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# Geoeconomic Fragmentation and the Future of Multilateralism

Prepared by Shekhar Aiyar, Jiaqian Chen, Christian Ebeke, Roberto Garcia-Saltos, Tryggvi Gudmundsson, Anna Ilyina, Alvar Kangur, Tansaya Kunaratskul, Sergio Rodriguez, Michele Ruta, Tatjana Schulze, Gabriel Soderberg, and Juan Pedro Trevino

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Authorized for distribution by Pierre-Olivier Gourinchas and Ceyla Pazarbasioglu

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**ABSTRACT:** *After several decades of increasing global economic integration, the world is facing the risk of policy-driven geoeconomic fragmentation (GEF). This note explores the ramifications. It identifies multiple channels through which the benefits of globalization were earlier transmitted, and along which, conversely, the costs of GEF are likely to fall, including trade, migration, capital flows, technology diffusion and the provision of global public goods. It explores the consequences of GEF for the international monetary system and the global financial safety net. Finally, it suggests a pragmatic path forward for preserving the benefits of global integration and multilateralism.*

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## Acronyms/Glossary

AB	Appellate Body
AEs	Advanced Economies
AfCFTA	African Continental Free Trade Area
AML/CFT	Anti-Money Laundering/ Countering the Financing of Terrorism
AREAER	Annual Report on Exchange Arrangements and Exchange Restrictions
BIS	Bank of International Settlements
BSAs	Bilateral Swap Arrangements
CBDC	Central Bank Digital Currencies
CIPS	Cross-border Inter-bank Payment System
CLS Bank	Continued Link Settlement Bank
CMIM	Multilateral Currency Swap Arrangements
COVID-19	Coronavirus Disease of 2019
CPTPP	Comprehensive and Progressive Agreement for Trans-Pacific Partnership
DM	Digital Money
ECB	European Central Bank
EMs	Emerging Markets
EMDEs	Emerging Markets and Developing Economies
EU	European Union
FDI	Foreign Direct Investment
FTP	Financial Transaction Plan
FX	Foreign Exchange
GATT	General Agreement on Tariffs and Trade
GATS	General Agreement on Trade in Services
GEF	Geo-Economic Fragmentation
GDP	Gross Domestic Product
GFC	Global Financial Crisis
GFSN	Global Financial Safety Net
GVCs	Global Value Chains
IMF	International Monetary Fund

IMF IV	International Monetary Fund Institutional View
IMS	International Monetary System
LICs	Low Income Countries
MSMEs	Micro, Small, and Medium-Sized Enterprises
NTBs	Non-Tariff Barriers
OECD	Organization for Economic Cooperation and Development
PRGT	Poverty Reduction and Growth Trust
RFAs	Regional Financing Arrangements
RTFs	Regional Trade Arrangements
R&D	Research and Development
SIPS	Systemically Important Payment Systems
SOEs	State-Owned Enterprises
SPFS	System for Transfer of Financial Messages
SWIFT	Society for Worldwide Interbank Financial Telecommunication
TRIPS	Trade-Related Aspects of Intellectual Property Rights
UNGA	United Nations General Assembly
UNCTAD	United Nations Conference on Trade and Development
WTO	World Trade Organization
WWII	World War II

## Executive Summary

After decades of increasing global economic integration, the world is facing the risk of fragmentation. A shallow and uneven recovery from the global financial crisis (GFC) was followed by Brexit, U.S.—China trade tensions, and a growing number of military conflicts. The post-GFC era has seen a leveling-off of global flows of goods and capital, and a surge in trade restrictions. The COVID-19 pandemic and Russia’s invasion of Ukraine have further tested international relations and increased skepticism about the benefits of globalization. This Staff Discussion Note explores the potential economic ramifications of a policy-driven reversal of global economic integration, a multidimensional process that the authors refer to as geoeconomic fragmentation (GEF).

The benefits of globalization propagate through multiple channels; the adverse consequences of GEF would be felt in many areas as well. For several decades, *trade deepening* has helped catalyze catch-up in per capita incomes across countries and a large reduction in global poverty, while in advanced economies, low-income consumers have benefited disproportionately through lower prices. Conversely, the unraveling of trade links would most adversely impact low-income countries and less well-off consumers in advanced economies. Restrictions on *cross-border migration* would deprive host economies of valuable skills while reducing remittances in migrant-sending economies. Reduced *capital flows* would hinder financial deepening in destination countries, especially through foreign direct investment which can be an important source of *technological diffusion*. And a decline in international cooperation would put at risk the provision of vital *global public goods*.

Estimates of the costs of GEF from economic modeling vary widely. Available studies suggest that the deeper the fragmentation, the deeper the costs; that technological decoupling significantly amplifies losses from trade restrictions; that adjustment costs are likely to be large; and that emerging market economies and low-income countries are likely to be most at risk due to the loss of knowledge spillovers. Depending on modeling assumptions, the cost to global output from trade fragmentation could range from 0.2 percent (in a limited fragmentation / low-cost adjustment scenario) to up to 7 percent of GDP (in a severe fragmentation / high-cost adjustment scenario); with the addition of technological decoupling, the loss in output could reach 8 to 12 percent in some countries. More work is needed to assess and aggregate the costs through multiple channels.

GEF could strain the international monetary system and the global financial safety net (GFSN). Financial globalization could give way to “financial regionalization” and a fragmented global payment system. With less international risk-sharing, GEF could lead to higher macroeconomic volatility, more severe crises, and greater pressures on national buffers. Facing fragmentation risks, countries may look to diversify away from traditional reserve assets—a process that could be accelerated by digitalization—potentially leading to higher financial volatility, at least during transition. By hampering international cooperation, GEF could also weaken the capacity of the GFSN to support crisis countries and complicate the resolution of future sovereign debt crises.

To avert runaway fragmentation, the rules-based multilateral system must adapt to the changing world. This includes the international trade and monetary systems. Given current geopolitical realities, progress through multilateral consensus may not always be possible. Trust may have to be rebuilt gradually through differential engagements depending on the countries’ preferences and willingness to work together. Where preferences are broadly aligned, multilateral cooperation remains the best approach to address global challenges. In areas like climate change and pandemics such cooperation is essential. When multilateral efforts stall, open and non-discriminatory plurilateral initiatives (fewer countries wanting to do more) could be a practical way forward. When countries opt for unilateral actions, credible “guardrails” may be needed to mitigate global spillovers and protect the vulnerable (such as “safe corridors” for food and medicine). Addressing these challenges requires a joint effort of all international organizations, including the IMF. To be effective in a more shock-prone world, the IMF should remain representative of its global membership and at the core of the reinforced GFSN.

# I. Introduction

**The global economy may be on the brink of a reversal of the steady increase in integration that characterized the second half of the 20<sup>th</sup> century.** The shallow economic recovery in many regions following the GFC (2008–10) coincided with a growing debate, especially in advanced economies (AEs), about the value of multilateralism and the unequal benefits of globalization. This increasing skepticism toward multilateralism contributed to the growing appeal of inward-looking policies, with policymakers becoming more receptive to erecting barriers between nations, including in the areas of trade, capital, migration, and technology sharing. The United Kingdom's decision to leave the European Union in 2016 was an example of this broader trend. It was soon followed by a series of protectionist measures and counter-measures in trade between the world's two largest economies, the United States and China.

**The COVID-19 pandemic and increased geopolitical tensions have tested international relations and raised more questions about the benefits of global integration.** Among other measures, national authorities responded to the pandemic by restricting the free movement of goods, most notably in the health sector, as well as the free movement of people via travel bans. While some of these measures, including certain travel restrictions, were appropriate to contain the virus during the initial phases, others, such as restrictions on the export of key medical products, exacerbated the disruption of the pandemic and harmed trust in the benefits of an open trade system. Russia's invasion of Ukraine subsequently served to split countries along geopolitical lines and led to sanctions which have disrupted trade, tested the global financial architecture, and heightened tensions and uncertainty over the direction of globalization.

**Policy-driven reversal of integration, often guided by strategic considerations, will be referred to as geoeconomic fragmentation (GEF) in this paper.** GEF encompasses reversals along any and all of the different channels whereby countries engage with each other economically, including through trade, capital flows, the movement of workers across national boundaries, international payments, and multilateral cooperation to provide global public goods.

- **The motivation behind policies driving GEF varies.** It includes national strategic objectives, such as security considerations or enhancing autonomy via reduced reliance on other countries or regions. It could arise as a product of strategic economic rivalry among nations or groups of nations. Sometimes it may be a consequence of primarily *domestic* economic policy objectives, for example a desire to incentivize production and employment within national borders, or as a reaction against the perceived unequal distribution of gains from trade.
- **GEF does not** include fragmentation arising from autonomous shifts in preferences or technology. For example, a shift away from manufacturing goods (which tend to be more tradeable) toward services (which tend to be less tradeable), does not comprise GEF. The definition also excludes fragmentation driven by *prudential* policies that are undertaken in an internationally coordinated manner, for example those directed at improving domestic financial stability. In practice, however, there is often no bright light between prudential and protectionist policies.

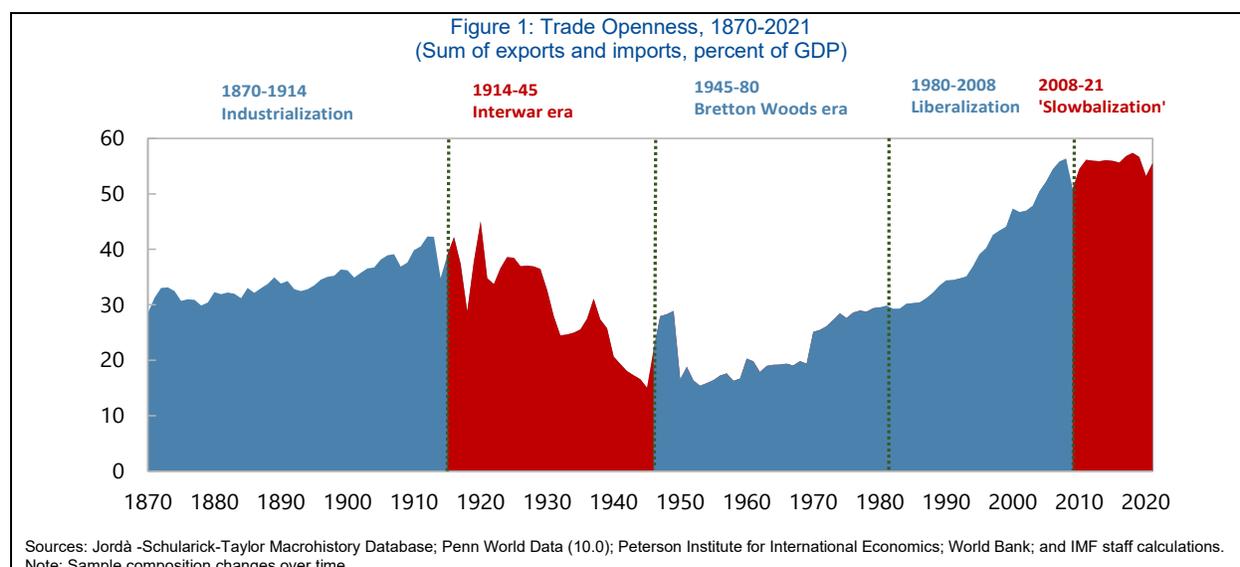
**While fragmentation may entail strategic advantages for some countries in selected cases, it is very likely to involve significant economic costs in the aggregate.** The costs would include higher import prices, segmented markets, diminished access to technology and to both skilled and unskilled labor, and ultimately reduced productivity which may result in lower living standards. GEF is likely to complicate multilateral cooperation in critical areas such as climate change mitigation and pandemic preparedness.

**This note serves as an umbrella paper and provides an overview of the multifaceted topic of fragmentation.** It will be followed by more focused analytical work in individual areas identified here, including a chapter on foreign direct investment (FDI) fragmentation in the April 2023 *World Economic Outlook* and a chapter on financial fragmentation in the April 2023 *Global Financial Stability Report*. The rest of the note proceeds as follows. Chapter 2 looks at the current state of global economic integration, reviewing recent trends in trade, capital flows and migration and examining possible early signs of GEF. Chapter 3 provides a framework to examine the possible economic consequences of GEF, identifying several channels through which it could manifest its impact. Chapter 4 discusses the implications of fragmentation for the international monetary system (IMS), including the global financial safety net (GFSN) and international payment systems. Chapter 5 summarizes key takeaways, makes recommendations, and discusses some open questions regarding both national and international policies.

