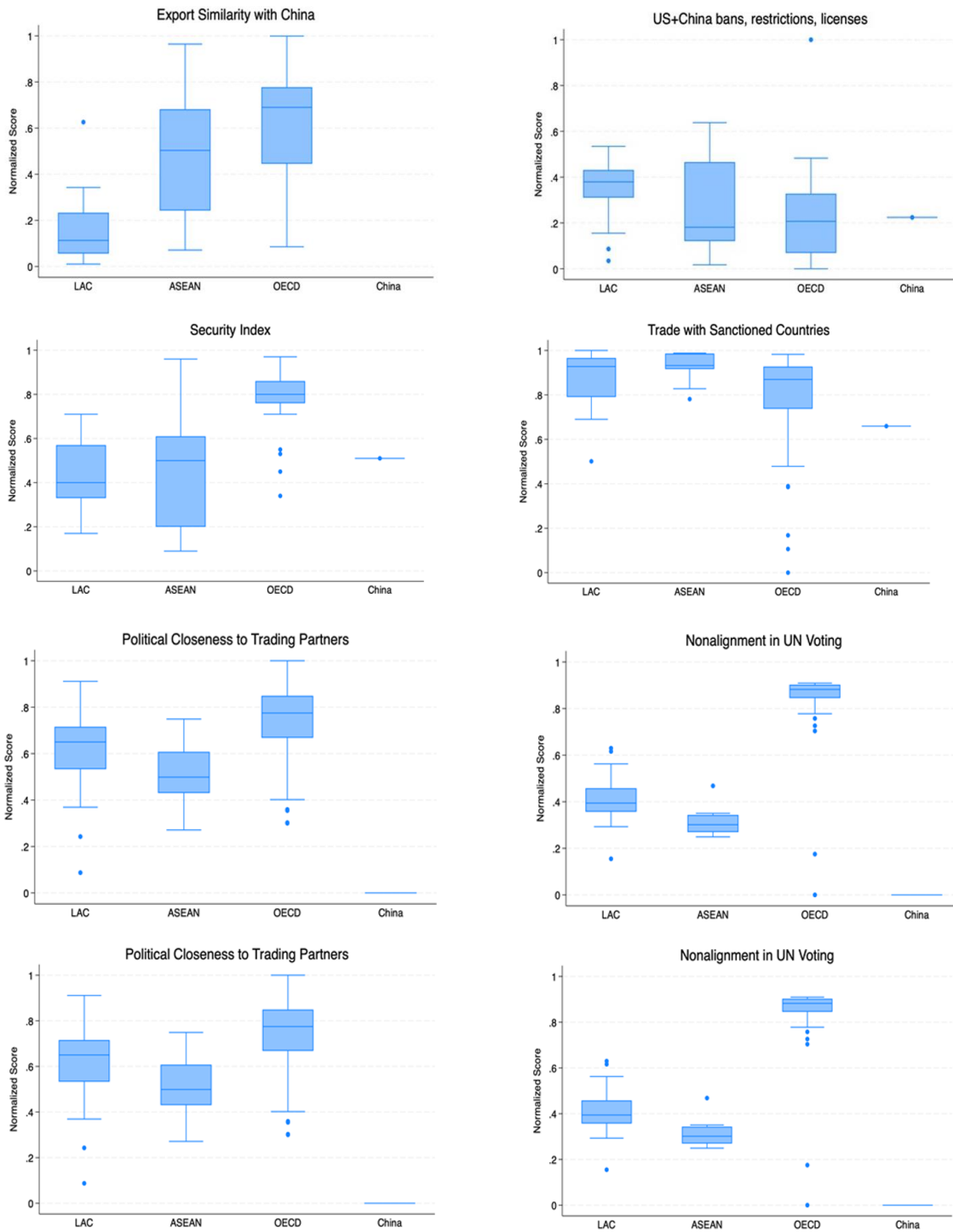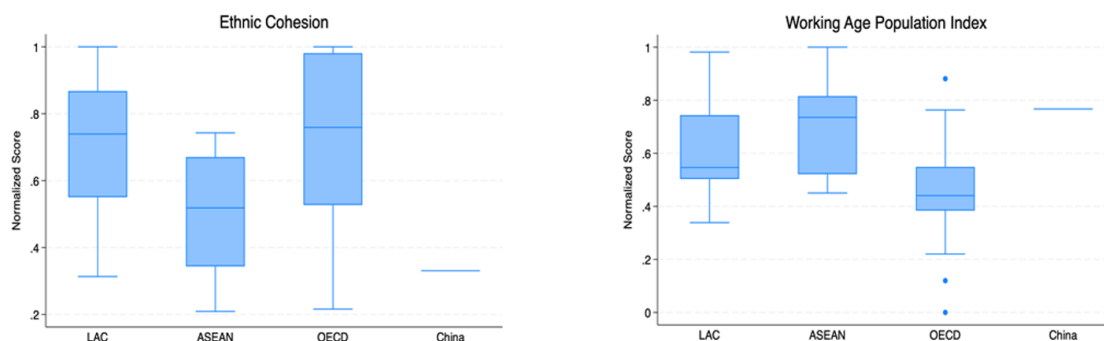
Source: Refer to the methodological annex for details on sources and methods used to construct the indicators. Note: Each variable has been constructed such that higher normalized scores correspond to better performance.

INTRA-REGIONAL COMPARISON

This section shifts the focus to the country level to examine differences in the indicator results across countries and regions. Tables 4 to 6 show the country-level rankings for each indicator within the technology, sustainability, and geopolitics subcomponents, respectively. Before discussing the results, several caveats are in order. First, it is crucial to emphasize that the indicators presented here do not capture all the factors that influence a countries' ability to participate in GVCs, as that is not the purpose of the exercise. Instead, our goal throughout this paper has been to identify and discuss emerging trends in technology, sustainability, and geopolitics that we expect will increasingly shape GVCs into the future. The structure of the index, and variables we selected, reflect this objective.

As a result, certain variables that we know to be important in determining the current configuration of GVCs are not included in our analysis. These factors include geography, especially distance to key markets and production hubs, FTA networks, tax and regulatory frameworks, and existing manufacturing base, among others. In this way, the indicators are intended to be more forward looking, aiming to show how future trends shaping the global economy may create new opportunities and challenges for countries. For these reasons, the results should not be expected to align perfectly with past observed trends in GVC integration.

The case of Mexico helps illustrate the limitations and potential usefulness of our approach. Clearly, Mexico has been among the most successful countries in terms of value chain integration in recent decades. This is due to a combination of structural factors such as proximity to the United States and policy decisions including low trading barriers, macroeconomic stability, and trade agreements with major commercial partners. However, as discussed below, Mexico is not the best performing LAC country across our variables, although it does have the highest scores in LAC on many of the technology indicators. This reflects the fact that Mexico lags behind many LAC countries on sustainability indicators such as clean energy consumption and trade in energy transition goods, while its growing investment links with China can expose it to disruptions relating to U.S. trade restrictions.

With those words of caution, we highlight several relevant results from the country rankings. First, the rankings confirm LAC's broad comparative advantage in sustainability. The region clearly performs best on this set of variables, with LAC countries including Brazil, Chile, Costa Rica, Panama, and Uruguay near the top of the rankings for several indicators. In contrast, the region has significant challenges on

technology indicators, where all LAC countries occupy the bottom half of the ranking. Geopolitics, meanwhile, presents more varied results, with some Caribbean countries in particular such as Guyana, Jamaica, and Suriname performing relatively well.

Looking within subcomponents, the results help shed light on the multidimensional and in some way countervailing impacts that technology, sustainability, and geopolitics can potentially bring. For example, while most LAC countries have relatively green energy matrices, which is reflected in strong scores on the carbon emissions per unit of GDP and clean energy consumption variables, some major economies are less well positioned on the trade related sustainability variables. Uruguay, for example, despite its strong clean energy credentials, has a low share of exports of energy transition related goods while imposing relatively high tariffs on these products. These factors could limit the opportunity to attract greenshoring or powershoring investments. Similarly, the geopolitical results show that while most LAC countries have been relatively shielded from exposure to international sanctions and other geopolitical risks, their ability to attract investment leaving China might be limited due to lack of a similar manufacturing and export base.

Finally, the indicator scores show encouraging signs that potential new opportunities may emerge for countries whose GVC participation has been limited to date. Several small Caribbean and Central American countries have strong performances on the geopolitical indicators, suggesting that they can leverage diplomacy and trade policy to seek out investments in strategic sectors. In addition, Panama, Paraguay, and Peru all score well on the sustainability indicators, reflecting factors such as clean energy resources, critical minerals, and strong exports of products related to the energy transition. These results suggest that emerging trends in GVCs can help diversify the region's participation in value chains, with appropriate policy support. The next section examines which policies can help take advantage of these opportunities.

LAC POLICY RESPONSES TO POTENTIAL REORGANIZATION OF GLOBAL VALUE CHAINS

In this paper we have examined a spectrum of shocks propelled by technological advancements, sustainability imperatives, and geopolitical forces that have the potential to reorganize GVCs on a global scale, thereby creating new opportunities for LAC to integrate into value chains. We introduced a new index assessing LAC's preparedness in this evolving context. The results of the index underscore that each of the main drivers of GVCs we analyze here, technology, sustainability, and geopolitics, is multifaceted, with potential counteracting elements in some instances. As a result, they create novel policy challenges for governments seeking to capitalize effectively on emerging opportunities. These go well beyond the traditional trade and integration agenda, but by no means obviate the need to address long standing traditional barriers to trade.

In this concluding section we point to several policy recommendations that emerge from our analysis. While the balance between opportunities and the challenge of implementation varies across the region, we underscore various potential ways through which the region can derive benefits from the likely shifts in GVCs, along with the corresponding policies that will be required to take advantage of these changes successfully.

The discussion broadly follows the structure of the three main drivers of GVC change that have oriented this paper and includes the following crosscutting sets of recommendations[1]:

- Benefitting and capturing value amid the ongoing digital technology transitions

- Seizing the green comparative advantage

- Attracting investment amid increasing geopolitical risks

- Aligning policies with major industrial policy initiatives in key trading partners, such as the United States and the European Union

- Addressing the unfinished agenda of regional and global economic integration.

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[1] For an in depth discussion of policy options for LAC see the studies commissioned for the Georgetown Americas Institute and CAF Development Bank of Latin America research project: Chiquiar and Tobal (2024); Reis, Rios, Motta,Veiga, and Fernandes (2024); Campos, Cornick and Trejos (2024); Zuluaga, Oviedo and Muñoz (2024); Frederick (2024); Gonzalez and Jaramillo (2024).