## II. The State of Global Economic Integration

### Looking Back

**Globalization has gone through ebbs and flows.** Globalization is often described as a process of increasingly free flow of ideas, people, goods, services, and capital across national borders that leads to greater economic integration. The main phases of globalization can be illustrated using the trade openness metric—the sum of exports and imports of all countries relative to global GDP (Figure 1).



Each period was characterized by different configurations of economic and financial powers, and by different rules and mechanisms governing economic and financial relations across nations:

- i. **The Industrialization era** was a period when global trade—dominated by Argentina, Australia, Canada, Europe, and the United States—was facilitated by the gold standard and was largely driven by advances in transportation that lowered trade costs and boosted trade volumes.

- ii. **The Interwar era** witnessed a dramatic reversal of globalization due to international conflicts and the rise of protectionism (for example, the adoption of Smoot-Hawley Act in the United States during the Great Depression). Despite efforts by the League of Nations to foster multilateral cooperation, trade became regionalized following the imposition of discriminatory trade barriers and the breakdown of the gold standard into currency blocs ([Eichengreen and Irwin 1995](#)).
- iii. **The Bretton Woods era** began shortly after the end of WWII and was marked by the creation of new international institutions (IMF, World Bank, General Agreement on Tariffs and Trade). With the emergence of the United States as the dominant economic power, the U.S. dollar (pegged to gold) became the linchpin of the system with other exchange rates pegged to the dollar. The post-war recovery and trade liberalization led to the rapid expansion of Europe, Japan, and developing economies. Capital controls were gradually relaxed in many countries. But expansionary US fiscal and monetary policy driven by the need to finance social and military spending ultimately made the system unsustainable. By 1974, the United States terminated dollar-gold convertibility and many countries switched to floating exchange rates.
- iv. **The Liberalization era** saw a gradual removal of trade barriers in large emerging market economies (EMs), including China, and unprecedented levels of international economic cooperation, including the integration of the former Soviet bloc into the global economic system. Liberalization accounted for most of the increase in trade in this period ([Baier and Bergstrand 2001](#)). The World Trade Organization (WTO), established in 1995, became the new multilateral institution overseeing trade agreements and facilitating negotiations and dispute settlement. Cross-border capital flows—FDI, bank lending, portfolio investment—surged, increasing the complexity and interconnectedness of the global financial system.
- v. **The “Slowbalization”** that followed the GFC (2008–10) has been characterized by a slower expansion of cross-border lending and trade. Globalization has plateaued.

## The Current State of Global Economic Integration

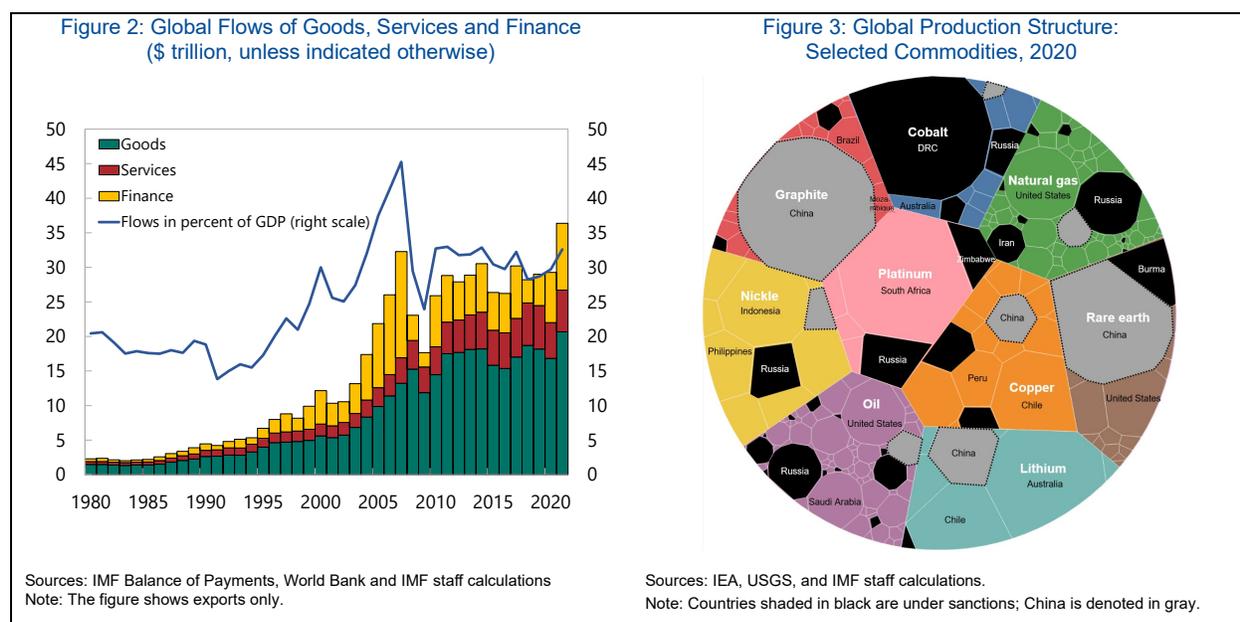
**The current economic structure of the world and its multilateral institutions has been largely shaped by the Liberalization era.** Beside the integration of nearly all countries into the global economy, the current system has several important features.

**The network of linkages across countries has become highly complex.** In addition to trade in goods, trade in services has grown dramatically over the past two decades (Figure 2). Both the volume and types of cross-border financial flows have expanded as well. Cross-border movement of people and information have reached new highs. The world has become more interconnected than ever, with the number of internet users reaching nearly [66 percent](#) of the world’s population in 2022.

**Supply chains have become highly internationalized.** This has occurred through the outsourcing of manufacturing and some services (mainly from AEs) to countries with skilled but cheaper labor. As a result, trade in intermediate goods now slightly exceeds trade in final goods.

**The production of many critical commodities has become highly concentrated.** While increased specialization led to efficiency gains, it has also become a source of fragility for global value chains (GVCs). For example, while the United States dominates the supply chain (upstream, refining, and consumption) for oil and gas, China is the dominant player in clean energy minerals. This makes GVCs vulnerable not only to market power and logistical risks but also to geopolitically-induced disruptions, including through trade

restrictions ([Leruth and others 2022](#)). Figure 3 shows a high concentration in global production of key commodities, exacerbated by the fact that some of the large producers are under sanctions.

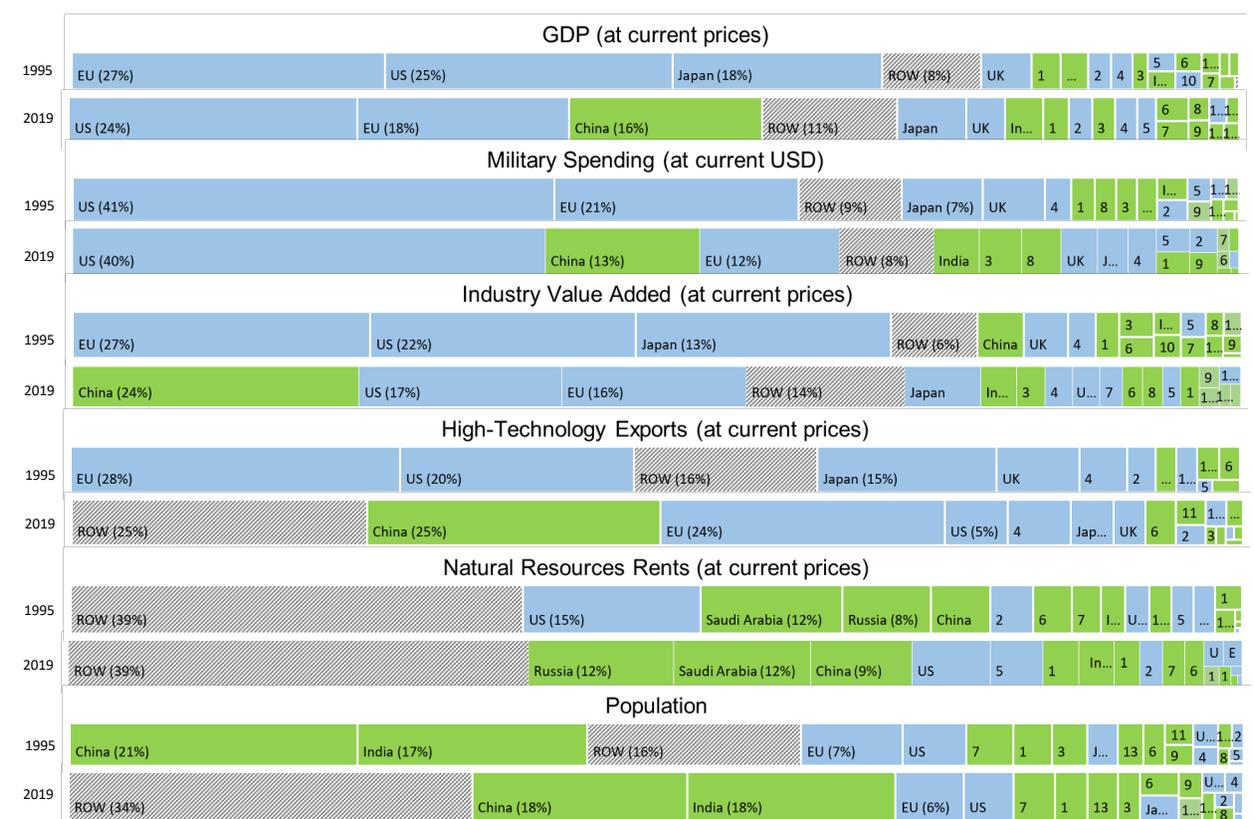


**Emerging market economies (EMs) have been playing an increasingly important role in the global economic system.** Figure 4 shows the shares of AEs and EMs in global GDP, military spending, industry value added, high-tech exports, natural resources rents, and population in 1995 and in 2019 (just before the COVID-19 pandemic). While the EU, Japan, the United Kingdom, and the United States had accounted for 74 percent of global GDP in 1995, their weight dropped to about 50 percent by 2019. The decline in the share of AEs in global manufacturing has been even more dramatic, with China now accounting for roughly one-third of the global manufacturing value added (based on World Bank data). Major EMs have also become an increasing source of outward FDI, in a shift from a receiving-country status a few decades ago. While AEs have maintained their dominant position in the financial, high-tech, and military sectors, emerging market and developing economies (EMDEs) have a larger share of the global population and supply of primary commodities, as well as a growing share of manufacturing. The evolution of trade patterns mirrored these economic shifts, with China becoming the largest trading partner for a growing number of countries around the world (Figure 5).

## Signs of Fragmentation

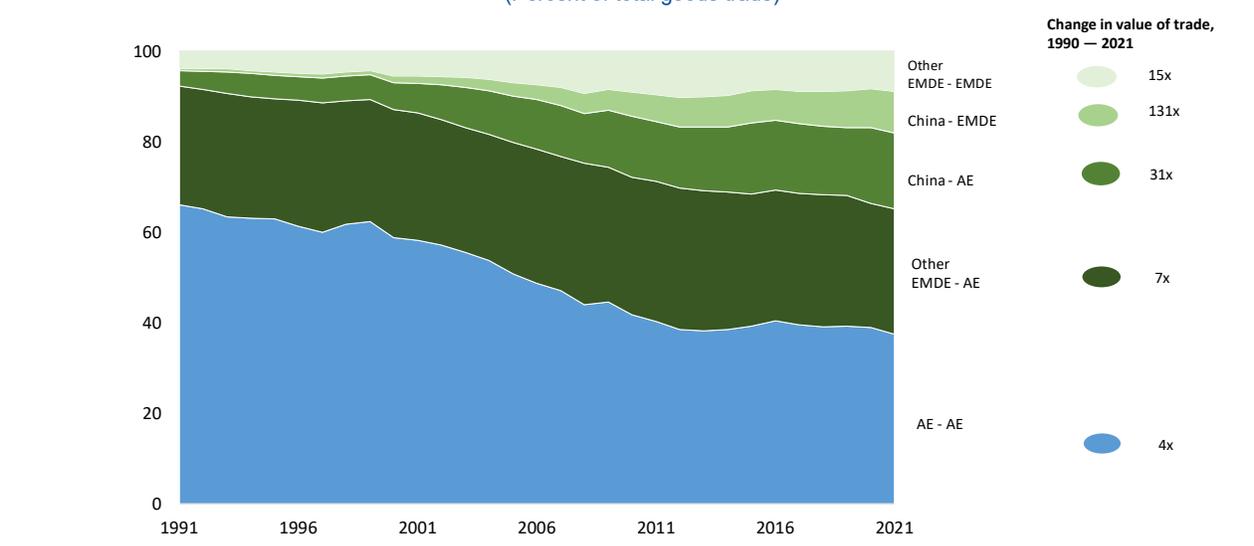
**Globalization has slowed after the GFC.** The post-GFC leveling-off was not uniform across different types of flows (Figure 2). The bulk of the slowdown in cross-border capital flows was due to cross-border lending as banks deleveraged to rebuild capital buffers. The slowdown in trade was partly cyclical, reflecting lower demand, and partly structural, owing to changes in the structure of GVCs, especially as China's growing production of intermediate goods replaced imported inputs (Constantinescu, Mattoo and Ruta, 2020). Services trade held up well, mainly reflecting the rapid deployment of internet and a growing share of cross-border services, including in the financial sector ([UNCTAD 2018a](#)).