Table 4. Country Rankings on Technology Indicators

Rank	Logistic Performance index	Mobile Connectivity index	ICT capital goods imports index	Human Capital- AI Readiness index
1	Singapore	Singapore	Singapore	Singapore
2	Finland	Switzerland	United States	Israel
3	Denmark	Denmark	Vietnam	Brunei
4	Germany	Australia	Malaysia	Iceland
5	Netherlands	Finland	Philippines	Denmark
6	Switzerland	Norway	South Korea	Sweden
7	Austria	Ireland	**Mexico**	Estonia
8	Belgium	United States	Czechia	Malaysia
9	Canada	United Kingdom	Hungary	United Kingdom
10	Sweden	New Zealand	Ireland	New Zealand
11	France	Sweden	Thailand	Norway
12	Japan	Netherlands	Netherlands	Finland
13	Spain	Austria	Japan	Netherlands
14	South Korea	Iceland	Israel	South Korea
15	United States	Luxembourg	Germany	Canada
16	China	Germany	Slovakia	Australia
17	Australia	Canada	Poland	**Uruguay**
18	Greece	Japan	**Brazil**	United States
19	Italy	France	Laos	Greece
20	Norway	Spain	Australia	Portugal
21	United Kingdom	Estonia	**Argentina**	Luxembourg
22	Malaysia	South Korea	**Costa Rica**	Ireland
23	Estonia	Belgium	Denmark	Japan
24	Iceland	Lithuania	Sweden	France
25	Ireland	Slovenia	Finland	Slovenia
26	Israel	Czechia	Indonesia	Austria
27	Luxembourg	Israel	Canada	Poland
28	New Zealand	Italy	Austria	Germany
29	Poland	Slovakia	Portugal	Switzerland
30	Thailand	Hungary	Iceland	Lithuania
31	Latvia	Portugal	Norway	Czechia
32	Lithuania	China	**Paraguay**	**Trinidad and Tobago**
33	Portugal	Poland	United Kingdom	Latvia
34	Turkey	Latvia	France	Spain
35	Philippines	Greece	New Zealand	Slovakia
36	Vietnam	**Uruguay**	Latvia	Italy
37	Czechia	**Brazil**	Colombia	Hungary
38	Slovakia	**Chile**	Estonia	Belgium
39	Slovenia	Turkey	**Peru**	**Panama**
40	**Brazil**	Malaysia	**Panama**	**Peru**
41	Hungary	Thailand	**Trinidad and Tobago**	**Belize**
42	**Panama**	Mexico	Chile	China
43	Indonesia	Brunei	Lithuania	Indonesia
44	**Chile**	**Panama**	**Nicaragua**	**Colombia**
45	**Peru**	**Costa Rica**	Italy	**Bolivia**
46	**Uruguay**	Vietnam	Slovenia	Myanmar
47	**Colombia**	Indonesia	Turkey	**Brazil**
48	**Costa Rica**	**Colombia**	Belgium	**Guyana**
49	**Honduras**	**Argentina**	**Ecuador**	Turkey
50	**Mexico**	**Peru**	Spain	**Costa Rica**
51	**Argentina**	**Paraguay**	Switzerland	**Mexico**
52	**El Salvador**	**Ecuador**	Greece	**Chile**
53	**Paraguay**	**Trinidad and Tobago**	**Uruguay**	Vietnam
54	**Dominican Republic**	**Dominican Republic**	**Dominican Republic**	**Argentina**
55	**Guatemala**	**Philippines**	**Belize**	**Honduras**
56	**Jamaica**	**Belize**	Luxembourg	**Nicaragua**
57	**Nicaragua**	**Bolivia**	**Guatemala**	Thailand
58	**Trinidad and Tobago**	**Venezuela**	**Suriname**	**Dominican Republic**
59	Cambodia	**Suriname**	**Jamaica**	**Suriname**
60	Laos	**El Salvador**	**Honduras**	Philippines
61	**Bolivia**	**Guyana**	Brunei	**Venezuela**
62	**Guyana**	**Guatemala**	**Bolivia**	**Jamaica**
63	**Venezuela**	Cambodia	**Venezuela**	**Paraguay**
64	**Ecuador**	Laos	**Guyana**	**El Salvador**
65	**Suriname**	**Jamaica**	Myanmar	**Ecuador**
66	Brunei	**Honduras**	Cambodia	**Guatemala**
67	Myanmar	**Nicaragua**	**El Salvador**	Laos
68	**Belize**	Myanmar	**China**	Cambodia

Rank	Digital Services Trade Restrictivness index	Digitally Deliverable Services index	Government Promotion of Investments in Emerging Techs index	Global Cybersecurity Index
1	Canada	United States	China	United States
2	Dominican Republic	Ireland	Singapore	United Kingdom
3	Costa Rica	Germany	Luxembourg	Estonia
4	Ecuador	China	Israel	Singapore
5	Australia	Japan	Finland	South Korea
6	Norway	Netherlands	United States	Spain
7	Switzerland	Switzerland	South Korea	Malaysia
8	United Kingdom	Luxembourg	Malaysia	Lithuania
9	United States	France	France	Japan
10	Mexico	United Kingdom	Canada	Canada
11	Slovakia	Canada	Germany	France
12	Japan	Italy	Japan	Turkey
13	Estonia	Belgium	Sweden	Australia
14	Luxembourg	Sweden	Brunei	Germany
15	Denmark	South Korea	Netherlands	Luxembourg
16	Lithuania	Spain	United Kingdom	Portugal
17	Netherlands	Israel	Thailand	Latvia
18	Guatemala	Finland	Indonesia	Netherlands
19	Sweden	Austria	Ireland	Norway
20	Germany	Denmark	Switzerland	Brazil
21	Spain	Poland	Portugal	Belgium
22	Finland	Turkey	Vietnam	Italy
23	France	Brazil	Austria	Finland
24	Italy	Australia	Estonia	Indonesia
25	Philippines	Norway	New Zealand	Sweden
26	New Zealand	Philippines	Australia	Vietnam
27	Thailand	Czechia	Lithuania	Greece
28	Ireland	Malaysia	Turkey	Austria
29	Portugal	Mexico	Czechia	Poland
30	Vietnam	New Zealand	Laos	Denmark
31	Belgium	Hungary	Iceland	China
32	Czechia	Portugal	Hungary	Slovakia
33	Hungary	Indonesia	Slovenia	Hungary
34	Israel	Argentina	Belgium	Israel
35	Paraguay	Greece	Denmark	Switzerland
36	Slovenia	Costa Rica	Norway	Thailand
37	Greece	Slovakia	Uruguay	Ireland
38	Singapore	Thailand	Philippines	New Zealand
39	Austria	Panama	Myanmar	Mexico
40	South Korea	Uruguay	Spain	Iceland
41	Brazil	Estonia	Chile	Philippines
42	Latvia	Slovenia	Colombia	Uruguay
43	Brunei	Colombia	Poland	Dominican Republic
44	Bolivia	Latvia	Latvia	Slovenia
45	Peru	Chile	Guyana	Czechia
46	Chile	Iceland	Trinidad and Tobago	Chile
47	Turkey	Lithuania	Mexico	Costa Rica
48	Iceland	Cambodia	Italy	Colombia
49	Colombia	Vietnam	Argentina	Paraguay
50	Poland	Dominican Republic	Costa Rica	Brunei
51	Indonesia	El Salvador	Jamaica	Peru
52	China	Nicaragua	Dominican Republic	Argentina
53	Uruguay	Peru	Cambodia	Myanmar
54	Argentina	Laos	Slovakia	Panama
55	Cambodia	Myanmar	Panama	Jamaica
56	Laos	Bolivia	Brazil	Suriname
57	Belize	Ecuador	Peru	Guyana
58	El Salvador	Honduras	Belize	Venezuela
59	Guyana	Paraguay	Suriname	Ecuador
60	Honduras	Trinidad and Tobago	Venezuela	Trinidad and Tobago
61	Jamaica	Belize	Ecuador	Laos
62	Malaysia	Brunei	Greece	Cambodia
63	Myanmar	Guatemala	Guatemala	Bolivia
64	Nicaragua	Guyana	Paraguay	El Salvador
65	Panama	Jamaica	Bolivia	Guatemala
66	Suriname	Singapore	El Salvador	Belize
67	Trinidad and Tobago	Suriname	Honduras	Nicaragua
68	Venezuela	Venezuela	Nicaragua	Honduras

Table 5. Country Rankings on Sustainability Indicators

Rank	Low Carbon Intensity index	Renewable Energy Consumption index	Trade in Energy Transition Goods index	Protectionism in Energy Transition Goods index
1	Switzerland	Iceland	Panama	Singapore
2	Sweden	Paraguay	Chile	Iceland
3	Costa Rica	Norway	Peru	Norway
4	Ireland	Uruguay	Australia	Switzerland
5	Iceland	Costa Rica	Jamaica	Brunei
6	Singapore	Sweden	Greece	Canada
7	Denmark	Denmark	Brazil	Peru
8	Panama	New Zealand	Hungary	Costa Rica
9	Paraguay	Brazil	Brunei	United Kingdom
10	Uruguay	Austria	Luxembourg	Japan
11	France	Ecuador	South Korea	El Salvador
12	Venezuela	Switzerland	Finland	Guatemala
13	United Kingdom	Finland	Laos	Honduras
14	Colombia	El Salvador	Malaysia	Nicaragua
15	Norway	Belize	Sweden	Mexico
16	Luxembourg	Honduras	Italy	Colombia
17	Portugal	Latvia	Germany	New Zealand
18	Italy	Portugal	Estonia	Israel
19	Latvia	Laos	Japan	Australia
20	Spain	Colombia	Singapore	Dominican Republic
21	Guatemala	Venezuela	Czechia	United States
22	El Salvador	Peru	Thailand	Trinidad and Tobago
23	Austria	Nicaragua	Lithuania	Panama
24	Dominican Republic	Suriname	United States	Turkey
25	Peru	Canada	China	Germany
26	Myanmar	Guatemala	Denmark	France
27	Nicaragua	Luxembourg	Portugal	Sweden
28	Netherlands	Cambodia	Iceland	Austria
29	Finland	Chile	Slovenia	Belgium
30	Germany	Spain	Poland	Italy
31	Brazil	Lithuania	Turkey	Spain
32	Hungary	Greece	Netherlands	Denmark
33	New Zealand	Vietnam	Mexico	Finland
34	Estonia	Panama	Austria	Portugal
35	Belgium	Italy	Latvia	Czechia
36	Philippines	Slovenia	Spain	Greece
37	Slovenia	Ireland	Slovakia	Poland
38	Israel	Myanmar	Canada	Jamaica
39	Slovakia	United Kingdom	Belgium	Hungary
40	Argentina	Germany	Philippines	Slovenia
41	Mexico	Turkey	Ecuador	Vietnam
42	Honduras	Estonia	France	Lithuania
43	Greece	Philippines	Israel	Netherlands
44	Indonesia	China	United Kingdom	Latvia
45	Turkey	United States	Colombia	Slovakia
46	Chile	Bolivia	Venezuela	Thailand
47	Guyana	Australia	Vietnam	Estonia
48	Ecuador	Mexico	Suriname	Luxembourg
49	Bolivia	Japan	Indonesia	Philippines
50	Japan	France	Switzerland	Ireland
51	Czechia	Argentina	Norway	Myanmar
52	United States	Netherlands	Costa Rica	South Korea
53	Thailand	Slovakia	Dominican Republic	Ecuador
54	Poland	Hungary	El Salvador	Chile
55	Jamaica	Malaysia	Uruguay	Indonesia
56	Belize	Thailand	Cambodia	Laos
57	South Korea	Dominican Republic	Ireland	Malaysia
58	Cambodia	Belgium	Guatemala	China
59	Suriname	Indonesia	Trinidad and Tobago	Belize
60	Malaysia	Jamaica	New Zealand	Guyana
61	Australia	South Korea	Paraguay	Suriname
62	Canada	Czechia	Argentina	Paraguay
63	Lithuania	Guyana	Honduras	Bolivia
64	Laos	Israel	Myanmar	Uruguay
65	Vietnam	Poland	Nicaragua	Cambodia
66	Brunei	Singapore	Bolivia	Argentina
67	Trinidad and Tobago	Brunei	Guyana	Brazil
68	China	Trinidad and Tobago	Belize	Venezuela