Figure 4: The Global Economic System, 1995 vs. 2019  
(Percent of the total, AEs in blue, EMs in green)



Sources: World Bank and IMF staff calculations.  
 Note: Industry comprises value added in mining, manufacturing, construction, electricity, water, and gas. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. The estimates of natural resources rents (oil, gas, coal, and other minerals) are calculated as the difference between the price of a commodity and the average cost of producing it. This is done by estimating the price of units of specific commodities and subtracting estimates of average unit costs of extraction or harvesting costs. These unit rents are then multiplied by the physical quantities countries extract or harvest to determine the rents for each commodity. The labels are Brazil (1), Canada (2), Russia (3), Korea (4), Australia (5), Mexico (6), Indonesia (7), Saudi Arabia (8), Turkiye (9), Switzerland (10), Thailand (11), Argentina (12), Nigeria (13), EU shown excl. UK.

Figure 5: Bilateral Goods Trade by Development Status, 1990–2021  
(Percent of total goods trade)



Sources: IMF Direction of Trade Statistics and IMF staff calculations.

**Despite clear benefits, discontent with globalization has been growing:**

- On the upside, the benefits of global economic integration are generally well recognized and include lower transaction costs, lower consumer prices, greater economic efficiency through specialization, faster technology diffusion, faster cross-country income convergence, and a large decline in extreme poverty.
- On the flipside, discontent with globalization has been driven by its real or perceived distributional effects, including the decline in the labor share of income and skill-related inequality. Surging incomes among the top 1 percent have fueled further concerns about the globalization-inequality nexus ([Kanbur 2015](#)). A [2021 Ipsos-World Economic Forum survey](#)—that measures support for globalization in 25 countries—shows that support for globalization and trade has declined, with half the respondents unsure of its benefits and a third advocating for trade barriers (see Chapter 3 for further discussion).

**Rising discontent with globalization has fueled political populism and trade tensions.** Complaints have been growing about some jurisdictions “abusing the system” by enabling tax optimization schemes and retaining comparative advantage through questionable domestic laws and regulations (for example, non-observance of labor standards, currency manipulation, undercutting the anti-money laundering and counter-terrorist financing (AML/CFT) regulations, active recourse to industrial state subsidies). The intensification of the U.S.—China trade tensions in 2018 led to a surge in global trade policy uncertainty (Figure 6) and contributed to a paralysis of multilateral trade dispute mechanisms.<sup>1</sup>

**The COVID-19 pandemic and the war in Ukraine have deepened cracks in the global economic order.** At the height of the pandemic, many countries imposed export restrictions on medical goods and foodstuffs—exports bans accounted for about 90 percent of trade restrictions. While the number of international military conflicts around the world has been rising steadily since the GFC (Figure 6), the war in Ukraine has triggered a geopolitical rift. Both the war and related sanctions imposed by western countries on Russia and Belarus led to major dislocations in energy and agricultural commodity markets, as many countries also imposed export bans on agricultural goods and fertilizers.<sup>2</sup> The deepening geopolitical confrontation has wreaked havoc in European energy markets, leading to extreme volatility and fears of energy shortages. The production chains and financing networks which worked relatively well under benign global conditions turned out to be less resilient in times of COVID-19 and increased geopolitical tensions.

**Rising geopolitical tensions have led to more protectionism and increasing use of cross-border restrictions on the national security grounds.** While there are few clear signs of fragmentation in the trade data yet (outside of sanctioned countries and entities), the number of protectionist measures is rising. Data from the *Global Trade Alert database* shows a rising number of trade restrictions imposed by countries, notably in high-tech sectors that are likely linked to national security or strategic competition (Figure 7) ([IMF 2022a](#)). The *IMF Annual Report on Exchange Arrangements and Exchange Restrictions*, which documents trade and capital flow measures implemented by countries, shows that restrictions motivated by national security considerations surged in 2020 (Figure 8). While in part coinciding with the onset of the pandemic, increased geopolitical tensions have contributed to the proliferation of FDI restrictions ([Evenett 2021](#)). The recent U.S. Inflation Reduction Act contains provisions that aim at providing incentives to domestic producers, in some

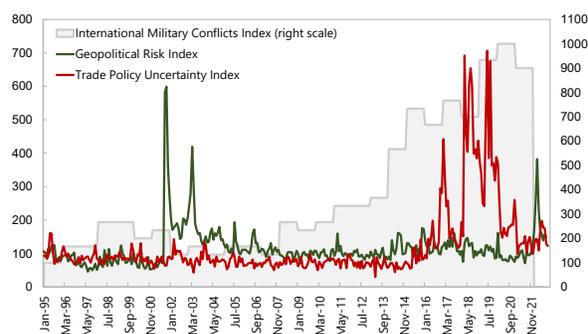
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<sup>1</sup> From 1995 until the suspension of the Appellate Body (AB) in 2019 following a sustained US blockade of new AB appointments, the WTO’s dispute settlement system played a crucial role in enforcing internationally agreed WTO rules and bringing greater policy stability to international trade. In the year prior to the suspension there were about 50 WTO dispute proceedings each month. Although the first-stage dispute panels continue to examine disputes, their proposed decisions are typically appealed “into the void” and no further action can be taken, greatly reducing the effectiveness of the dispute system.

<sup>2</sup> During 2022, export restrictions on food and fertilizer exports were imposed by more than 30 countries (see [Global Food Security Portal](#)).

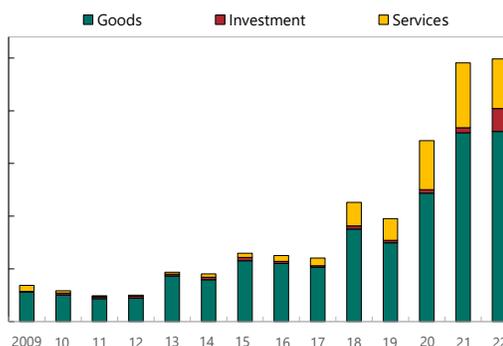
cases to the detriment of foreign producers. Other recent measures include the European “Chips Act.” providing support to semiconductor technologies and applications in the EU, or the “Made in China 2025” state-backed subsidy program seeking to improve China’s competitiveness in high-tech manufacturing. Most recently, the United States has announced measures restricting sales to China of certain high-tech goods, software, and other technology related to advanced computing and semiconductor manufacturing, as well as activities of “US persons” that support the development or production of certain technologies in China.<sup>3</sup> Such measures— often motivated by national security or economic security considerations— increase the risk of a global high-tech decoupling, with adverse implications for the global economy (see Chapter 3).

Figure 6. Geopolitical Risks, Military Conflicts and Trade Policy Uncertainty (1995 = 100)



Sources: [Geopolitical Risk Index](#) (as of October 21, 2022); Trade Policy Uncertainty Index (Caldara, Dario, Matteo Iacoviello, Patrick Molligo, Andrea Prestipino, and Andrea Raffo (2020)); Uppsala Conflict Data Program (UCDP) (data up to 2021); and IMF staff calculations.

Figure 7. Trade Restrictions Imposed (Number)



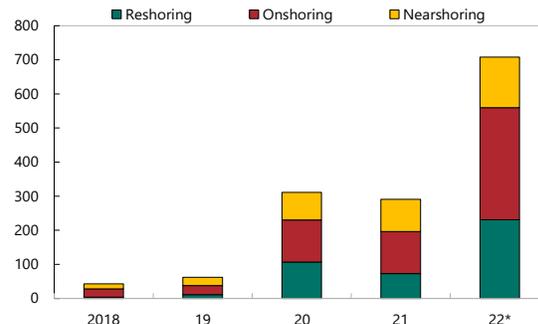
Sources: Global Trade Alert (2022), updated as of December 7, 2022

Figure 8. National Security Mentioned in IMF AREAER Reports (Number)



Sources: 2022 IMF, Regional Economic Outlook: Asia and Pacific.

Figure 9. Mentions of Key Terms in Corporate Presentations (Number)



Sources: 2022 IMF, Regional Economic Outlook: Asia and Pacific.

**Companies are increasingly focusing on the resilience of their supply chains.** While such moves are generally driven by a legitimate desire to minimize security and logistical risks, in some cases, production location decisions by firms may be guided by government policies rather than efficiency considerations. While evidence suggests that supply chain resilience to shocks is better built by diversifying across sources of inputs ([IMF, 2022b](#)), firms may instead be considering reshoring or friend-shoring to cope with risks. Indeed, mentions of key words like “reshoring,” “near-shoring,” and “onshoring” appear to have increased significantly in company earnings calls and annual reports (Figure 9).

<sup>3</sup> The [U.S. National Strategy \(October 2022\)](#) sets a goal to “maintain as large a lead as possible” in selected technologies such as computing, biotech, and clean tech. The China-related [measures](#) announced on October 7, 2022, seek to restrict China’s access to these technologies, with a focus on technologies that could be used in the military sector.

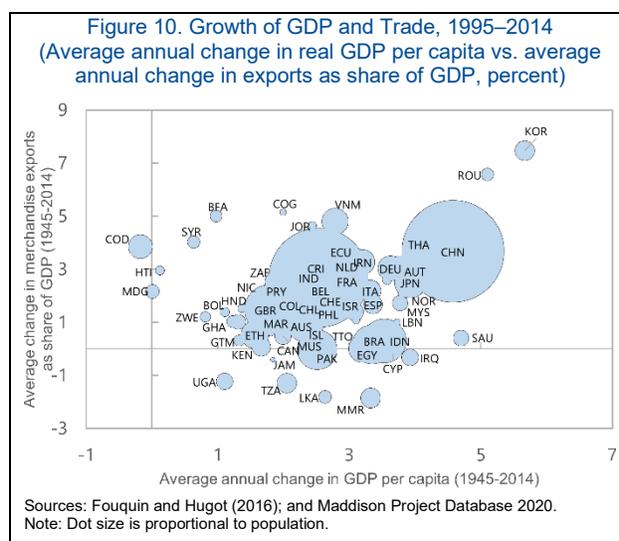
### III. Transmission Channels

**The economic consequences of GEF can be transmitted through several distinct but interconnected channels.** Similar to economic integration, the impact of GEF can be felt via changing patterns of trade, technology, labor, capital, and the provision of global public goods. These channels interact within and across national borders as well as geographic blocs. They can operate with greater force during periods of uncertainty, both in terms of the uncertain transition to a more fragmented world, as well as due to lack of clarity about the final shape that a more fragmented world might take. The [Online Annex](#) provides an overview of key papers that cover each channel of GEF.

#### Trade

**For several decades, international trade has been a catalyst for catch-up in incomes across countries, a reduction in global poverty, and higher standards of living.** Since the middle of the 20<sup>th</sup> century, trade has allowed less developed countries to integrate into the world economy and achieve catch-up that has contributed significantly to higher productivity levels across the developing world ([Frankel and Romer 1999](#), [Rodrik 2007](#), [Dornbusch 1992](#)). In recent years, the rise of global value chains (GVCs), has promoted technology diffusion across firm networks and pulled many countries closer to the technological frontier.<sup>4</sup> A strong positive link between increased openness and growth rates has emerged (see Figure 10), helping to vastly improve living standards for a large part of the global population ([Dollar and Kraay 2004, 2002](#); [Dollar 1992](#)), and contributing to a sharp and sustained decline in global poverty levels ([Bhagwati and Srinivasan 2002](#)). Trade integration has also drawn workers, especially women ([Rocha and Winkler 2019](#)), from less productive activities to more productive work. Trade liberalization, by removing tariffs, has reduced prices on imported inputs and consumer goods and disproportionately benefited low-income consumers in AEs ([Jaravel and Sager 2019](#); [Fajgelbaum and Khandelwal 2016](#)).

**Global gains from trade have, however, often been distributed unequally among people and across borders.** In many cases, the share of labor in AEs' national income has fallen as the gains from trade have accrued disproportionately to capital and skilled workers ([IMF 2017a, 2017b](#)). In some cases, GVCs have also come at the expense of environmental deterioration ([World Bank 2020b](#)). Nonetheless, on the whole trade integration has functioned as an engine of income growth ([Feyrer 2019, 2021](#); [Sachs and Warner 1995](#)) and innovation ([Melitz and Redding 2021](#)). Moreover, the literature suggests that trade is not the primary contributor to rising within-country income inequality (see Helpman, 2006 for a literature review). Several policy proposals showcase the importance of domestic policies—especially carefully targeted fiscal policies, job counseling and



<sup>4</sup> See, for example, [World Bank \(2020b\)](#); [Hanson \(2012\)](#); [Ben-David \(1996\)](#); [Acemoglu and others \(2015\)](#).

retraining, productive infrastructure investment, labor market reforms and greater financial inclusion—in ensuring that gains from trade are shared more broadly.<sup>5</sup>

**Recent trade restrictions have involved economic costs and reduced efficiency.** Evidence from the 2018-2019 US-China trade dispute suggests significant costs of protective measures on economic welfare. Tariffs were entirely passed on to domestic consumers and importers by increasing input costs.<sup>6</sup> They also dampened U.S. export growth ([Handley, Kamal, and Monarch 2020](#)) and lowered employment ([Flaen and Pierce 2019](#)). Similarly, the two decades leading up to the US-China trade war saw only a negligible impact of temporary trade barriers enacted by the United States on protected industries but a persistent negative effect on domestic employment ([Barattieri and Cacciatore forthcoming](#); [Barattieri, Cacciatore, and Ghironi 2021](#)).

**Going forward, increased fragmentation in trade would reduce economic opportunities, especially for developing economies; impede global poverty reduction; and lower living standards.** Reduced trade-led income convergence across countries will have significant welfare costs for low-income countries (LICs), while in AEs low-income consumers would be disproportionately hurt by higher prices. Mitigating policies may reduce some effects felt by specific populations but the aggregate effect is to lower living standards. A shift to near- or “friend”-shoring could reduce local producers’ vulnerability to geopolitical developments and global shocks (for example, pandemics) but would also involve sizable costs and significant disruptions as markets became increasingly segmented across national borders. Any transition period would likely be associated with particularly deep output losses, including in EMDEs given their disproportionately higher reliance on trade and thin buffers to respond to shocks. Moreover, a reconfiguration of supply chains could create a series of temporary supply shortages, pushing up commodity prices and accelerating inflation. Quantitative estimates of the impact of trade fragmentation vary widely depending on assumptions about the scope of fragmentation and the specific scenarios considered (see Box 1).

## Technology Diffusion

**The global spread of ideas has pushed out the technological frontier and reduced the technological gap for many countries.** Openness stimulates innovation by increasing domestic competition ([Buera and Oberfield 2020](#)), improving technology adoption and knowledge transfer ([Branstetter, Glennon, and Jensen 2018](#)), and enhancing the skill base of the workforce ([Bloom and others 2016](#)). In the shared digital economy, technological leaders have advanced the global technology frontier ([Acemoglu, Robinson, and Verdier 2017](#)), built data intelligence, and boosted digital trade ([UNCTAD 2018b](#)). The diffusion of ideas also promotes innovation by other countries, for example, to mitigate climate change ([Barrett 2021](#)). Technological progress also involves disruption to existing processes which may lead to an uneven distribution of benefits and costs for those reliant on existing procedures. The effect of automation and the increasing use of intangible capital on wages and employment, especially among the low-skilled, is an important policy concern ([Bloom and others 2016](#), [Bloom and others 2018](#); [Acemoglu and Restrepo 2020](#)). Nevertheless, past technological innovations spurred by knowledge diffusion have generally had the overwhelming effect of expanding productive capacity and raising living standards, especially if accompanied by policies that facilitate sectoral reallocation ([Aghion and others 2020](#); [Artuc and others 2022](#)).

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<sup>5</sup> See, for example, [Dixit and Norman \(1985\)](#), [Antras, Gancia, and Zilibotti \(2017\)](#), [Lyon and Waugh \(2018\)](#), [IMF \(2017b\)](#), [IMF/WB/WTO \(2017\)](#), [Hollweg and others \(2014\)](#).

<sup>6</sup> See, for example, [Cavallo and others \(2021\)](#), [Amiti, Redding, and Weinstein \(2019\)](#), [Flaen and Pierce \(2019\)](#), [Fajgelbaum and others \(2020\)](#).

### Box 1. Quantitative Estimates of Output Losses from GEF

**Recent studies show that GEF is likely to be costly.** Due to the recent nature of fragmentation, there remains limited work on the quantitative costs of fragmentation and most analyses focuses on modeling exercises as opposed to empirical estimation. This box summarizes and compares four such studies which all find significant costs to fragmentation despite different assumptions and methodology. The papers focus primarily on trade and technology barriers, with a variety of assumptions regarding trade restrictions as well as technological decoupling in some cases. Box Figure 1.1 summarizes the main results from the four papers considered, showcasing the long-term GDP losses for two scenarios in each paper, although the papers look at different regions so results cannot be directly compared across papers.

- [IMF \(2022a\)](#) looks at the effect of elimination of trade in high-tech manufacturing and energy across rival blocs. Countries are assigned to different blocs depending on how they voted on the motion to condemn Russia's invasion of Ukraine at the United Nations General Assembly (UNGA) in March. The baseline results suggest sizeable output losses of about 1.2 percent of world GDP; when escalating non-tariff barriers (NTBs) in other sectors are added, the losses rise to 1.5 percent. Trade-intensive countries in the Asia-Pacific region are disproportionately affected, with losses of about 3.3 percent in the more severe scenario.
- **Bolhuis, Chen, and Kett (forthcoming)** construct a new dataset of production and trade in a large number of sectors, with particular emphasis on commodities, that underpins the modelling of two scenarios. A limited fragmentation scenario looks at partial trade restrictions between different blocs while a more severe fragmentation scenario features two rival blocs with zero inter-bloc trade. Depending on trade elasticities, which determine the cost of adjustment, long-run output is reduced by 0.2 to 1 percent and by 1.9 to 6.9 percent globally in these scenarios with greater restrictions again leading to greater losses.
- [Cerdeiro and others \(2021\)](#) deploy a set of structural models to examine the costs of three different cumulative layers of fragmentation: a trade layer featuring elevated NTBs, a sectoral misallocation layer resulting from reduced trade, and an additional layer due to lower foreign knowledge diffusion. The authors consider a range of fragmentation scenarios: in some scenarios there are countries not tied to any of the dominant blocs, whereas in other scenarios all countries are forced to trade only with a single bloc. Their mildest scenarios suggest limited global losses as some countries gain due to substitution across regions. However, the more severe scenarios imply output losses on the scale of 8.5 percent for the most severely affected countries when accounting for all three layers of fragmentation.
- [Goes and Bekkers \(2022\)](#) focus on knowledge diffusion across countries which can have large effects on productivity and subsequently domestic output. The global economy is divided into an Eastern bloc and a Western bloc based on UNGA voting records. The results show relatively modest losses of as little as 0.4 percent of GDP for some countries in a scenario of very limited decoupling but very large losses of as much as 12 percent for the most affected countries under full technological decoupling.

**Despite large uncertainties, the papers collectively point to several key results.**

**First, the costs are greater the deeper the fragmentation.** Each paper considers a range of scenarios, and those involving more barriers and fewer choices for countries lead to greater output losses. For example, in [IMF \(2022a\)](#), losses are greater following a broadening of NTBs from only select sectors to all goods sectors, while in [Cerdeiro and others \(2021\)](#) and Bolhuis, Chen, and Kett (forthcoming) losses are greater if "third-party" countries are forced to trade exclusively with one dominant bloc rather than being free to trade with multiple dominant blocs.

**Second, reduced knowledge diffusion due to technological decoupling is a powerful amplifier of the trade channel.** Papers that explicitly consider the dynamic effects arising from technological decoupling, such

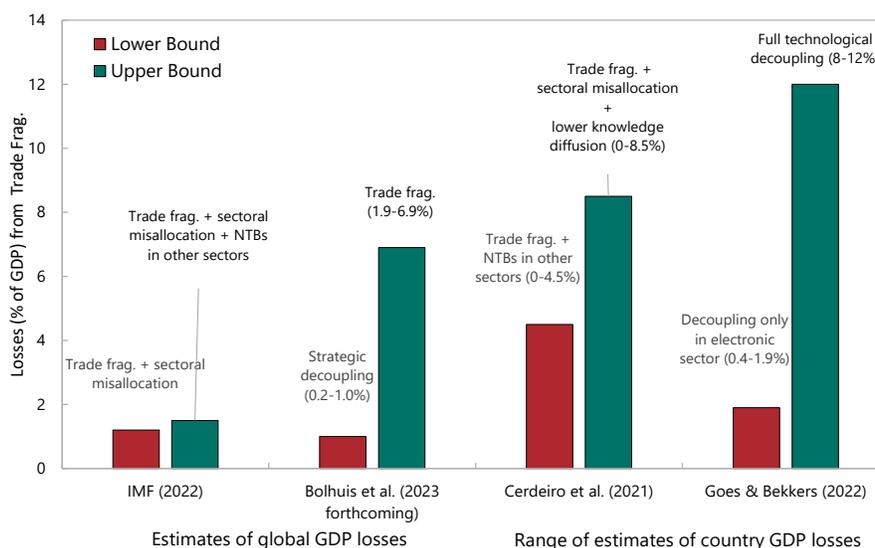
as [Goes and Bekkers \(2022\)](#) and [Cerdeiro and others \(2021\)](#), find a larger impact than those which only model trade barriers. This is due to the fact that productivity, which underpins the potential for countries to increase their economic well-being, is largely determined by access to technologies, knowledge, and processes.

**Third, EMs and LICs tend to be most at risk from trade and technology fragmentation.** Since they are further from the technological frontier, they lose disproportionately when access to embodied technology and R&D is lost. As the experience of the last several decades shows, EMs and LICs have improved their living standards to a significant extent via their greater integration in the global economy (see discussion in Chapter 3).

**Fourth, transition costs are likely to be considerable.** Short-run elasticities of substitution in trade are considerably smaller than long-run elasticities, because it takes time and effort to reconfigure supply chains ([Boehm, Levchenko, and Pandalai-Nayar, forthcoming](#)). As shown in Bolhuis, Chen, and Kett (forthcoming), this implies that short-term costs from trade fragmentation can be much greater than the long-term costs depicted in Box Figure 1.1. On the other hand, productivity losses from less knowledge diffusion could take time to accumulate, increasing the long-term cost of technological decoupling.

**Finally, the estimates presented here should not be taken as an upper-bound, since they do not consider several GEF transmission channels.** To the best of our knowledge no estimates are available of the combined effect of fragmentation through all the channels identified in Chapter 3, including reductions in labor and capital flows, as well as deterioration in the provision of global public goods. Furthermore, the interaction of the different channels, as well as political economy considerations such as outsized retaliation and policy uncertainty, could also multiply potential losses.

**Box Figure 1.1: Long-Term Losses, Percent of GDP, from Global Trade Fragmentation**



Sources: Individual papers and authors' calculations.