Rank_	Country Mineral index	Biodiversity and Habitat- Environmental Performance index	Exposure to Natural Disasters index	Vulnerability to Natural Disasters index
1	Australia	Germany	Luxembourg	Finland
2	Brazil	France	Singapore	Sweden
3	China	Thailand	Czechia	South Korea
4	Indonesia	Belize	Hungary	Luxembourg
5	Chile	Slovenia	Paraguay	Iceland
6	Turkey	Latvia	South Korea	Brunei
7	Bolivia	Belgium	Switzerland	Turkey
8	Argentina	Estonia	Austria	Denmark
9	United States	Laos	Denmark	Ireland
10	Mexico	Singapore	Slovakia	Japan
11	Peru	Czechia	Brunei	Switzerland
12	Philippines	Austria	Bolivia	Slovakia
13	Canada	Lithuania	Laos	Netherlands
14	Poland	Portugal	Estonia	Austria
15	Germany	Netherlands	Trinidad and Tobago	Estonia
16	Czechia	Myanmar	Finland	Germany
17	Spain	Australia	Iceland	Lithuania
18	Portugal	Bolivia	Lithuania	Portugal
19	Norway	Iceland	Latvia	Hungary
20	Austria	Denmark	Israel	Greece
21	Finland	Dominican Republic	Sweden	Belgium
22	Brunei	Brazil	Norway	Norway
23	Cambodia	Ecuador	Jamaica	New Zealand
24	Laos	Colombia	Ireland	Czechia
25	Malaysia	Italy	Uruguay	Singapore
26	Myanmar	Finland	Poland	Italy
27	Singapore	United Kingdom	Suriname	Slovenia
28	Thailand	Philippines	Belgium	Spain
29	Vietnam	Malaysia	Germany	Poland
30	Belize	Greece	Netherlands	China
31	Colombia	South Korea	Cambodia	United Kingdom
32	Costa Rica	Nicaragua	Belize	United States
33	Dominican Republic	Costa Rica	United Kingdom	Suriname
34	Ecuador	Japan	Guyana	Canada
35	El Salvador	Sweden	France	Australia
36	Guatemala	Trinidad and Tobago	Portugal	Chile
37	Guyana	Ireland	Guatemala	Uruguay
38	Honduras	Chile	Brazil	France
39	Jamaica	Indonesia	Dominican Republic	Guyana
40	Nicaragua	Swizerland	El Salvador	Trinidad and Tobago
41	Panama	Spain	Spain	Latvia
42	Paraguay	Panama	Greece	Costa Rica
43	Suriname	Slovakia	Malaysia	Argentina
44	Trinidad and Tobago	Canada	Italy	Panama
45	Venezuela	Norway	Honduras	Paraguay
46	Belgium	Cambodia	Turkey	Laos
47	Denmark	Hungary	Costa Rica	Brazil
48	Estonia	New Zealand	Slovenia	Belize
49	France	Paraguay	Argentina	Malaysia
50	Greece	Brunei	Chile	Israel
51	Hungary	Jamaica	Thailand	Dominican Republic
52	Iceland	Peru	Ecuador	Vietnam
53	Ireland	Luxembourg	Panama	Venezuela
54	Israel	Suriname	Peru	Nicaragua
55	Italy	Guyana	New Zealand	Bolivia
56	Japan	Argentina	Nicaragua	Mexico
57	Latvia	Israel	Venezuela	El Salvador
58	Lithuania	Venezuela	Myanmar	Jamaica
59	Luxembourg	Guatemala	Canada	Honduras
60	Netherlands	Uruguay	Vietnam	Guatemala
61	New Zealand	El Salvador	Australia	Cambodia
62	Slovakia	Honduras	Colombia	Thailand
63	Slovenia	United States	United States	Ecuador
64	South Korea	Mexico	Indonesia	Peru
65	Sweden	Turkey	Philippines	Indonesia
66	Switzerland	Poland	Japan	Colombia
67	United Kingdom	Vietnam	Mexico	Philippines
68	Uruguay	China	China	Myanmar

Table 6. Country Rankings on Geopolitics Indicators

Rank	Export Similarity with China index	Exposure to U.S. and China trade bans, restrictions and licenses index	Security Threat index	Trade with Sanctioned Countries index
1	Czechia	United States	Portugal	Belize
2	Vietnam	Brunei	Slovenia	Suriname
3	Germany	Laos	Singapore	Cambodia
4	South Korea	Venezuela	Iceland	Myanmar
5	Italy	Belize	Luxembourg	Laos
6	Poland	Suriname	Denmark	Trinidad and Tobago
7	Thailand	Iceland	Slovakia	Australia
8	France	Latvia	Austria	Canada
9	Netherlands	Cambodia	Norway	Mexico
10	Austria	Guyana	Switzerland	Ireland
11	Turkey	Luxembourg	Japan	Luxembourg
12	Japan	Bolivia	South Korea	Chile
13	Hungary	Honduras	New Zealand	Panama
14	Spain	Nicaragua	Estonia	Luxembourg
15	Slovakia	Trinidad and Tobago	Hungary	New Zealand
16	Lithuania	Slovakia	Netherlands	Philippines
17	Portugal	Paraguay	Poland	Peru
18	Sweden	Estonia	Czechia	Bolivia
19	Denmark	El Salvador	Finland	Iceland
20	United States	Uruguay	Latvia	Dominican Republic
21	Malaysia	Panama	Australia	Nicaragua
22	Singapore	Slovenia	Ireland	Vietnam
23	Slovenia	Myanmar	Sweden	Jamaica
24	Mexico	Jamaica	Canada	Portugal
25	Estonia	Guatemala	Lithuania	Norway
26	United Kingdom	Lithuania	Germany	Guyana
27	Belgium	Ecuador	Belgium	United States
28	Latvia	Peru	Israel	Colombia
29	Philippines	Hungary	Spain	Malaysia
30	Finland	Costa Rica	Costa Rica	Singapore
31	Israel	Dominican Republic	France	Israel
32	Indonesia	Finland	United Kingdom	Denmark
33	Canada	Greece	Guyana	Indonesia
34	Greece	Norway	Suriname	Switzerland
35	Luxembourg	Denmark	Vietnam	Austria
36	Switzerland	China	Chile	Sweden
37	Cambodia	Colombia	Uruguay	Japan
38	El Salvador	Czechia	Brunei	Uruguay
39	Brazil	New Zealand	Laos	France
40	Ireland	Poland	Argentina	Belgium
41	Guatemala	Philippines	Italy	United Kingdom
42	Dominican Republic	Austria	Panama	Germany
43	Myanmar	Ireland	United States	Spain
44	Colombia	Turkey	Malaysia	Slovenia
45	Costa Rica	Sweden	China	Argentina
46	Peru	Switzerland	Indonesia	Thailand
47	New Zealand	Chile	Bolivia	Netherlands
48	Norway	Israel	Greece	Czechia
49	Chile	Portugal	Nicaragua	Brazil
50	Australia	Vietnam	Paraguay	Hungary
51	Honduras	Argentina	Ecuador	Costa Rica
52	Laos	Indonesia	El Salvador	South Korea
53	Argentina	Malaysia	Peru	Ecuador
54	Ecuador	Australia	Brazil	Honduras
55	Paraguay	Belgium	Guatemala	Brunei
56	Uruguay	Brazil	Cambodia	Guatemala
57	Trinidad and Tobago	Germany	Dominican Republic	Paraguay
58	Iceland	Italy	Turkey	Slovakia
59	Brunei	Netherlands	Colombia	Italy
60	Jamaica	Spain	Venezuela	El Salvador
61	Venezuela	Thailand	Belize	Poland
62	Suriname	Mexico	Honduras	China
63	Bolivia	Singapore	Jamaica	Venezuela
64	Panama	France	Trinidad and Tobago	Finland
65	Nicaragua	United Kingdom	Thailand	Latvia
66	Guyana	Canada	Mexico	Estonia
67	Belize	Japan	Myanmar	Greece
68	China	South Korea	Philippines	Lithuania

Rank_	Political Closeness from Trading Partners index	Nonalignment in UN Voting index	Ethnic Cohesion index	Working Age Population index
1	Luxembourg	Germany	**El Salvador**	Singapore
2	Iceland	Belgium	**Jamaica**	**Jamaica**
3	Belgium	Denmark	**Uruguay**	Brunei
4	Austria	Lithuania	Denmark	South Korea
5	**Trinidad and Tobago**	Luxembourg	Germany	**Brazil**
6	Denmark	Netherlands	Ireland	Malaysia
7	Portugal	Poland	Italy	**Colombia**
8	**Jamaica**	Slovakia	Norway	**Trinidad and Tobago**
9	Slovakia	Slovenia	Portugal	Thailand
10	Ireland	Greece	South Korea	China
11	Sweden	Estonia	Sweden	**Costa Rica**
12	Slovenia	Latvia	Czechia	Luxembourg
13	Latvia	Norway	Poland	**Chile**
14	France	Portugal	France	Vietnam
15	Norway	Spain	Japan	Turkey
16	Czechia	Iceland	Greece	Indonesia
17	Netherlands	Czechia	**Paraguay**	Slovakia
18	Spain	South Korea	**Dominican Republic**	**Belize**
19	Estonia	Finland	Finland	**Mexico**
20	Italy	Italy	**Costa Rica**	Ecuador
21	Germany	Hungary	Austria	**El Salvador**
22	Laos	France	**Chile**	Poland
23	**Guyana**	Austria	**Honduras**	**Suriname**
24	United Kingdom	Ireland	Hungary	Iceland
25	Israel	New Zealand	**Brazil**	Spain
26	Lithuania	Sweden	Netherlands	Austria
27	Poland	Switzerland	New Zealand	Switzerland
28	**Bolivia**	Japan	**Venezuela**	**Honduras**
29	Switzerland	United Kingdom	Philippines	**Peru**
30	**Belize**	Australia	**Mexico**	Hungary
31	**Costa Rica**	Turkey	**Panama**	**Dominican Republic**
32	**Panama**	Canada	Cambodia	Canada
33	Finland	**Brazil**	**Nicaragua**	**Uruguay**
34	**Colombia**	Guatemala	Australia	Ireland
35	**Dominican Republic**	**Honduras**	Turkey	Cambodia
36	Canada	**Panama**	Slovenia	**Panama**
37	**El Salvador**	Colombia	**Argentina**	**Argentina**
38	**Paraguay**	Myanmar	United Kingdom	New Zealand
39	**Ecuador**	**Uruguay**	Slovakia	**Nicaragua**
40	Greece	**Mexico**	Vietnam	**Guyana**
41	**Mexico**	**Argentina**	**Colombia**	Australia
42	Singapore	**Costa Rica**	Latvia	United States
43	Hungary	**Dominican Republic**	Thailand	Laos
44	Malaysia	**Chile**	Estonia	**Paraguay**
45	United States	**Paraguay**	**Guatemala**	Norway
46	**Suriname**	**Ecuador**	Belgium	**Bolivia**
47	Argentina	**Peru**	United States	Netherlands
48	Philippines	Guyana	Spain	Philippines
49	**Guatemala**	**Suriname**	Myanmar	Myanmar
50	**Peru**	Belize	**Ecuador**	Slovenia
51	Indonesia	**Jamaica**	Latvia	Portugal
52	**Honduras**	El Salvador	Switzerland	**Venezuela**
53	**Brazil**	**Trinidad and Tobago**	Canada	Belgium
54	Myanmar	**Venezuela**	Malaysia	Lithuania
55	Brunei	Thailand	**Peru**	Germany
56	Cambodia	Singapore	China	Italy
57	**Uruguay**	Philippines	**Trinidad and Tobago**	Czechia
58	Thailand	Vietnam	**Bolivia**	United Kingdom
59	South Korea	Malaysia	Laos	Greece
60	**Chile**	**Bolivia**	Israel	Denmark
61	Australia	Brunei	Indonesia	Estonia
62	Turkey	Laos	Belize	**Guatemala**
63	Japan	Indonesia	Brunei	Latvia
64	New Zealand	Cambodia	Guyana	Sweden
65	Vietnam	Israel	Iceland	Finland
66	**Venezuela**	**Nicaragua**	Luxembourg	France
67	**Nicaragua**	China	Singapore	Israel
68	China	United States	Suriname	Japan