Note: Estimates of long-term losses (percent of GDP) from Global Trade Fragmentation from various studies. Numbers refer to GDP losses that are not directly comparable across papers as some refer to global GDP while others refer to specific regions or countries. Numbers in brackets represent ranges of losses based on assumptions about the severity of fragmentation and trade elasticities, and /or geographical ranges. The height of each bar corresponds to the upper limit of the range. NTBs = non-tariff barriers to trade.

**Strategic competition by governments and skepticism toward knowledge sharing are increasingly harming economic prospects.** Targeted subsidies to strategic industries by governments, often disguised in the form of below-market borrowing or below-market equity, have given rise to market distortions. Such schemes have been found to be negatively associated with firm productivity and have resulted in excess capacity in some sectors ([OECD 2021](#), [Evenett and Fritz 2021](#)). Although increasing returns to scale in the

data economy could justify regulation to prevent concentration of market power, some measures may also involve protectionist motivations and monopoly rent-seeking ([Garcia-Macia and Goyal 2020](#)).

**Technological fragmentation and reduced technological diffusion could severely dent innovation and lead to a significant productivity decline, particularly for less developed countries.** Trade barriers to high-tech inputs and services could diminish productivity spillovers and impede income convergence across countries. Strategic intervention on behalf of governments may entail costly barriers to technology diffusion. Efforts to prevent countries from upgrading technologically could discourage R&D due to limited market access, reduce innovation (including for climate-friendly technologies and semiconductors), and create supply shortages in other industries, raising prices and curbing entry of new firms. Data localization efforts taken of late by some governments could induce a general shift toward greater state control over data, data flows, and digital technologies ([Drake, Cerf, and Kleinwächter 2016](#), [Cory and Dascoli 2021](#)), while potentially hampering productivity and pushing up prices. Efficiency losses from technological and digital fragmentation could be particularly substantial in areas where common platforms facilitate a fast verification of tech protocols, such as in cross-border payments.

## Other Channels

**GEF is likely to affect the global economy through several other channels, amplifying the impact from trade and technology fragmentation.** Reduced cross-border flows of labor and capital and heightened uncertainty would also take a toll on global economic output, while lack of international cooperation could impede the provision of vital global public goods.

**Rising barriers to cross-border labor flows could reduce efficiency, hinder innovation and technological diffusion and worsen adverse demographic trends.** A reduction in skilled migration would reduce the effective human capital stock in host countries and stifle innovation, while the loss of network effects through migrant diaspora populations could reduce cross-border diffusion of technology.<sup>7</sup> In many AEs with rapidly ageing populations, further barriers to immigration could exacerbate unfavorable demographic trends, since immigrants tend to be younger than the average age of the native host population. In origin countries, less opportunities for emigration would tend to reduce remittance flows, which can be an important source of income stabilization ([Banerjee and Duflo 2007](#), [Islamaj and Kose, 2022](#)).

**GEF could hinder cross-border capital flows, reducing the options for external financing and impeding economic development.** As noted in [IMF IV \(2022\)](#), stable capital flows—especially FDI—can help smooth consumption, finance investment, diversify risks, and contribute to a more efficient allocation of resources. Foreign capital also boosts productivity by bringing in knowledge, skills, and technology, and by deepening the domestic financial sector ([Eichengreen and others 2021](#), [Cline 2010](#), [Alfaro, Kalemli-Ozcan, and Sayek 2009](#)), although the extent of the gains has been debated ([Gourinchas and Jeanne 2006](#)). More volatile capital flows, such as portfolio and cross-border bank flows, can also be beneficial as long as associated risks are mitigated by robust macroeconomic frameworks.<sup>8</sup> The introduction of new barriers to capital mobility would fragment capital markets, reduce financing choices for recipients of capital flows, and lead to less investment. A

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<sup>7</sup> In particular, immigration restrictions on high-skilled labor could impose unintended costs on host countries by shifting domestic jobs abroad ([Glennon 2020](#)), creating company losses ([Bahar, Choudhury, and Glennon 2020](#)), reducing the talent pool ([Kato and Sparber 2013](#)), and reducing domestic workers' stake in production relative to capital ([Clemens, Lewis, and Postel 2018](#); [Abramitzky and others, forthcoming](#)).

<sup>8</sup> See, for example, [IMF \(2020a\)](#), [Basu and others \(2020\)](#), [Reinhart and Reinhart \(2009\)](#), [Aiyar \(2012\)](#), [Schularick and Taylor \(2012\)](#).

retrenchment in FDI flows is likely to increase capital misallocation, as well as reduce multinational company linkages and technology spillovers.

**In addition to direct channels, GEF is likely to lead to heightened *uncertainty* during a possibly protracted process of fragmentation.** On the supply side, delays in investment decisions due to uncertainty could significantly weigh on productivity and stifle R&D. On the demand side, uncertainty could increase households' precautionary savings and drive up the demand for risk-free assets ([Christelis and others 2020](#), [Leland 1968](#)). Pressures to migrate from vulnerable parts of the world could rise as a means to insure against food insecurity ([Smith and Floro 2020](#), [Smith and Wesselbaum 2022](#)) and income risk ([Morten 2019](#), [Munshi and Rosenzweig 2016](#)). Along with an increase in intrinsic economic uncertainty, a fragmented world is also likely to witness an increase in *policy* uncertainty. Estimates of the adverse effect of policy uncertainty range from a 2-5 percent reduction in the productivity of UK firms over the three years following the Brexit referendum ([Bloom and others 2019](#)), to a one percentage point decline in world trade growth during 2018-19 following an increase in trade policy uncertainty during that period ([Constantinescu and others 2019](#)).

**Finally, international cooperation is crucial for the successful provision of *global public goods*.**

Mitigating climate change and preventing global pandemics are examples of necessary global public goods that cannot be supplied without widespread cross-border coordination. Other challenges, such as implementing universal regulatory practices, sharing scientific discoveries, and preventing humanitarian and financial crises also require countries to work together ([Buchholz and Sandler 2021](#)). Despite some idiosyncratic measures and selective trade restrictions being put in place, the swift and coordinated response to the Covid-19 pandemic on the whole provided a successful example of economic integration.<sup>9</sup> Cross-country access, transmission of technology, and trade in medical equipment served to prevent even further harm, reduced excessive spillovers, eased pressures on supply chains, and helped boost global production of vaccines and their rollout ([Agarwal and Gaule 2022](#)). Similarly, climate change mitigation and adaptation have benefited from policy coordination and technology diffusion across borders. Climate mitigation in one country can also incentivize countries with trade links to adopt similar policies ([Linsenmeier, Mohammad, and Schwerhoff 2022](#)). Meeting the 1.5 degree climate goal of the Paris Climate Agreement will require international cooperation ([Black and others 2021](#)).

## IV: The International Monetary System

**A stable international monetary system (IMS) is critical for global economic stability and growth.** The IMS comprises rules and conventions, mechanisms and institutions that facilitate international trade and cross-border investment.<sup>10</sup> The core objectives of the IMS include: (1) facilitating international risk sharing through effective oversight of capital flows; (2) promoting smooth global adjustment to shocks, crisis prevention, and resolution; and (3) ensuring sufficient global liquidity and robustness of the GFSN. History shows that an IMS designed for a particular configuration of the world economy could become brittle in the face of structural shifts

<sup>9</sup> Among the factors that rendered the Covid-19 pandemic more painful than needed on both the health and economic fronts were trade restrictions on medical goods and limited provision and distribution of vaccines in some instances ([OECD 2020, 2021](#); [Espitia et al. 2020](#)). Uncoordinated lockdowns—while often necessary on medical grounds—created negative international spillovers that accounted for about 60 percent of the observed decline in trade ([Aiyar et al. 2022](#)).

<sup>10</sup> The rules and conventions govern monetary and exchange rate arrangements, cross-border payments for current transactions, capital flows and related management measures, international reserves, and the various layers of the GFSN. IMS mechanisms allow for balance-of-payments adjustments and GFSN access (including IMF financing) to help maintain or restore stability when faced with a shock. Institutions ensure that the rules and mechanisms are enforced and remain relevant, so the IMS is stable and efficient ([IMF 2016b](#)).

and may collapse or experience a major crisis (see [Online Annex](#)). The current weaknesses in the IMS adjustment mechanisms and the GFSN (discussed in [IMF 2011](#), [2016a](#)) may be exacerbated by GEF.

## International Risk Sharing

**Financial integration has led to welfare gains from greater international risk sharing.** Access to a broad range of external financing sources can help countries to mitigate consumption fluctuations stemming from idiosyncratic shocks to their economies ([Obstfeld 1994a](#), [1994b](#)). Financial integration, however, can also create new channels for risk transmission across borders (for example, during the Liberalization era (see Figure 1), increased capital mobility was accompanied by an increased incidence of banking crises ([Reinhart and Rogoff 2008](#))).<sup>11</sup>

**By limiting risk-sharing opportunities, GEF could lead to greater domestic macroeconomic volatility with an adverse impact on growth.** As global trade and supply chains readjust and become tied to blocs of countries, financial exposures of individual countries may become less diversified. Depending on the extent of fragmentation, financial globalization could give way to “financial regionalization” where the first-order benefits and risks associated with capital flows are transferred to the respective blocs. At the same time, blocs formed based on geopolitical alignments may not necessarily enjoy the full benefits of financial integration, as shocks would likely be more correlated within blocs, thus reducing options for consumption smoothing. That said, the reduced reliance on unfriendly trade partners may help mitigate geopolitical tail risks. During the transition to a more fragmented world, the benefits of international risk-sharing may be muted as all shocks may become more correlated due to heightened uncertainty and global risk-off sentiment.

**Under GEF, financial regulation and oversight of capital flows may become more fragmented.** IMF ([2011](#), [2016a](#)) identified the lack of a global comprehensive oversight framework for cross-border capital flows as one of the key shortcoming of the current IMS. The regionalization of regulation may result in even less comprehensive oversight and thus contribute to regulatory arbitrage and weaker financial risk management. These risks may be particularly elevated in the non-bank financial sector, where prudential regulation is currently less comprehensive than in the banking sector. Some banking models (for example, the cross-border banking model reliant on short-term wholesale funding) could become increasingly untenable.

## Crisis Prevention, Mitigation, and Resolution

**The likelihood of crises will ultimately depend on the new configuration of cross-border linkages and complementary policies** (see Chapter 3). At the early stages of GEF, macro-economic volatility, swings in cross-border financing flows, and overall policy uncertainty are likely to be exceptionally high, which may disproportionately raise the crisis risks for vulnerable countries. In the new steady state, the implications of GEF would depend on the contours of different blocs and the new institutions supporting these blocs. Past studies suggest that in more financially integrated markets, crises are more likely ([Devereux and Yu 2020](#)). There is also large empirical evidence on the amplification effects of cross-border credit ([Aiyar 2012](#), [Schularick and Taylor 2012](#), [Laeven and Valencia 2018](#), [Jorda, Schularick and Taylor 2017](#)) and exposure to the global

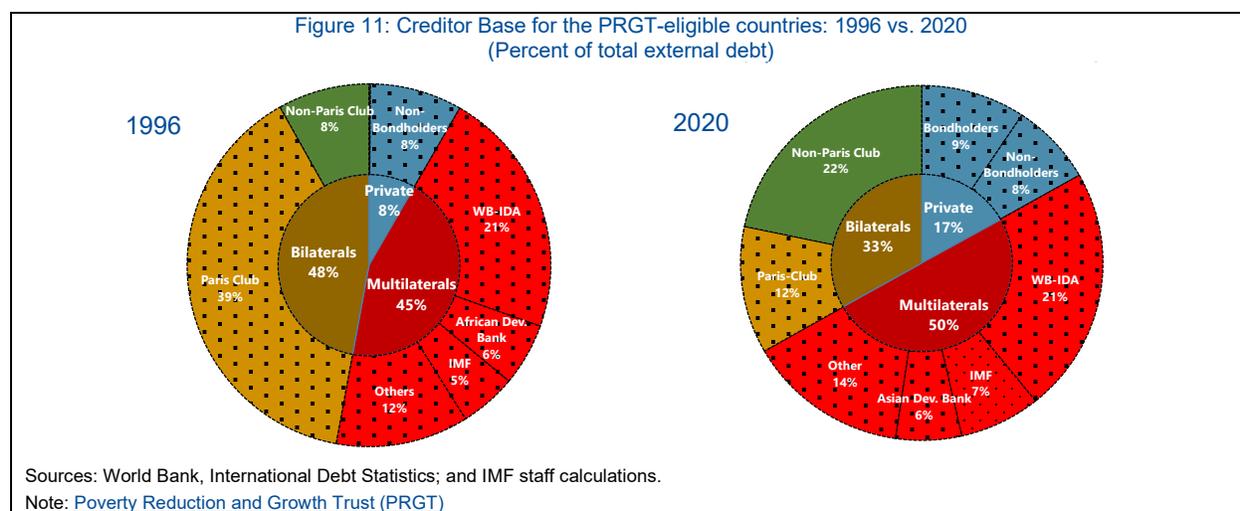
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<sup>11</sup> Different channels explored in the literature that determine the extent of international risk sharing include types of flows ([Kose and others 2009](#); [Brunnermeier and others 2012](#); [Bracke and Schmitz 2011](#); [Islamaj and Kose 2021](#)); duration of shocks ([Lewis and Liu 2015](#)); the conditions in the recipient countries, including policies and institutions ([Balli and Rana 2015](#); [Gardberg 2018](#); [Hervia and Serven 2018](#)).

financial cycle (Rey 2015). With GEF likely impeding the transmission of monetary and financial shocks between blocs in a new steady state, crises triggered by external shocks could become less frequent.

**However, under GEF, crises may be more severe.** Given lower international risk-sharing, higher financing costs, reduced scope for policy coordination across countries, and more fragmented global liquidity backstop (see below), the severity of crises may be greater unless regional or domestic risk mitigation policies play a larger role.<sup>12</sup> For example, a globally coordinated policy response during the GFC was critical for limiting output losses (Adam, Subacchi, and Vines 2012). In the absence of international policy coordination, countries would have to rely on bloc-specific adjustment mechanisms and costly self-insurance (for example, reduced reliance on external debt (Annex 2), higher FX reserves to ensure smooth external adjustment after shocks). At a global level, a synchronized deleveraging by many countries or an increased competition for scarce safe assets can be self-defeating.

**The resolution of sovereign debt crises may become even more challenging.** Since the 1990s, the foreign creditor base for LICs has changed dramatically: the share of Paris Club official creditors declined, while the share of China, India, and other non-Paris Club official creditors increased (see Figure 11). If the world were to divide along the geopolitical lines this would further complicate debt resolution and post-crisis adjustment, especially in LICs.



## The Global Payment System

**Recent geopolitical events have increased the risk of fragmentation in the international payment system.** After Russia's invasion of Ukraine in February 2022, key Russian banks were banned from using SWIFT, thus limiting their ability to make transactions with the rest of the world. As a result, Russia was forced to rely on its domestic messaging standard.<sup>13</sup> If geopolitical tensions continue to escalate, other countries may seek to become less reliant on international financial infrastructure and standards. This could be either because

<sup>12</sup> Likewise, [Devereux and Yu \(2020\)](#) show that under integrated world financial markets crises are less severe in terms of lost output and consumption than under financial autarky.

<sup>13</sup> The domestic standard known as the System for Transfer of Financial Messages (SPFS) system was created after Russia's annexation of Crimea in 2014 because of concerns that Russian banks could be banned from using SWIFT (see Annex 2). Previous instances of disconnecting banks from SWIFT include the imposition of financial sanctions against Iran in 2012.

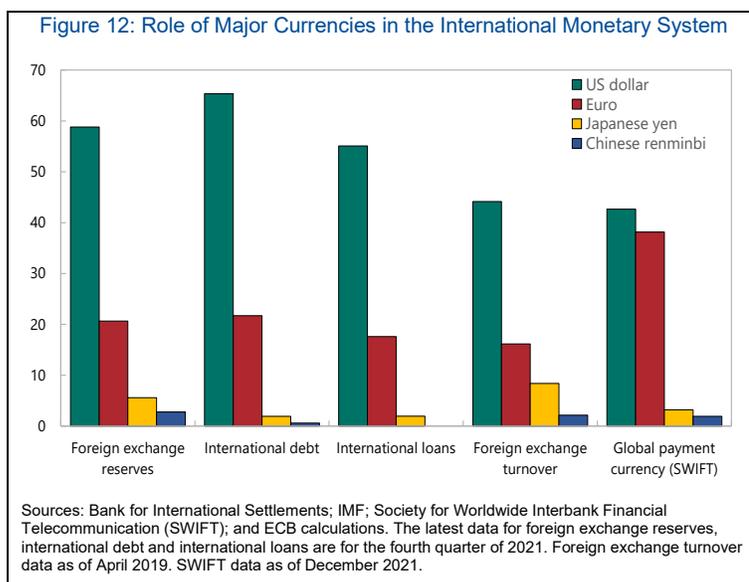
of concerns about sanctions, a partial redenomination of trade and financial operations in other currencies, or other geopolitical considerations. As a result, new parallel systems that lack inter-operability may emerge leading to higher transaction costs and other inefficiencies. The need to design and implement reliable and robust alternatives would entail additional costs for development, maintenance, and oversight (see Annex 2).

### **GEF could also limit gains and increase risks stemming from digitalization of the global payment system.**

New forms of both central bank and privately issued digital money (DM) have the potential to significantly improve payment efficiency domestically and across borders (BIS 2022). Currently, all of the G20 member countries are exploring a central bank digital currency (CBDC), with 16 already in development or at the pilot stage.<sup>14</sup> Many countries are also exploring different models for multi-CBDC platforms (BIS 2021). As new currencies and platforms enter the realm of trade and cross-border activity, the diversity in technology and systems across jurisdictions could increase, potentially leading to further fragmentation in regulation and supervision (IMF 2021). Gaps in oversight across platforms could lead to disorderly transitions, heightened vulnerabilities from capital flows, and/or increased volatility as global bond markets readjust (BIS 2021). GEF may also compromise the orderly transition to a modernized digital IMS, undercutting gains from digitalization. Further, a fragmented global payment system could in turn reinforce GEF through its effects on trade and capital flows (see Annex 2).

## Global Reserves and Currency Configurations

**GEF could also lead to shifts in countries' preferences over the currency composition of their foreign exchange (FX) reserves.** Currently, the US dollar is a dominant currency and US dollar sovereign bonds are the most widely held safe assets globally (Figure 12). That said, the freezing by the United States and its allies of about USD 300 billion of the Russian Central Bank's FX reserves following Russia's invasion of Ukraine will likely influence the reserve management decisions of countries that do not have friendly relations with the United States and Europe (Mühleisen 2022).<sup>15</sup> In addition to geopolitical considerations, the future transformation of trade, finance, and GVCs will influence the transactional demand and invoicing in different currencies. For example, an accelerated transition towards cross-border trade in national currencies as well as a shortening or re-direction of GVCs towards geopolitically aligned countries may reduce the demand for the US dollar for transactions and invoicing in the rest of the world.

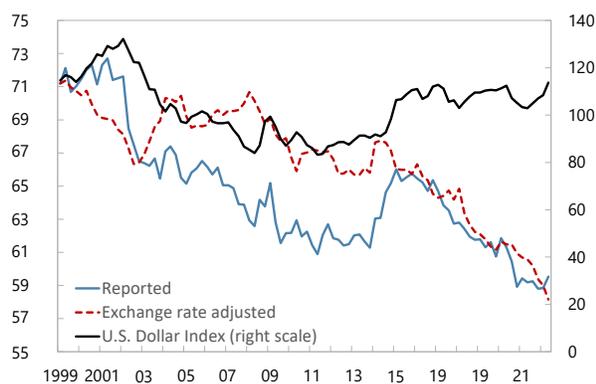


<sup>14</sup> See [Central Bank Digital Currency Tracker – Atlantic Council](#).

<sup>15</sup> Earlier instances of the FX reserves freezing included Afghanistan, Iran, Libya, North Korea, Syria, and Venezuela.

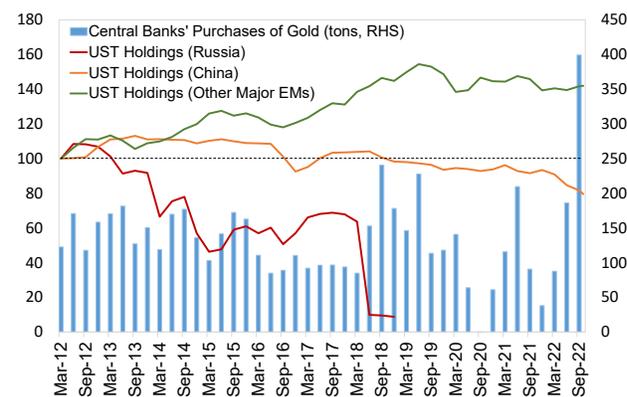
Over time, GEF could induce some shifts in the composition of global FX reserves, which could be accompanied by financial volatility. Despite the weaknesses of the current reserve system (the “New Triffin dilemma”<sup>16</sup>) any significant shifts away from the status quo are only possible if and when there are viable alternatives to the dominant currencies.<sup>17</sup> Currently, there are no such alternatives (see, for example, [Mühleisen, 2022](#)). While the US dollar share of global FX reserves has been gradually declining (Figure 13) and the share of nontraditional reserve currencies has been rising over the years, the latter remains low. The countries that choose to shift their FX reserves away from the dominant currencies may gain some diversification benefits, but likely face higher transaction costs, higher riskiness of reserve portfolios, and potentially difficulties in carrying out traditional central bank operations. Thus, changes in FX reserve composition may be limited initially, and possibly tilted towards gold—in fact, central bank purchases of gold have increased dramatically in Q3 2022 (Figure 14).<sup>18</sup>

Figure 13. U.S. Dollar Share of Global Foreign Exchange Reserves and the US Dollar Index, 1999–2022:Q2 (Percent; index Jan 2006 = 100)



Sources: Arslanalp, Eichengreen, and Simpson-Bell 2022; IMF, Currency Composition of Official Reserves (COFER); US Federal Reserve Board; and IMF staff estimates.

Figure 14. Central Banks' Demand for Gold and Foreign Holdings of US Treasury Securities (Percent, index Mar 2012 = 100, tons)



Sources: Treasury International Capital data; and World Gold Council. Note: “Other major EMs” include countries with data consistently available for all years 2012–22 (Brazil, Chile, China, Colombia, India, Iraq, Kuwait, Mexico, Peru, Philippines, Saudi Arabia, Thailand, UAE).

### The increasing adoption of digital money could offer additional opportunities for reserve diversification.

For instance, a digitalized national currency with more attractive use features could become more widely used for cross-border payments ([BIS 2022](#)). Further technological advances could accelerate this process by reducing transaction costs, facilitating accessibility and automation, and fostering integration into other digital services ([Kim and others, forthcoming](#)).

<sup>16</sup> The ability of the United States to act as a global liquidity provider depends on its capacity to credibly issue safe assets. However, while the global demand for US dollar liquidity keeps growing, the share of the United States in the world economy is shrinking. At the same time, the stock of the US sovereign debt relative to GDP is rising steadily potentially weakening the investor confidence in the risk-free status of the US Treasury securities (see [Gourinchas and Rey, 2007](#); [Gourinchas, Rey, and Sauzet 2019](#); [IMF 2011](#)).

<sup>17</sup> The reserve currency status requires that a reserve issuing country has (i) significant economic size and dominant role in international trade and financial networks; (ii) policy credibility; (iii) sizable transactional demand for its currency; and (iv) strong network effects (see [IMF 2020](#)).

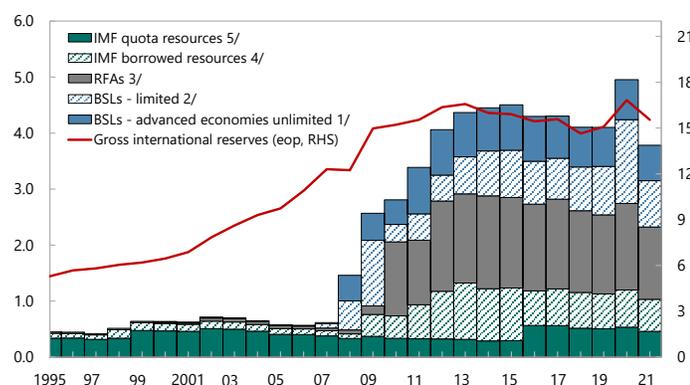
<sup>18</sup> Based on data from the World Gold Council, central bank purchases of gold reached 399 tons in the third quarter of 2022, well above the 119 tons quarterly average since 2010.