BENEFITTING AND CAPTURING VALUE AMID THE ONGOING TECHNOLOGICAL TRANSITION

The digital transformation is reshaping the landscape of GVCs, offering unprecedented opportunities for reorganization and efficiency enhancements. In this digital era, technologies like the Internet of Things (IoT), artificial intelligence (AI), and blockchain play pivotal roles in optimizing production processes, reducing lead times, and enhancing overall supply chain visibility. These advancements empower businesses to adapt swiftly to dynamic market demands, enabling a more agile and responsive GVC.

LAC boasts a robust foundation to capitalize on the surge in digitally enabled cross-border trade. Notably, LAC countries possess a wealth of highly skilled professionals, coupled with lower wage levels compared to advanced industrial economies. The added advantages of English-language proficiency, cultural compatibility, and similar time zones to the United States further enhance the region's attractiveness in the digital arena, particularly in professional services.

The index presented in Section 4, however, shows that the region lags behind ASEAN countries in its preparedness for digitally driven GVCs. Governments in LAC must therefore play a crucial role in supporting companies and workers to take advantage of these trends. Policymakers should prioritize the development of robust digital infrastructure, including high-speed internet access and secure data storage facilities in order to close the connectivity gap with Asia and Europe. Investing in digital literacy programs to ensure a workforce adept at leveraging these technologies is another policy priority that the index in Section 4 highlights.

Critically, unlocking the potential of digital trade also requires addressing regulations surrounding digital service provision and cross border data flows. This includes avoiding burdensome domestic regulations such as licensing requirements and special authorizations that limit digital services provision by foreign firms. While most LAC countries have relatively open digital trade frameworks, there is currently a push for greater regulation in many countries. The importance of domestic regulations will only increase as the range of services with the potential for digital delivery across borders, such as telemedicine, online education, legal services, and many others, grows. Another policy priority is to strike the correct balance between ensuring data privacy and protection without establishing cumbersome localization rules and other measures that limit the transmission of data across jurisdictions. Removing restrictions on cross border data flows has been estimated to boost services imports, with attendant gains in firm productivity and consumer welfare, by 5% across all economies (Ferracane and van der Marel 2018).

Strategic public-private partnerships are also vital to incentivize businesses to adopt digital technologies. Governments can provide financial incentives, tax breaks, and research grants to encourage companies to invest in digital tools that enhance their role in GVCs. This collaborative approach fosters innovation,

ensuring that businesses remain at the forefront of technological advancements. Additionally, fostering an open and supportive regulatory environment encourages experimentation and the adoption of emerging technologies. Governments should proactively engage with industry stakeholders to understand their evolving needs, ensuring that policies are agile and adaptive to the rapidly changing digital landscape.

SEIZING GREEN COMPARATIVE ADVANTAGE

LAC's abundance of natural resources, including clean energy resources and critical minerals essential for the energy transition, positions the region as a significant contributor to green or low carbon inputs in GVCs. With a low carbon primary energy matrix and robust environmental and climate policy frameworks, LAC can play a pivotal role in the global production landscape where carbon emissions increasingly influence investment and sourcing decisions. This paradigm shift offers an opportunity for LAC to transcend its traditional role as a primary materials supplier and move into more value added innovation. Technologies like carbon capture and storage (CCS) can render natural gas carbon neutral, produce blue hydrogen, and diminish the carbon footprint of conventional fossil fuels.

Here too, governments have a central role in supporting and accelerating a powershoring or greenshoring transition, whereby companies will seek out jurisdictions that facilitate low carbon production processes. First, policymakers must ensure that the region's abundant clean energy resources are translated into concrete investment opportunities by maintaining stable and efficient regulatory and institutional frameworks for clean energy investment. This means streamlining licensing processes and ensuring attractive commercial terms for independent power producers. In addition, electricity grids in many countries require upgrading and expansion, or else transmission constraints will emerge as a bottleneck to investment in renewable energy.

Beyond the energy sector, policy frameworks that prioritize sustainable and eco-friendly practices are essential. Governments should implement smart regulations that incentivize industries to reduce their carbon footprint, fostering the adoption of cleaner technologies, without sacrificing competitiveness. In this vein, policymakers need to take measures to accelerate the electrification of the transport sector, which remains a major source of emissions in the region. As other regions race ahead in the adoption of EVs, LAC risks losing part of its inherent green comparative advantage.

In addition, to ensure competitiveness in emerging clean energy technology value chains, LAC must embrace market access and avoid the temptation of protectionism. Past experience shows that the latter strategy will undermine long term competitiveness. In this regard, our index shows that tariff levels in LAC for products related to the energy transition are on average higher than in the ASEAN and OECD countries.

Facilitating research and development initiatives focused on clean technologies and sustainable practices is another critical aspect. Governments can encourage innovation by providing research grants, fostering collaboration between academia and industry, establishing industrial clusters or special economic zones on clean technologies, and supporting startups that contribute to environmentally friendly solutions.

This approach not only boosts the region's competitiveness but also positions it as a hub for sustainable innovation in GVCs.

Finally, governments can leverage trade agreements and partnerships to promote sustainable practices. Encouraging responsible sourcing and ethical production through international collaboration ensures that Latin American industries adhere to high environmental standards, further solidifying their position in GVCs. Aligning with international environmental standards not only enhances the competitiveness of Latin American industries but also ensures smoother integration into global green value chains.

ATTRACTING INVESTMENT AMID INCREASING GEOPOLITICAL RISK

Global geopolitics will increasingly shape the region's role in the global economic landscape. Latin America in many ways stands to benefit from ongoing shifts in geopolitical dynamics, global trade tensions, and regional alliances, but governments must adopt strategic domestic and foreign policies to seize these opportunities and ensure that these trends do not impede integration into GVCs.

On a broad level, governments in Latin America can proactively respond to these geopolitical trends by implementing policies to attract foreign direct investment (FDI) and foster a conducive environment for GVC participation. Creating transparent and stable regulatory frameworks, coupled with streamlined bureaucratic processes, instills confidence among international investors. Predictable and investor friendly policies serve as catalysts for FDI, encouraging multinational corporations to establish and expand their operations in the region.

Strategic infrastructure investments, both domestic and cross regional, are paramount. Governments should prioritize the development of transportation networks, ports, and logistics hubs to facilitate seamless connectivity within GVCs. These initiatives enhance the region's competitiveness by reducing transportation costs and ensuring efficient movement of goods across borders.

In many instances, countries need to modernize and upgrade their institutions and policies to attract FDI, focusing not only in attracting investment but providing post establishment support (OECD 2018). By embracing friendly policies, investing in infrastructure and innovation, and actively participating in international economic networks, Latin American nations can position themselves as key players in the evolving landscape of GVCs.

Diversifying trading partners and fostering economic diplomacy are also key strategies in an increasingly tumultuous geopolitical environment. Governments can actively engage in regional and international forums, negotiate favorable trade agreements, and establish diplomatic relations that strengthen economic ties. By diversifying their global partnerships, Latin American countries can reduce dependency on a specific market and better navigate geopolitical uncertainties.

Beyond these broad recommendations, governments can take more specific steps to ensure they are well positioned in the evolving geopolitical landscape. Strengthening anti-corruption and anti-money laundering frameworks will help mitigate risks around sanctions evasion that increasingly affects companies' decisions on investment locations and sourcing. At a more operational level, establishing more efficient and effective customs controls, including the use of digital technologies, will help assure companies that their supply chains are not exposed to sanctioned entities or jurisdictions. In addition, stronger inter-governmental cooperation on security and law enforcement further instills confidence among companies that are increasingly sensitive to geopolitical risk.

ALIGNMENT WITH MAJOR POLICY INITIATIVES IN KEY TRADING PARTNERS (UNITED STATES AND THE EUROPEAN UNION)

Latin America stands at a crucial juncture to capitalize on the emerging industrial policies in the United States and the European Union, presenting a unique opportunity for enhanced participation in the reorganization of GVCs. The evolving trends of nearshoring and friendshoring, driven by a desire for supply chain resilience and proximity to major economies, create avenues for the region to strengthen its position in these value chains.

Table 7. Policy Responses to Supply Chain Resilience in the United States, European Union, and Japan

	National Policies		International Policies	
	Re / Near / Friend–shoring and other supply chain resilience policies	Traditional FTAs	Regional Trade Agreements	Sectoral Agreements
United States	Executive order on America's Supply Chains (2021) American Rescue Plan Act (2021) Infrastructure Investment and Jobs Act (2021) Innovation and Competition Act (CHIPS Act) (2021) Inflation Reduction Act (IRA) (2022) Executive Order on Outbound Investment (2023)		USMCA	U.S.-EU Trade and Technology Council (TTC) Supply chain partnerships with Japan / South Korea Partnership for Global Infrastructure and Investment (PGII) Minerals Security Partnership (with G7+) APEP in Western Hemisphere IPEF in Indo-Pacific
European Union	Open Strategic Autonomy (2020) Directive on Corporate Sustainability (2022) EU Chips Act (2023) Important Projects of Common Interest (IPCEI)	Japan EPA (2019) Vietnam TIPA (2020) UK TCA (2021) NZ FTA (2023) Several in negotiation (Singapore, India, Indonesia, ASEAN)	EU-Mercosur (under negotiation)	U.S.-EU Trade and Technology Council (TTC) DPA with Japan / Singapore / South Korea EU-ASEAN Supply chain partnerships
Japan	Promoting Investment stimulus package (2020) Act on the Promotion of National Security through Integrated Economic Measures Creation of the Economic Security Ministry (2022)	EU EPA (2019) US Sectorial (2020) UK EPA (2021) Several in negotiation (Turkey, Ukraine, Colombia, China- South Korea/ Gulf Cooperation Council)	CPTPP (2018) RCEP (2022)	Supply chain partnerships. DPA with EU

To harness this opportunity, governments in Latin America can enact strategic policies that align with the shifting dynamics mostly in the United States and the European Union, but also in other key regional partners in Asia (Table 4). Enhancing competitiveness through targeted investments in digital infrastructure, innovation, and sustainable practices is pivotal. By aligning domestic policies with the environmental and technological standards set by the United States and the European Union, Latin American nations can position themselves as reliable and attractive partners for nearshoring initiatives.

Diplomatic efforts are also crucial. Actively engaging with the United States and the European Union by establishing strong diplomatic ties and participating in forums that shape international economic policies will fortify Latin America's integration into the evolving landscape of GVCs. In summary, aligning with emerging industrial policies in the United States and the European Union provides Latin America with a unique opportunity to bolster its participation in reshaped GVCs.

TACKLING THE UNFINISHED AGENDA OF REGIONAL AND GLOBAL INTEGRATION

LAC countries are well positioned to leverage regional integration initiatives to increase their participation in traditional value chains or in emerging strategic nearshoring opportunities in sectors such as EVs, batteries, solar panels, semiconductors, etc. However, these new regionalization trends also present certain risks of exacerbating fragmentation, for example groups motivated by excluding China or the United States, although if used strategically, they can also help counter pressures from outside actors

through greater bargaining power and promoting intraregional trade as a buffer against fragmentation and decoupling pressures.

In this context, here are several policy priorities indispensable for Latin America's successful insertion into regional and GVCs. By harmonizing and simplifying trade rules, enhancing trade facilitation measures, and connecting to major emerging global trade initiatives, the region can position itself as a more attractive and efficient partner in the intricate web of international trade, fostering economic growth and sustainability.

The first policy priority focuses on promoting the convergence of trade rules, specifically rules of origin (RoOs), among countries with existing new generation Free Trade Agreements (FTAs). The complexity and administrative burden imposed by multiple and overlapping RoOs hinder the development of robust supply chains, limiting the utilization of bilateral FTAs. The objective is to replace the current patchwork of RoOs with a unified regime featuring full cumulation. This approach allows firms in any country to use materials from any other member country without compromising preferential access, thereby removing a significant barrier to intraregional trade. The harmonization of trade rules among existing trade agreements must be supplemented by the closing of some missing trade links within the region, particularly between Mexico and Brazil. This priority represents an outstanding agenda item where LAC have accrued certain advantages over time, yet progress has lagged behind that of the Asian and African regions in recent years.

The second policy priority involves ambitious trade facilitation measures to enhance connectivity across the hemisphere. These measures address logistical bottlenecks that create avoidable transaction costs and impede the flow of goods. The proposed interventions include expanding and connecting national single windows for foreign trade, implementing authorized economic operator programs, and other coordinated border management initiatives. Such efforts, exemplified by initiatives within the Pacific

Alliance and Central America, aim to streamline trade procedures, reduce transaction costs, and enhance the competitiveness of firms in the global economy. Empirical studies highlight the positive payoffs of trade facilitation measures, emphasizing their vital role in ensuring consistent, just-in-time delivery and fostering economic growth in the region.

Finally, LAC stands at a crucial juncture to actively engage with global partners in the United States, Europe, and Asia through comprehensive trade agreements, even though the political context is not highly conducive to these types of agreements nowadays. Initiating and fortifying collaborations with these major economic blocs, including the USMCA in North America, EU bilateral FTAs, or the RCEP (Regional Comprehensive Economic Partnership), and CPTPP (Comprehensive and Progressive Agreement for Trans-Pacific Partnership) in the Asia-Pacific region, is vital for the region's economic growth and resilience. As shown in (Figure 6.X) only a subset of countries in the region are fully engaged in these global initiatives. These agreements offer unparalleled opportunities to diversify markets, foster cross regional value chains, and attract foreign direct investment. Embracing these partnerships positions Latin America as a key player in an increasingly fragmented global economy.

Figure Source: Author's preparation based on official sources7: LAC Participation in a New Emerging Global Trade Architecture (2023)
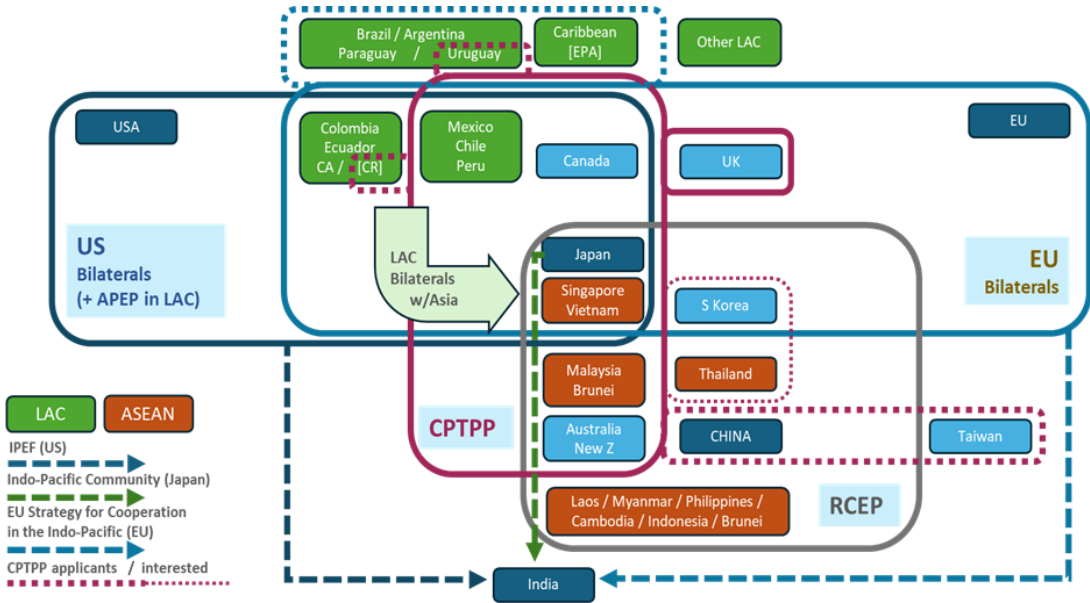
Source: Author's preparation based on official sources

METHODOLOGY ANNEX

TECHNOLOGY

Indicator: Logistic Performance Index

The Logistics Performance index serves as a metric for assessing the efficiency and effectiveness of a country's ability to transport goods across borders and within its territory. We use the LPI indicator developed by the World Bank, which is based on a global survey of international logistics operators. This survey gathers firsthand feedback on the logistics environment of various countries, offering insights into their level of "friendliness" for trade. Additionally, the LPI provides detailed and frequent data on activities such as maritime shipping, container tracking, postal services, and air freight operations.

Source: World Bank LPI database. Details here.

Indicator: Mobile Connectivity Index

The Mobile Connectivity index evaluates countries based on key factors influencing mobile internet adoption. We use the scores generated by the GSMA Mobile Connectivity Index, which assesses four primary enablers, including infrastructure, affordability, consumer readiness, and content and services.

Source: GSMA database for Mobile Connectivity. Details here.

Indicator: ICT Capital Goods Imports Index

The ICT Capital Goods Imports index measures countries' access to essential capital goods necessary for involvement in digital and high-technology value chains. We use UNComtrade data, which categorizes ICT capital goods according to HS 6-digit classifications. These categories are based on the list of critical goods and materials for high-technology supply chains outlined by the US Department of Commerce in Executive Order 14017. The indicator is derived by calculating the proportion of ICT capital goods within a country's total imports between 2019 and 2022.

Sources: UNComtrade, U.S. Executive Order 14017.

Indicator: Human Capital - AI Readiness Index

The Human Capital - AI Readiness Index assesses a country's capacity to support the technology sector by evaluating the availability of appropriate skills within its population. We use scores from Oxford Insights' Government AI Readiness data, which considers various factors including Graduates in STEM fields (UNESCO); GitHub users per thousand population (GitHub); Female STEM graduates (World Bank); Quality of engineering and technology higher education (QS Engineering & Technology rankings) and ICT skills (ITU)

Source: Oxford Insights Government AI Readiness Index 2023. Details here.

Indicator: Digital Services Trade Restrictiveness Index

The Digital Services Trade Restrictiveness Index (DSTRI) measures the barriers hindering or preventing firms from delivering services through electronic networks, irrespective of their sector. We use the OECD's DSTRI Index scores, which comprise five key measures: Infrastructure and connectivity; Electronic transactions; E-payment systems; Intellectual property rights and other barriers to trade in digitally enabled services.

Source: OECD Digital Services Trade Restrictiveness Index. Details here.

Indicator: Digitally Deliverable Services Index

The Digitally deliverable services index encompasses a combination of several extended balance of payments services classification (EBOPS) items, including Insurance and pension services; Financial services; Charges for the use of intellectual property; Telecommunications, computer and information services, and other sub-items such as Audiovisual and related service. Our methodology draws upon the OECD's outlined approach for countries not covered by their dataset. Data is sourced from the OECD International Trade in Services Statistics (ITSS) Database and the WTO Trade in Commercial Services Data.

Source: OECD Digitally deliverable services as a share of commercial services trade. Details here.

Indicator: Government Promotion of Investments in Emerging Technologies Index

The Government promotion of investments in emerging technologies index measures the average response to survey questions regarding the degree to which governments encourage investment in five emerging technology categories. We use the Portulan Institute's Network Readiness Index scores, which assess Artificial Intelligence; Robotics; App- and web-enabled markets; Big data analytics, and Cloud computing, along with data from the World Economic Forum's Executive Opinion Survey.

Source: Network Readiness Index 2023. Details here.

Indicator: Global Cybersecurity Index

The Global Cybersecurity Index measures the commitment of countries to cybersecurity. We use the Telecommunication Development Sector scores that analyze each country's Legal measures; Technical measures; Organizational measures; Capacity Development; and Cooperation aggregated into an overall score.

Source: International Telecommunication Union (ITU). Details here.

SUSTAINABILITY

Indicator: Low Carbon Intensity Index

The Low carbon intensity index measures CO_2 emissions per unit of GDP expressed in kilograms of CO_2 per USD. We use the scores from the World Bank CO_2 emissions (kg per PPP $ of GDP) indicator.

Source: World Bank. Details here.

Indicator: Renewable Energy Consumption Index

The Renewable Energy Consumption index measures the proportion of energy consumption derived from renewable sources within a country. We utilize data from the International Energy Agency (IEA), extracting total consumption and renewable consumption for all analyzed countries.

Source: U.S. Energy Information Administration. Details here.

Indicator: Trade in Energy Transition Goods Index

The Trade in Energy Transition Goods indicator measures a country's ability to participate in global markets and global supply chains for goods essential to the energy transition. We rely on UNComtrade Data and US Department of Commerce Executive Order 14017 to define energy transition goods using HS 6-digit categories (excluding fossil fuels). The indicator is computed as the proportion of energy transition goods in a country's total exports from 2019 to 2022.

Source: UNComtrade and U.S. Department of Commerce Executive Order 14017.

Indicator: Protectionism in energy transition goods Index

The Protectionism in Energy Transition Goods index assesses a country's trade openness regarding goods crucial for the energy transition. We use UNComtrade Data and US Department of Commerce Executive Order 14017 to define these goods using HS 6-digit categories (excluding fossil fuels). The indicator is computed as the most-favored nation tariff level applied to energy transition goods in 2022.