## The Global Financial Safety Net

**The GFSN plays an important role in safeguarding the stability of the global economy, but its coverage is uneven and global liquidity provision is limited.** The goal of the GFSN is to provide countries with insurance against shocks, financing to mitigate their impact and incentives for sound macro-economic policies

(IMF 2016b). The GFSN has four layers: central banks' FX reserves, central banks' bilateral swap arrangements (BSAs), Regional Financing Arrangements (RFAs), and the IMF (Figure 15). As of end-2021, BSAs and RFAs (\$2.65 trillion) accounted for a much smaller share of the GFSN resources than global reserves (\$14.96 trillion). However, the coverage of the various layers of the GFSN is uneven and global liquidity provision through the GFSN is limited. The IMF is the only layer that provides universal coverage—BSAs are mainly extended by central banks in major economies to selected central banks in other countries, while RFAs provide liquidity only to their members. Nonetheless, the GFSN has been able to provide support during the COVID-19 pandemic partly due to its significant expansion after the GFC (Figure 15).

Figure 15: Evolution of the Global Financial Safety Net, 1995–2021 (Percent of Global GDP)



Sources: Central bank websites; Regional Financing Arrangements annual reports; and IMF staff estimates.

Note: Two-way arrangements are counted only once.

1 Permanent swap lines among major advanced economy central banks (Federal Reserve Board, European Central Bank, Bank of England, Bank of Japan, Swiss National Bank, Bank of Canada). The estimated amount is based on known past usage or, if undrawn, on average past maximum drawings of the remaining central bank members in the network, following the methodology in Denbee and others (2016).

2 Limited-amount swap lines include all arrangements with an explicit amount limit and exclude all CMIM arrangements, which are included under Regional Financing Arrangements.

3 Based on explicit lending capacity/limit where available, committed resources, or estimated lending capacity based on country access limits and paid-in capital.

4 After prudential balances.

5 Quota for countries in the Financial Transaction Plan after deducting prudential balance..

**GEF will likely lead to a more fragmented supply of and higher demand for the GFSN resources.** *On the supply side*, GEF could induce a reconfiguration of BSAs and RFAs along geopolitical lines. In the near term, this could cause some disruptions in liquidity provision to countries in need resulting in deeper and more protracted crises. In the longer term, central banks with prominent roles within their respective blocs could provide liquidity through BSAs to members of their blocs (Ocampo 2017), along with newly created RFAs. Therefore, the bloc-specific importance of these layers of the GFSN will likely increase, but their coverage may become more uneven and less coordinated across blocs. The pooling of resources within blocs rather than globally may lead to an inadequate supply of liquidity to address large shocks. Heterogeneity in oversight could test the capacity of newly created RFAs to respond to shocks (IMF 2016b). *On the demand side*, the impact of GEF would depend on how it affects the trade and financial linkages during transition and in the new steady state. The transition risks include capital flow volatility, bank disintermediation and a greater incidence of currency substitution. These developments could increase the demand for resources from the GFSN.

**GEF could also hamper global policy cooperation, including on the appropriate GFSN resources.**

Multilateral institutions that become dominated by a particular geopolitical bloc may find it difficult to be perceived as neutral. This would reduce their credibility, affect their legitimacy, and limit their ability to coordinate and mediate across different blocs. Multilateral institutions that have a more balanced shareholder representation may be at risk of falling into a lack of agreement on strategies to address common challenges thus leading to inaction.

## V. A Way Forward

**As the risk of fragmentation rises, it is important to recognize that the benefits of globalization and multilateralism are worth preserving.** Globalization has helped improve living standards in many countries, with over a billion people lifted out of extreme poverty over recent decades ([World Bank 2020b](#)). Nonetheless, concerns about the fairness and fitness of the current rules-based multilateral system have been building up. With increased diversity and interdependence in the global economic ecosystem, geopolitical tensions and rivalry have intensified and could potentially lead to a reversal of global integration.

**The cost of GEF can be very large, especially for vulnerable countries and populations.** Attempts to take advantage of the re-wiring of GVCs, or to impose discriminatory measures against foreign competitors, could lead to countermeasures, potentially triggering a race to the bottom in critical areas such as climate mitigation, international taxation, and exchange rates. In such an environment, “innocent bystanders” and vulnerable nations would be disproportionately affected. Some countries may opt to significantly increase domestic buffers at a cost of reduced future output and social protection (see Annex 1).<sup>19</sup>

**The rules-based multilateral system must adapt to the changing world economy.** The new realities include the changing nature of trade, an increasingly diverse multi-polar world, a widening trust deficit, and the inability of current multilateral mechanisms to prevent negative global spillovers from unilateral actions. These new realities require a fundamental rethinking of how to address global existential threats (such as climate change, pandemics) and avoid runaway fragmentation while upgrading multilateral rules to ensure cooperation on global public goods, fair competition, and adequate protection of the most vulnerable. Some policy measures—even if driven by legitimate security concerns—may deepen and entrench fragmentation and should therefore be mitigated through credible “guardrails”.

**Mitigating risks and effects of GEF will require a pragmatic and multipronged approach.** In the current geopolitical environment, progress through multilateral consensus may not always be possible. Trust may have to be rebuilt gradually through different types of engagement depending on the extent of alignment of countries’ preferences and actions (see Figure 16):

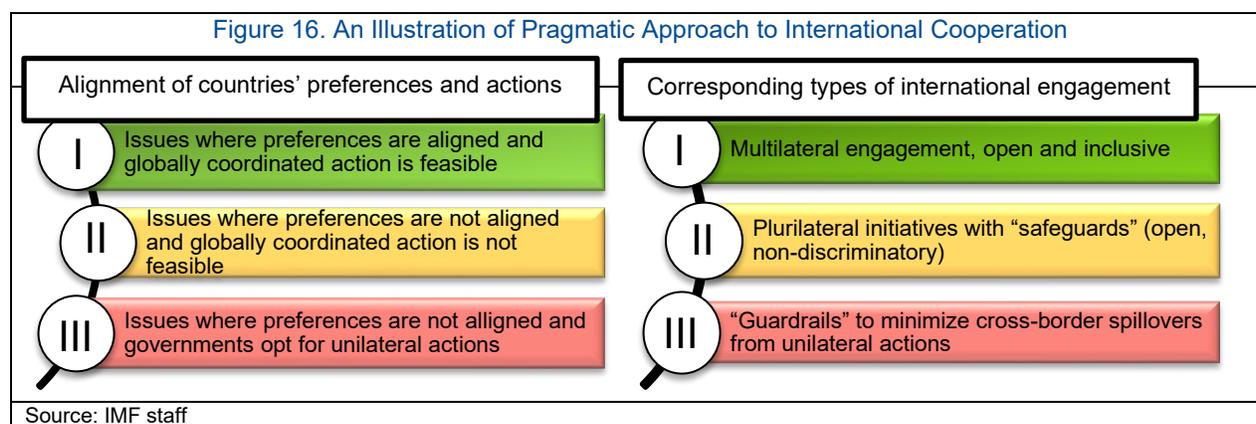
- I. In areas of common interest (such as climate change mitigation, food security, pandemic preparedness) *multilateral effort* remains the best approach to make progress toward common goals.
- II. In areas where countries’ preferences are not well aligned and when multilateral negotiations stall, *open and non-discriminatory plurilateral initiatives* could be a practical way forward.
- III. In areas where preferences are not aligned and countries increasingly resort to unilateral actions, credible “*guardrails*” may be needed to mitigate global spillovers and protect the vulnerable.

**What do we mean by “guardrails”?** Guardrails could include multilateral consultations, as well as commonly agreed norms of conduct (such as agreements on “safe corridors” to ensure a minimum level of cross-border flows of critical goods, services, and finance). A framework for multilateral consultations could include ex ante notification of the policy intention, an explanation of its rationale and objectives, and a discussion of potential cross-border spillovers and ways to address them. Such deliberations can help identify unintended consequences and, perhaps, alternative ways of achieving the same policy objectives and—over time—help

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<sup>19</sup> While countries may need to adapt their policy frameworks should GEF become entrenched, the analysis of adaptation policies is beyond the scope of this paper. Such analysis would also require more clarity on the contours of GEF and added frictions.

develop commonly agreed rules of conduct. Possible applications of this approach to the global trade system and the IMS are discussed next.



## Strengthening the Global Trade System

**Advancing multilateral trade rules may require focusing on selected high-impact reforms.** Key contentious issues include *trade-distorting practices* (such as industrial subsidies, market access barriers), the increasing use of trade policy for *non-trade objectives* (such as national security, labor, climate change), and the *dispute settlement* impasse at the WTO (see Annex 2). Finding an agreement on all these issues, while desirable, is challenging given the diverse WTO membership, increasing complexity of trade policy, and heightened geopolitical tensions. Advancing multilateral trade rules may require identifying areas where preferences across all countries are broadly aligned (Figure 16, pillar I). This would call for a *focused* approach, starting with implementing fewer high-impact multilateral reforms that could act as catalyst: open a path for rebuilding trust. The package agreed at the 12<sup>th</sup> Ministerial Conference of the WTO in July 2022 is a step in this direction.<sup>20</sup>

**In critical areas where coordinated action is currently not feasible, plurilateral approaches with appropriate safeguards could be a way forward** (Figure 16, pillar II). Considering limited progress in several critical areas (such as trade in services and in environmentally friendly goods) *plurilateral* agreements within the WTO can help break negotiation deadlocks and build the basis for upgrading the WTO rules. This approach requires appropriate safeguards to ensure the open and non-discriminatory nature of plurilateral initiatives. Agreements are "open" when members keep an open-door policy for others who are willing and able to commit to the same rules and norms of conduct. Plurilateral initiatives are "non-discriminatory" when members do not discriminate between different foreign producers or service providers. Similarly, "deep" Regional Trade Agreements (RTAs) have contributed to reducing trade costs and regulating frontier issues ranging from foreign investment to state-owned enterprises (SOEs) (see Annex 2 for details). By focusing negotiations on reforming behind-the-border provisions that are non-discriminatory, deep RTAs can help support multilateral integration ([Mattoo, Mulabdic, and Ruta 2022](#), [Lee, Mulabdic, and Ruta 2022](#)).

<sup>20</sup> Agreements covered fisheries subsidies – the first multilateral agreement concluded at the WTO since 2013; a Ministerial Declaration on the pandemic response; the exemption of World Food Program purchases from export restrictions; and the start of an institutional reform process. Within the Ministerial Declaration on the WTO's pandemic response, Members agreed on a partial 5-year waiver from WTO intellectual property rules for COVID vaccines.

### When countries opt for unilateral actions, credible “guardrails” could help limit cross-border spillovers

(Figure 16, pillar III). The focus should be on designing effective mechanisms that would preserve legitimate policy space while maintaining the stability and effectiveness of the trade system and helping sustain a minimum level of critical cross-border flows of goods, services, and finance. For example, this could include internationally agreed *norms on “safe corridors”* for critical goods and services (for example, food, medicines, energy), such as the recently agreed exemption of World Food Program purchases from export restrictions (see footnote 20). Another example is the recent proposal to develop a *consultation framework on the use of subsidies*,<sup>21</sup> which could include (1) improved data and information sharing, (2) a deeper analysis of subsidies to identify their economic impact, including cross-border spillovers, and to explore alternative approaches to better meet public policy objectives while reducing the negative effects on trading partners, and (3) an informed inter-governmental dialogue. Over time, such dialogue could help develop international rules and norms on the appropriate use and design of subsidies. Similar processes could be considered for the technology transfer requirements, data regulations, or other trade measures. The starting point would be to address data gaps and measurement issues. Data gaps are particularly acute for the behind-the-border trade distortive measures, such as subsidies, local content requirements, or competition laws (see Figure 17).