Source: UNComtrade and U.S. Department of Commerce Executive Order 14017.

Indicator: Critical Minerals Index

The Critical Minerals Index measures countries' endowment of mineral resources crucial for decarbonization technologies and the energy transition. We compute each country's portion of total global reserves for five critical minerals—graphite, nickel, cobalt, lithium, and copper—using data from United States Geological Survey (USGS) reports. We derive an aggregate indicator by computing an average across all five minerals (countries lacking reserves for a specific mineral were allocated a value of zero).

Source: United States Geological Survey (USGS). Details here.

Indicator: Biodiversity and Habitat Index

The Biodiversity and Habitat index measures a countries' actions toward retaining natural ecosystems and protecting biodiversity within their borders. We use Yale's Biodiversity & Habitat Index scores which consists of seven indicators: Terrestrial biome protection; Marine protected areas; Protected areas representativeness index; Species habitat index; Species protection index, and Biodiversity habitat Index.

Source: Yale Environmental Performance Index. Details here.

Indicator: Exposure to Natural Disaster Index

The Exposure to Natural Disaster index measures a country's exposure to earthquakes, tsunamis, cyclones, coastal floods, riverine floods, drought, and sea-level rise. We use the World Risk Index Exposure scores which looks at the latent risk of countries falling victim to a humanitarian disaster caused by extreme natural events and the negative impacts of climate change.

Source: World Risk Report. Details here.

Indicator: Vulnerability to Natural Disasters Index

The Vulnerability to Natural Disasters index measures susceptibility, lack of coping abilities, and lack of adaptive capacities to natural disasters. We use the World Risk Index Vulnerability scores which looks at the latent risk of countries falling victim to a humanitarian disaster caused by extreme natural events and the negative impacts of climate change.

Source: World Bank. Details here.

GEOPOLITICS

Indicator: Export Similarity with China Index

The Exports Similarity index compares the exports of two countries' export structure. The export structure of country A will be considered similar to that of country B, if goods constituting the exports of both countries refer to identical product categories. We use the World Bank World Integrated Trade Solution (WITS) data and the following export similarity calculation methodology: https://www.jstor.org/ stable/2231506.

Source: World Bank World Integrated Trade Solution (WITS). Details here.

Indicator: Exposure to U.S. and China Trade Bans, Restrictions and Licenses Index

The Trade Bans index measures the extent of bans, restrictions, sanctions, and licensing measures imposed on a country by China and the United States. We utilize data from Global Trade Alert, which tracks bans, licenses, and restrictions imposed on analyzed countries. We calculate the total number of these restrictions imposed on each country and determine how many originated from the USA and China.

Source: Global Trade Alert. Details here.

Indicator: Security Index

The Security Index assesses the overall security conditions within countries. We use data from the security apparatus category included in the Fragile State Index compiled by the Fund for Peace. This variable encompasses various security threats faced by a state, including bombings, attacks, battle-related deaths, rebel movements, mutinies, coups, terrorism, organized crime, homicides, and citizens' perceived trust in domestic security.

Source: Fund for Peace. Details here.

Indicator: Trade with Sanctioned Countries Index

The Trade with Sanctioned Countries metric evaluates countries' vulnerability to supply chain disruptions and regulatory risks stemming from commercial ties with sanctioned nations. We utilize UNComtrade data to determine the proportion of total trade conducted with partner countries under US country sanctions programs overseen by the Office of Foreign Assets Control (OFAC).

Source: UNComtrade and Office of Foreign Assets Control (OFAC). Details here.

Indicator: Political Closeness to Trading Partners Index

The Political Closeness to Trading Partners index measures the likeness of a country's political system to that of its trading counterparts. This similarity is derived by comparing country pairs' scores on the Freedom House Freedom in the World Index. Using UNComtrade data, the index is computed as the mean disparity between a country's political system and that of its trading partners, weighted by each trading partner's share of the country's total trade.

Sources: UNComtrade and Freedom House.

Indicator: Nonalignment UN Voting Index

The Nonalignment UN Voting Index measures a country's' neutrality in terms of their voting in the UN vis-à-vis votes cast by USA and China. We use data from Erik Voeten's United Nations General Assembly Voting Data. Non-alignment is defined as the number of votes a country casted the same as China minus number of votes casted the same as USA. The indicator is calculated as the average for 2019-2022.

Source: Erik Voeten's United Nations General Assembly Voting Data (processes by Alphacast). Details here.

Indicator: Ethnic Cohesion Index

The Ethnic Cohesion index assesses the degree of political representation of all politically significant ethnic groups within countries from 1946 to 2005. We use data from the Ethnic Power Relations (EPR) dataset, specifically utilizing scores from the ethnic fragmentation variable.

Source: The Ethnic Power Relations (EPR) dataset. Lars-Erik Cederman, Brian Min, and Andreas Wimmer. Details here.

Indicator: Working Age Population Index

The Working Age Population index measures the proportion of older dependents (individuals aged over 64) relative to the working-age population (individuals aged 15-64). We use the Age Dependency Ratio indicator provided by the World Bank computed as the number of dependents per 100 working-age population.

Source: World Bank. Details here.

Note on Normalized Scores

To ensure standardized comparison, all scores underwent normalization using the min-max method.

This process confined scores within a standardized range of 0 to 1, facilitating consistency. A score of 0 represented the lowest value, while 1 denoted the highest value, maintaining uniformity across all metrics.

DATA ANNEX

Country	Logistic Performance index	Mobile Connectivity index	ICT Capital Goods Imports index	Human Capital - AI Readiness index	Digital Services Trade Restrictiveness index	Digitally Deliverable Services index	Government Promotion of Investements in Emerging Techs index	Global Cybersecurity index
Argentina	0.560	0.668	0.197	0.349	0.660	0.640	0.349	0.501
Australia	0.740	0.906	0.204	0.754	0.939	0.709	0.512	0.975
Austria	0.800	0.868	0.176	0.707	0.798	0.745	0.537	0.939
Belgium	0.800	0.834	0.114	0.588	0.838	0.794	0.456	0.963
Belize	0.000	0.603	0.096	0.448	0.000	n/a	0.235	0.103
Bolivia	0.480	0.593	0.085	0.422	0.758	0.314	0.066	0.161
Brazil	0.640	0.762	0.226	0.401	0.777	0.707	0.284	0.966
Brunei	0.000	0.712	0.088	0.938	0.768	n/a	0.703	0.561
Cambodia	0.480	0.546	0.050	0.000	0.595	0.410	0.311	0.191
Canada	0.800	0.855	0.176	0.774	1.000	0.817	0.742	0.977
Chile	0.600	0.761	0.128	0.358	0.737	0.491	0.381	0.688
China	0.740	0.807	0.000	0.432	0.692	0.883	1.000	0.925
Colombia	0.580	0.678	0.152	0.425	0.701	0.551	0.379	0.637
Costa Rica	0.580	0.706	0.197	0.363	0.957	0.595	0.343	0.675
Czechia	0.660	0.823	0.411	0.663	0.837	0.692	0.492	0.744
Denmark	0.820	0.909	0.196	0.886	0.896	0.739	0.456	0.926
Dominican Republic	0.520	0.635	0.101	0.303	0.960	0.468	0.315	0.751
Ecuador	0.000	0.652	0.114	0.198	0.957	0.396	0.217	0.263
El Salvador	0.540	0.571	0.000	0.203	n/a	0.488	0.059	0.133
Estonia	0.720	0.844	0.151	0.866	0.917	0.558	0.519	0.995
Finland	0.840	0.905	0.188	0.803	0.877	0.759	0.831	0.958
France	0.780	0.846	0.164	0.720	0.877	0.860	0.748	0.976
Germany	0.820	0.860	0.249	0.697	0.877	0.912	0.734	0.974
Greece	0.740	0.785	0.106	0.739	0.816	0.626	0.178	0.940
Guatemala	0.520	0.550	0.092	0.163	0.895	n/a	0.089	0.131
Guyana	0.480	0.556	0.070	0.374	n/a	n/a	0.368	0.281
Honduras	0.580	0.513	0.088	0.343	n/a	0.364	0.022	0.022
Hungary	0.640	0.817	0.362	0.600	0.834	0.654	0.465	0.913
Iceland	0.720	0.866	0.170	0.906	0.733	0.502	0.469	0.798
Indonesia	0.600	0.679	0.178	0.427	0.693	0.642	0.604	0.949
Ireland	0.720	0.889	0.355	0.721	0.856	0.923	0.578	0.859
Israel	0.720	0.822	0.271	0.960	0.820	0.778	0.833	0.909
Italy	0.740	0.822	0.123	0.608	0.874	0.809	0.357	0.961
Jamaica	0.500	0.514	0.090	0.264	n/a	n/a	0.335	0.325
Japan	0.780	0.846	0.313	0.721	0.918	0.876	0.717	0.978
Laos	0.480	0.525	0.205	0.079	0.501	0.310	0.478	0.203
Latvia	0.700	0.798	0.152	0.658	0.777	0.551	0.373	0.973

Technology Indicators							
Country	Logistic Performance index	Mobile Connectivity index	ICT Capital Goods Imports index	Human Capital - AI Readiness index	Digital Services Trade Restrictiveness index	Digitally Deliverable Services index	Government Promotion of Investements in Emerging Techs index	Global Cybersecurity index
Lithuania	0.680	0.833	0.127	0.669	0.896	0.528	0.506	0.979
Luxembourg	0.720	0.861	0.094	0.727	0.917	0.861	0.949	0.974
Malaysia	0.720	0.739	0.670	0.844	n/a	0.668	0.764	0.981
Mexico	0.580	0.717	0.469	0.363	0.921	0.657	0.368	0.817
Myanmar	0.000	0.475	0.056	0.413	n/a	n/a	0.384	0.364
Netherlands	0.820	0.868	0.314	0.776	0.896	0.874	0.666	0.971
New Zealand	0.720	0.878	0.163	0.813	0.860	0.657	0.516	0.840
Nicaragua	0.500	0.503	0.124	0.340	n/a	0.447	0.022	0.090
Norway	0.740	0.905	0.170	0.806	0.939	0.701	0.456	0.969
Panama	0.620	0.709	0.143	0.566	n/a	0.586	0.289	0.341
Paraguay	0.540	0.652	0.167	0.247	0.819	0.283	0.067	0.571
Peru	0.600	0.661	0.148	0.557	0.758	0.470	0.253	0.557
Philippines	0.660	0.630	0.560	0.275	0.873	0.695	0.392	0.770
Poland	0.720	0.801	0.229	0.705	0.697	0.738	0.379	0.939
Portugal	0.680	0.808	0.171	0.732	0.855	0.645	0.545	0.973
Singapore	0.860	0.931	1.000	1.000	0.800	n/a	0.996	0.985
Slovakia	0.660	0.820	0.243	0.633	0.920	0.601	0.300	0.924
Slovenia	0.660	0.830	0.115	0.708	0.819	0.562	0.459	0.749
South Korea	0.760	0.836	0.559	0.774	0.797	0.785	0.775	0.985
Spain	0.780	0.845	0.113	0.647	0.877	0.782	0.381	0.985
Suriname	0.000	0.571	0.091	0.282	n/a	n/a	0.235	0.312
Sweden	0.800	0.878	0.189	0.869	0.878	0.790	0.714	0.946
Switzerland	0.820	0.912	0.112	0.693	0.939	0.866	0.573	0.870
Thailand	0.700	0.738	0.341	0.306	0.859	0.580	0.644	0.865
Trinidad and Tobago	0.500	0.649	0.130	0.660	n/a	0.404	0.368	0.222
Turkey	0.680	0.747	0.115	0.365	0.736	0.714	0.502	0.975
United Kingdom	0.740	0.879	0.165	0.833	0.939	0.856	0.665	0.995
United States	0.760	0.886	0.689	0.740	0.939	1.000	0.786	1.000
Uruguay	0.600	0.765	0.106	0.752	0.682	0.579	0.435	0.752
Venezuela	0.460	0.578	0.077	0.266	n/a	0.000	0.235	0.271
Vietnam	0.660	0.685	0.671	0.355	0.854	0.470	0.541	0.946

Country	Low Carbon Intensity index	Renewable Energy Consumption index	Trade in energy transition goods index	Protectionism in energy transition goods index	Critical Mineral index	Biodiversity and Habitat-Environmental Performance index	Exposure to Natural Disasters index	Vulnerability to Natural Disasters index
Argentina	0.729	0.115	0.017	0.096	0.343	0.491	0.885	0.789
Australia	0.438	0.124	0.456	0.831	1.000	0.837	0.688	0.854
Austria	0.851	0.421	0.144	0.788	0.001	0.855	0.998	0.923
Belgium	0.801	0.078	0.123	0.785	0.000	0.874	0.982	0.906
Belize	0.601	0.387	0.000	0.435	0.000	0.879	0.975	0.766
Bolivia	0.663	0.148	0.008	0.345	0.361	0.836	0.997	0.731
Brazil	0.814	0.447	0.271	0.077	0.658	0.781	0.936	0.768
Brunei	0.297	0.000	0.225	0.994	0.000	0.592	0.000	0.000
Cambodia	0.505	0.268	0.030	0.269	0.000	0.601	0.975	0.704
Canada	0.413	0.307	0.125	0.992	0.106	0.605	0.741	0.861
Chile	0.697	0.262	0.496	0.653	0.547	0.653	0.871	0.851
China	0.000	0.148	0.164	0.506	0.613	0.190	0.354	0.873
Colombia	0.884	0.359	0.104	0.874	0.000	0.768	0.685	0.533
Costa Rica	0.986	0.612	0.059	0.926	0.000	0.701	0.901	0.796
Czechia	0.637	0.029	0.168	0.779	0.023	0.857	0.999	0.899
Denmark	0.949	0.461	0.162	0.782	0.000	0.817	0.998	0.942
Dominican Republic	0.847	0.082	0.059	0.824	0.000	0.816	0.930	0.752
Ecuador	0.690	0.414	0.118	0.677	0.000	0.773	0.854	0.655
El Salvador	0.851	0.396	0.053	0.911	0.000	0.358	0.927	0.717
Estonia	0.801	0.164	0.170	0.760	0.000	0.870	0.996	0.923
Finland	0.826	0.407	0.209	0.780	0.001	0.755	0.995	0.966
France	0.936	0.119	0.111	0.790	0.000	0.883	0.973	0.835
Germany	0.819	0.193	0.170	0.792	0.055	0.888	0.980	0.923
Greece	0.719	0.228	0.392	0.779	0.000	0.726	0.918	0.911
Guatemala	0.858	0.290	0.024	0.911	0.000	0.413	0.957	0.709
Guyana	0.692	0.026	0.001	0.413	0.000	0.510	0.974	0.832
Honduras	0.727	0.379	0.013	0.899	0.000	0.345	0.912	0.710
Hungary	0.804	0.101	0.229	0.777	0.000	0.599	0.999	0.914
Iceland	0.960	1.001	0.160	1.000	0.000	0.820	0.995	0.950
Indonesia	0.712	0.076	0.079	0.566	0.550	0.632	0.601	0.569
Ireland	0.962	0.202	0.029	0.715	0.000	0.658	0.986	0.934
Israel	0.744	0.025	0.111	0.834	0.000	0.476	0.991	0.755
Italy	0.866	0.212	0.171	0.785	0.000	0.756	0.913	0.899
Jamaica	0.604	0.054	0.396	0.777	0.000	0.582	0.989	0.713
Japan	0.656	0.119	0.169	0.914	0.000	0.697	0.563	0.934
Laos	0.333	0.361	0.199	0.562	0.000	0.867	0.996	0.778
Latvia	0.865	0.373	0.132	0.763	0.000	0.875	0.992	0.804
Lithuania	0.383	0.231	0.164	0.773	0.000	0.855	0.994	0.922
Luxembourg	0.881	0.284	0.224	0.756	0.000	0.551	0.999	0.956
Malaysia	0.457	0.092	0.188	0.559	0.000	0.729	0.914	0.761

Country	Low Carbon Intensity index	Renewable Energy Consumption index	Trade in energy transition goods index	Protectionism in energy transition goods index	Critical Mineral index	Biodiversity and Habitat-Environmental Performance index	Exposure to Natural Disasters index	Vulnerability to Natural Disasters index
Argentina	0.729	0.115	0.017	0.096	0.343	0.491	0.885	0.789
Australia	0.438	0.124	0.456	0.831	1.000	0.837	0.688	0.854
Austria	0.851	0.421	0.144	0.788	0.001	0.855	0.998	0.923
Belgium	0.801	0.078	0.123	0.785	0.000	0.874	0.982	0.906
Belize	0.601	0.387	0.000	0.435	0.000	0.879	0.975	0.766
Bolivia	0.663	0.148	0.008	0.345	0.361	0.836	0.997	0.731
Brazil	0.814	0.447	0.271	0.077	0.658	0.781	0.936	0.768
Brunei	0.297	0.000	0.225	0.994	0.000	0.592	0.000	0.000
Cambodia	0.505	0.268	0.030	0.269	0.000	0.601	0.975	0.704
Canada	0.413	0.307	0.125	0.992	0.106	0.605	0.741	0.861
Chile	0.697	0.262	0.496	0.653	0.547	0.653	0.871	0.851
China	0.000	0.148	0.164	0.506	0.613	0.190	0.354	0.873
Colombia	0.884	0.359	0.104	0.874	0.000	0.768	0.685	0.533
Costa Rica	0.986	0.612	0.059	0.926	0.000	0.701	0.901	0.796
Czechia	0.637	0.029	0.168	0.779	0.023	0.857	0.999	0.899
Denmark	0.949	0.461	0.162	0.782	0.000	0.817	0.998	0.942
Dominican Republic	0.847	0.082	0.059	0.824	0.000	0.816	0.930	0.752
Ecuador	0.690	0.414	0.118	0.677	0.000	0.773	0.854	0.655
El Salvador	0.851	0.396	0.053	0.911	0.000	0.358	0.927	0.717
Estonia	0.801	0.164	0.170	0.760	0.000	0.870	0.996	0.923
Finland	0.826	0.407	0.209	0.780	0.001	0.755	0.995	0.966
France	0.936	0.119	0.111	0.790	0.000	0.883	0.973	0.835
Germany	0.819	0.193	0.170	0.792	0.055	0.888	0.980	0.923
Greece	0.719	0.228	0.392	0.779	0.000	0.726	0.918	0.911
Guatemala	0.858	0.290	0.024	0.911	0.000	0.413	0.957	0.709
Guyana	0.692	0.026	0.001	0.413	0.000	0.510	0.974	0.832
Honduras	0.727	0.379	0.013	0.899	0.000	0.345	0.912	0.710
Hungary	0.804	0.101	0.229	0.777	0.000	0.599	0.999	0.914
Iceland	0.960	1.001	0.160	1.000	0.000	0.820	0.995	0.950
Indonesia	0.712	0.076	0.079	0.566	0.550	0.632	0.601	0.569
Ireland	0.962	0.202	0.029	0.715	0.000	0.658	0.986	0.934
Israel	0.744	0.025	0.111	0.834	0.000	0.476	0.991	0.755
Italy	0.866	0.212	0.171	0.785	0.000	0.756	0.913	0.899
Jamaica	0.604	0.054	0.396	0.777	0.000	0.582	0.989	0.713
Japan	0.656	0.119	0.169	0.914	0.000	0.697	0.563	0.934
Laos	0.333	0.361	0.199	0.562	0.000	0.867	0.996	0.778
Latvia	0.865	0.373	0.132	0.763	0.000	0.875	0.992	0.804
Lithuania	0.383	0.231	0.164	0.773	0.000	0.855	0.994	0.922
Luxembourg	0.881	0.284	0.224	0.756	0.000	0.551	0.999	0.956
Malaysia	0.457	0.092	0.188	0.559	0.000	0.729	0.914	0.761

Country	Low Carbon Intensity index	Renewable Energy Consumption index	Trade in energy transition goods index	Protectionism in energy transition goods index	Critical Mineral index	Biodiversity and Habitat-Environmental Performance index	Exposure to Natural Disasters index	Vulnerability to Natural Disasters index
Mexico	0.728	0.121	0.145	0.879	0.145	0.310	0.499	0.718
Myanmar	0.837	0.197	0.009	0.714	0.000	0.837	0.776	0.439
Netherlands	0.828	0.112	0.151	0.770	0.000	0.840	0.978	0.926
New Zealand	0.801	0.452	0.021	0.870	0.000	0.596	0.820	0.905
Nicaragua	0.833	0.344	0.009	0.898	0.000	0.715	0.813	0.733
Norway	0.883	0.792	0.064	1.000	0.003	0.604	0.989	0.906
Panama	0.943	0.212	1.000	0.804	0.000	0.628	0.841	0.787
Paraguay	0.938	0.843	0.020	0.363	0.000	0.595	0.999	0.784
Peru	0.844	0.347	0.489	0.971	0.140	0.566	0.834	0.612
Philippines	0.777	0.149	0.121	0.755	0.118	0.730	0.600	0.452
Poland	0.615	0.022	0.153	0.779	0.056	0.209	0.983	0.876
Portugal	0.870	0.368	0.160	0.780	0.005	0.850	0.969	0.916
Singapore	0.950	0.008	0.168	1.000	0.000	0.864	0.999	0.899
Slovakia	0.735	0.105	0.128	0.761	0.000	0.626	0.997	0.933
Slovenia	0.776	0.208	0.158	0.777	0.000	0.876	0.900	0.889
South Korea	0.520	0.039	0.211	0.697	0.000	0.725	0.999	0.956
Spain	0.859	0.241	0.131	0.784	0.006	0.630	0.922	0.879
Suriname	0.473	0.328	0.091	0.370	0.000	0.530	0.982	0.867
Sweden	0.998	0.500	0.185	0.789	0.000	0.678	0.990	0.959
Switzerland	1.000	0.412	0.068	1.000	0.000	0.630	0.998	0.934
Thailand	0.615	0.088	0.165	0.760	0.000	0.880	0.857	0.695
Trinidad and Tobago	0.100	0.000	0.022	0.807	0.000	0.675	0.995	0.825
Turkey	0.701	0.182	0.151	0.794	0.466	0.250	0.911	0.942
United Kingdom	0.890	0.195	0.107	0.916	0.000	0.751	0.974	0.870
United States	0.624	0.148	0.164	0.808	0.310	0.333	0.000	0.870
Uruguay	0.938	0.645	0.031	0.316	0.000	0.374	0.985	0.843
Venezuela	0.891	0.351	0.000	0.000	0.000	0.464	0.805	0.742
Vietnam	0.299	0.227	0.097	0.773	0.000	0.201	0.733	0.750

The table title (spanning the top): **Sustainability Indicators**

Geopolitical Indicatosrs							
Country	Export Similarity with China index	Trade Bans index	Security Threat index	Trade with sanctioned countries index	Political distance from trading partners index	Nonalignment in UN voting index	Ethnic Cohesion index	Working age population index
Argentina	0.138	0.155	0.570	0.838	0.578	0.421	0.689	0.506
Australia	0.153	0.121	0.790	0.982	0.359	0.758	0.706	0.499
Austria	0.779	0.207	0.860	0.906	0.915	0.852	0.865	0.560
Belgium	0.605	0.103	0.760	0.876	0.918	0.906	0.508	0.415
Belize	0.010	0.500	0.320	1.000	0.717	0.364	n/a	0.650
Bolivia	0.044	0.431	0.470	0.951	0.727	0.293	0.313	0.457
Brazil	0.326	0.086	0.380	0.809	0.498	0.630	0.765	0.817
Brunei	0.071	0.638	0.610	0.781	0.442	0.286	n/a	0.000
Cambodia	0.348	0.466	0.360	0.988	0.430	0.249	0.730	0.521
Canada	0.446	0.000	0.780	0.978	0.668	0.704	0.417	0.531
Chile	0.155	0.172	0.640	0.966	0.369	0.397	0.848	0.744
China	n/a	0.224	0.510	0.660	0.000	0.000	0.331	0.767
Colombia	0.233	0.224	0.330	0.926	0.690	0.481	0.588	0.805
Costa Rica	0.222	0.310	0.710	0.808	0.716	0.407	0.865	0.764
Czechia	0.999	0.224	0.800	0.819	0.822	0.882	0.981	0.391
Denmark	0.696	0.259	0.890	0.918	0.905	0.906	1.000	0.383
Dominican Republic	0.260	0.310	0.350	0.948	0.684	0.401	0.870	0.538
Ecuador	0.113	0.328	0.400	0.791	0.650	0.391	0.463	0.604
El Salvador	0.343	0.397	0.400	0.690	0.664	0.354	1.000	0.597
Estonia	0.618	0.414	0.830	0.386	0.775	0.892	0.527	0.363
Finland	0.531	0.293	0.800	0.479	0.709	0.879	0.869	0.252
France	0.819	0.017	0.710	0.879	0.833	0.869	0.953	0.220
Germany	0.922	0.069	0.770	0.849	0.770	0.909	1.000	0.407
Greece	0.442	0.293	0.450	0.168	0.634	0.896	0.941	0.384
Guatemala	0.296	0.345	0.380	0.765	0.563	0.616	0.514	0.339
Guyana	0.015	0.466	0.670	0.927	0.748	0.384	n/a	0.500
Honduras	0.150	0.431	0.320	0.782	0.533	0.562	0.830	0.546
Hungary	0.764	0.328	0.820	0.809	0.616	0.875	0.812	0.542
Iceland	0.085	0.483	0.960	0.949	0.921	0.886	n/a	0.585
Indonesia	0.465	0.138	0.480	0.916	0.544	0.263	0.209	0.699
Ireland	0.306	0.207	0.790	0.968	0.849	0.848	1.000	0.524
Israel	0.484	0.172	0.740	0.923	0.738	0.175	0.216	0.120
Italy	0.882	0.052	0.550	0.724	0.775	0.879	1.000	0.399
Jamaica	0.067	0.362	0.300	0.933	0.884	0.357	1.000	0.982
Japan	0.775	0.000	0.850	0.892	0.303	0.781	0.947	0.000
Laos	0.147	0.638	0.610	0.986	0.749	0.269	0.283	0.498
Latvia	0.591	0.483	0.800	0.389	0.834	0.892	1.000	0.324
Lithuania	0.725	0.345	0.780	0.106	0.734	0.906	1.000	0.412
Luxembourg	0.403	0.466	0.960	0.963	1.000	0.906	n/a	0.763
Malaysia	0.682	0.121	0.520	0.926	0.608	0.293	0.404	0.815

	Geopolitical Indicators							
Country	Export Similarity with China index	Trade Bans index	Security Threat index	Trade with sanctioned countries index	Political distance from trading partners index	Nonalignment in UN voting index	Ethnic Cohesion index	Working age population index
Argentina	0.138	0.155	0.570	0.838	0.578	0.421	0.689	0.506
Australia	0.153	0.121	0.790	0.982	0.359	0.758	0.706	0.499
Austria	0.779	0.207	0.860	0.906	0.915	0.852	0.865	0.560
Belgium	0.605	0.103	0.760	0.876	0.918	0.906	0.508	0.415
Belize	0.010	0.500	0.320	1.000	0.717	0.364	n/a	0.650
Bolivia	0.044	0.431	0.470	0.951	0.727	0.293	0.313	0.457
Brazil	0.326	0.086	0.380	0.809	0.498	0.630	0.765	0.817
Brunei	0.071	0.638	0.610	0.781	0.442	0.286	n/a	0.000
Cambodia	0.348	0.466	0.360	0.988	0.430	0.249	0.730	0.521
Canada	0.446	0.000	0.780	0.978	0.668	0.704	0.417	0.531
Chile	0.155	0.172	0.640	0.966	0.369	0.397	0.848	0.744
China	n/a	0.224	0.510	0.660	0.000	0.000	0.331	0.767
Colombia	0.233	0.224	0.330	0.926	0.690	0.481	0.588	0.805
Costa Rica	0.222	0.310	0.710	0.808	0.716	0.407	0.865	0.764
Czechia	0.999	0.224	0.800	0.819	0.822	0.882	0.981	0.391
Denmark	0.696	0.259	0.890	0.918	0.905	0.906	1.000	0.383
Dominican Republic	0.260	0.310	0.350	0.948	0.684	0.401	0.870	0.538
Ecuador	0.113	0.328	0.400	0.791	0.650	0.391	0.463	0.604
El Salvador	0.343	0.397	0.400	0.690	0.664	0.354	1.000	0.597
Estonia	0.618	0.414	0.830	0.386	0.775	0.892	0.527	0.363
Finland	0.531	0.293	0.800	0.479	0.709	0.879	0.869	0.252
France	0.819	0.017	0.710	0.879	0.833	0.869	0.953	0.220
Germany	0.922	0.069	0.770	0.849	0.770	0.909	1.000	0.407
Greece	0.442	0.293	0.450	0.168	0.634	0.896	0.941	0.384
Guatemala	0.296	0.345	0.380	0.765	0.563	0.616	0.514	0.339
Guyana	0.015	0.466	0.670	0.927	0.748	0.384	n/a	0.500
Honduras	0.150	0.431	0.320	0.782	0.533	0.562	0.830	0.546
Hungary	0.764	0.328	0.820	0.809	0.616	0.875	0.812	0.542
Iceland	0.085	0.483	0.960	0.949	0.921	0.886	n/a	0.585
Indonesia	0.465	0.138	0.480	0.916	0.544	0.263	0.209	0.699
Ireland	0.306	0.207	0.790	0.968	0.849	0.848	1.000	0.524
Israel	0.484	0.172	0.740	0.923	0.738	0.175	0.216	0.120
Italy	0.882	0.052	0.550	0.724	0.775	0.879	1.000	0.399
Jamaica	0.067	0.362	0.300	0.933	0.884	0.357	1.000	0.982
Japan	0.775	0.000	0.850	0.892	0.303	0.781	0.947	0.000
Laos	0.147	0.638	0.610	0.986	0.749	0.269	0.283	0.498
Latvia	0.591	0.483	0.800	0.389	0.834	0.892	1.000	0.324
Lithuania	0.725	0.345	0.780	0.106	0.734	0.906	1.000	0.412
Luxembourg	0.403	0.466	0.960	0.963	1.000	0.906	n/a	0.763
Malaysia	0.682	0.121	0.520	0.926	0.608	0.293	0.404	0.815

Geopolitical Indicators							
Country	Export Similarity with China index	Trade Bans index	Security Threat index	Trade with sanctioned countries index	Political distance from trading partners index	Nonalignment in UN voting index	Ethnic Cohesion index	Working age population index
Mexico	0.626	0.034	0.170	0.974	0.628	0.438	0.735	0.650
Myanmar	0.242	0.362	0.090	0.986	0.454	0.468	0.478	0.737
Netherlands	0.784	0.052	0.820	0.827	0.806	0.902	0.760	0.453
New Zealand	0.176	0.224	0.840	0.955	0.300	0.845	0.758	0.503
Nicaragua	0.036	0.431	0.440	0.943	0.087	0.155	0.718	0.503
Norway	0.169	0.276	0.860	0.930	0.829	0.892	1.000	0.494
Panama	0.039	0.379	0.540	0.966	0.711	0.488	0.733	0.511
Paraguay	0.110	0.414	0.430	0.764	0.657	0.394	0.890	0.496
Peru	0.183	0.328	0.400	0.952	0.550	0.391	0.396	0.544
Philippines	0.542	0.207	0.090	0.955	0.575	0.327	0.743	0.450
Poland	0.867	0.224	0.820	0.683	0.728	0.902	0.965	0.592
Portugal	0.713	0.172	0.970	0.930	0.886	0.892	1.000	0.428
Singapore	0.649	0.017	0.960	0.925	0.625	0.343	n/a	1.000
Slovakia	0.735	0.431	0.880	0.738	0.859	0.902	0.668	0.657
Slovenia	0.645	0.379	0.970	0.846	0.840	0.902	0.691	0.429
South Korea	0.899	0.000	0.850	0.804	0.402	0.882	1.000	0.881
Spain	0.753	0.052	0.720	0.847	0.800	0.889	0.496	0.568
Suriname	0.056	0.500	0.660	0.999	0.588	0.374	n/a	0.588
Sweden	0.698	0.190	0.790	0.904	0.849	0.845	1.000	0.298
Switzerland	0.372	0.190	0.860	0.909	0.718	0.838	0.420	0.549
Thailand	0.825	0.034	0.200	0.828	0.407	0.350	0.559	0.782
Trinidad and Tobago	0.088	0.431	0.270	0.983	0.911	0.354	0.319	0.793
Turkey	0.778	0.207	0.340	0.000	0.355	0.726	0.701	0.711
United Kingdom	0.614	0.017	0.710	0.863	0.740	0.778	0.674	0.388
United States	0.684	1.000	0.530	0.927	0.598	0.000	0.504	0.498
Uruguay	0.091	0.397	0.640	0.880	0.415	0.458	1.000	0.527
Venezuela	0.064	0.534	0.330	0.501	0.243	0.354	0.744	0.421
Vietnam	0.965	0.155	0.650	0.938	0.271	0.310	0.611	0.734

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The Georgetown Americas Institute's Latin America in the Global Economy (LAGE) program is a multiyear initiative to advance research and promote dialogue within the academy and with governments, the private sector, and civil society around the most critical economic challenges facing the region. A critical focus will be the emerging position of Latin America and the Caribbean (LAC) in a new global economic trade architecture characterized by deep structural changes.

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