Figure 17. Coverage and Data Availability for Selected Border and Behind-the-Border Trade Measures

Border measures	Data Availability & Data Sources	
Tariffs		World Integrated Trade Solution
Non-tariff barriers		World Integrated Trade Solution
Capital Flow Management Measures		IMF's Annual Report on Exchange Arrangements and Exchange Restrictions
Foreign Exchange Interventions		Selected central banks' websites and other estimates
<b>Behind-the-border measures</b>		
Subsidies		WTO, IMF, OECD, GTA
Local content requirements		The Peterson Institute for International Economics, Global Trade Alert, European Commission, USTR, World Bank.
Sanitary and Phytosanitary Measures		World Integrated Trade Solution
Public procurement		World Bank's Global Public Procurement Database
Trade in services regulations		OECD's Services Trade Restrictiveness Index, World Bank's Services Trade Restrictions Database
Competition laws		George Washington University's World Competition Database
Multiple Currency Practices		IMF's Annual Report on Exchange Arrangements and Exchange Restrictions
Investment performance requirements		UNCTAD's Foreign direct investment and performance requirements

Notes: Green = good; Orange = partial information; Red = some information  
Source: IMF staff.

## Strengthening the International Monetary System

**Future-proofing the IMS requires enhancing its ability to perform its core tasks.** [IMF \(2016a\)](#) identified three key areas where concerted effort is required to improve the resilience of the IMS: (1) mechanisms for crisis prevention and adjustment; (2) global cooperation on issues and policies affecting global stability; and (3) ensuring large enough and more coherent GFSN. GEF would make these tasks more daunting.

**A new digital global cross-border payment system could be an area of international cooperation.** The ongoing international cooperation on improving cross-border payments could be extended and deepened ([FSB 2020](#)). Given a broad interest in secure, cheap, and efficient cross-border payment mechanisms, there may be

<sup>21</sup> The April 2022 IMF-OECD-WB-WTO paper on [Subsidies, Trade, and International Cooperation](#)

scope for multilateral cooperation (Figure 16, pillar I) to build international public digital payment platforms that connect the national payment systems (BIS 2022, Georgieva 2022). Designing such platforms would require tight coordination and therefore, at least initially, could be done via plurilateral initiatives (Figure 16, pillar II). Because an international framework would be needed to facilitate interoperability and information-sharing between these initiatives, internationally developed guidelines or standards could serve as “guardrails” (Figure 16, pillar III). Importantly, new technology could allow for embedding “guardrails” into the design of the payment system itself. For instance, setting limits on how much a foreign currency can be transferred from one country to another could be “pre-programmed” to mitigate risks of volatile capital flows (BIS 2021).

**Cooperation on issues and policies affecting global stability, crisis prevention and resolution may become more challenging under GEF.** GEF and digitalization may accelerate the shift towards more diversified reserve currency configurations. In a more shock-prone world, ensuring that the GFSN remains adequate and that the IMS continues to function effectively will require more, not less, cooperation. Further analysis and dialogue on possible future contours of the IMS, its stability and possible transition risks can include all interested members of the international community. Ensuring that EMDEs have greater voice in the institutions that govern the IMS will help enhance the cohesion of various layers of the GFSN (IMF 2016a).

**The increasing use of current and financial account restrictions for security reasons calls for greater scrutiny** (Figure 16, pillar III). Existing processes in multilateral organizations— which were established in a more benign global environment—may not be sufficient for mitigating potential overuse of national security (or economic security) justifications for imposing cross-border trade or investment restrictions in the context of increased geopolitical tensions.<sup>22</sup>

## The Role of the IMF

**The IMF can play an important role in mitigating GEF risks.** The IMF can use its *convening powers* to bring together its members to discuss issues of common interest and agree on common approaches (as it currently does on climate action and debt resolution, in coordination with other international organizations). It can also play a bridging role between different plurilateral initiatives or blocs should GEF continue to unfold. Through its *multilateral and bilateral surveillance*—by monitoring, analyzing, and informing the international community about global spillovers—the IMF can help its members to reach a common understanding of the implications of inaction or damaging unilateral actions, to design credible guardrails, and possibly to arrive at cooperative solutions. Together with other international organizations (for example, the WTO) the IMF could, for instance, spearhead the creation of a *multilateral platform* for sharing information on cross-border restrictions motivated by strategic considerations and their rationale, providing analysis of cross-border spillovers, and supporting deliberations among key players on ways to address them. Over time, such deliberations could help develop norms of conduct in sensitive areas such as national security related policy measures.

**The IMF can also help its members to build resilience and cope with shocks.** In a more shock-prone world economy, the IMF can support its members through evenhanded *policy advice, lending, and capacity development*. To perform these functions effectively, the IMF should remain representative of its global membership and adequately resourced to serve as an anchor of the GFSN, which crucially depends on the successful completion of the 16<sup>th</sup> General Review of Quotas.

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<sup>22</sup> As discussed in Chapter 2, the number of security-related trade measures has increased in recent years. There are few international rules and frameworks that guide policymaking in this area (see Annex 3 for details).

## Annex 1. Debt Reduction as Self-insurance<sup>1</sup>

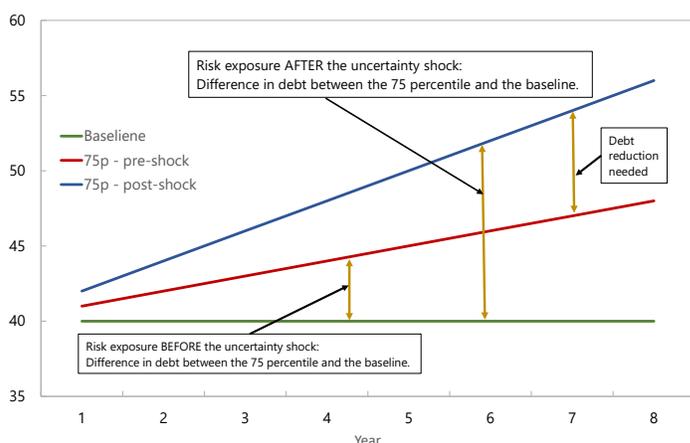
**In a more shock-prone world, policy makers may choose to self-insure by reducing public debt.** This may be a consequence of higher uncertainty and/or reduced capacity of the GFSN to effectively insure against shocks if international payment systems, swaps lines, or IMF's lending operations are impaired.

**Illustrative shocks are applied to the IMF Debt Sustainability Analysis (DSA) framework.** The uncertainty shock is calibrated as one-half the standard deviation of either the [World Uncertainty Index](#) or the [Geopolitical Risks Index](#) to avoid possible non-linearities at larger shocks. Higher uncertainty is modeled in the DSA by scaling up the variance-covariance matrix of debt drivers (primary balance, growth, interest rate, and exchange rate) in each country's latest Article IV report by the assumed shock and a new distribution of debt paths is computed. Risk exposure is estimated before and after the shock as the difference between debt under the baseline and at a given percentile. The difference in "risk exposure" is the reduction in debt needed to preserve the pre-shock "risk exposure." For illustrative purposes in Figure 1, the debt path at the 75<sup>th</sup> percentile is used as reference.

**The simulations show that a substantial debt reduction required to preserve countries' current level of risk exposure.** For a sample of seventeen EMs, the simulations point to an average reduction in the public debt-to-GDP ratio of about 3.4 percentage points over a five-year period. There is a substantial heterogeneity across countries. For half of the sample, the reduction in debt is at most one percentage point; however, for two-thirds of the sample the debt reduction is up to 6 percentage points. Countries in the top quartile display a debt reduction between 6 and 15 percentage points (Figure 2). The debt reduction on such scale is rare and tends to occur in a crisis. During the past 20 years, countries in the sample had only 36 episodes (or about 13 percent of all cases), where debt fell by at least 3.4 points of GDP during a five-year period. Four countries account for 1/2 of the cases.

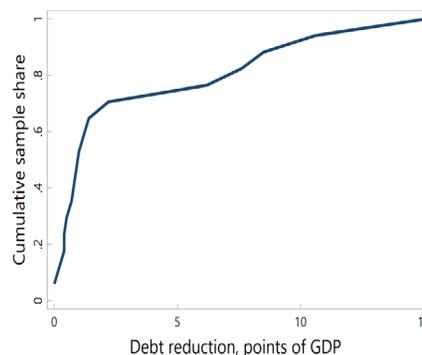
**Large and rapid debt reductions—especially if they occur simultaneously in several countries—could affect the global economy.** While the extent of deleveraging may vary across countries, a synchronized debt reduction by several large EMs would likely have a tangible impact on the global economy. While lower debt may be positive for some EMs, a forced synchronized deleveraging would have implications for future output and social protection and would be particularly painful in the context of limited international risk sharing.

Figure 1. Debt Reduction Needed to Keep the Same Risk Exposure after an Uncertainty Shock Occurs, Debt-to-GDP Ratio (percent)



Source: IMF staff calculations

Figure 2. Debt Reduction for Self-Insurance Motives (Cumulative Distribution)



Source: IMF staff calculations

<sup>1</sup> Prepared by Tohid Atashbar and Sergio Rodriguez

## Annex 2. Risks of Fragmentation of the Global Payment System<sup>1</sup>

**The global payment system is the underlying infrastructure and institutions (agreements, rules, and standards) that serves as a backbone of the modern economy and the IMS.** Payment connectivity, especially across borders, is fundamental for well-functioning global trade and economic integration. Cross-border payments are especially important. The key components of the global payment system were developed through international efforts seeking to increase efficiency and reduce risks as the scale of banks' global operations, and cross-border payments grew.

**The global payment system facilitates cross-border transactions and comprises multiple layers of financial market infrastructure, standards, and parties interacting.** Currently, most cross-border payments rely on a network of corresponding banks. Financial messages are needed to exchange information between parties involved in cross-border transactions; thus, common messaging standards and data formats are necessary for a smooth payment process. Society for Worldwide Interbank Financial Telecommunication (SWIFT) is the most widely accepted messaging standard that allows different banking and payment systems across countries to communicate with one another. It benefits from a network of more than 11,000 participating banks in more than 200 countries. Cross-border Inter-bank Payment System (CIPS), which is used for clearing and settlement of Renminbi cross-border transactions, also offers a payment messaging standard. As of October 2022, there are a total of 1,353 participants worldwide with 77 direct participants and 1,276 indirect participants, which rely on relationships with direct participants to connect to CIPS.<sup>2</sup> Nevertheless, CIPS still relies on the SWIFT messaging system to a large extent to carry out a sizeable portion of its payments.

**In addition to SWIFT, crucial functions in the global payment system are also carried out by several systemically important payment systems (SIPS) operating cross-countries or with multiple currencies.** For instance, the Continued Link Settlement Bank (CLS Bank) was founded by the private sector in cooperation with some central banks. It operates the world's largest payment and settlement systems for Payment vs. Payment (PvP) foreign exchange transactions to mitigate settlement risks pertaining to cross-currency transactions and products for its members. It currently settles payment transactions in 18 currencies.

**The precedence established in recent geopolitical events could prompt countries to seek greater independence in payments infrastructure.** This could include promoting national or regional infrastructures that increasingly constitute parallel and competing systems to established international infrastructures.

**Fragmenting of the global payment system could carry three primary risks.**

- *Reduced efficiency of the global payments system.* While risks of concentrating system-critical functions need to be managed, there are significant efficiency gains from widely used international infrastructure. There are large network effects as more actors share a common platform. Parallel and competing infrastructures could lead to loss of network effects and interoperability across borders.
- *Missed opportunity to reform the current system.* Ongoing multilateral initiatives seek to increase the efficiency of cross-border payments further. The initiatives range from improving standardization and linkages of existing infrastructure to building new platforms that connect multilateral parties leveraging recent technology. A fragmentation of the global payment system would severely undermine these efforts. For instance, instead of designing CBDC for wide cross-border interoperability, we could see the formation of multiple "CBDC blocs" – jurisdictions with CBDC intended for interoperability within the bloc but with little interoperability with CBDCs outside the bloc.
- *Negative feedback loop.* A fragmented payment system could introduce trading biases against other blocs, which could then change trade and investment patterns favoring constellations based on geopolitical considerations and contribute to world trade fragmentation.

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<sup>1</sup> Prepared by Gabriel Soderberg and Tansaya Kunaratskul.

<sup>2</sup> CIPS Participants Announcement No. 80, [https://www.cips.com.cn/en/participants/participants\\_announcement/58568/index.html](https://www.cips.com.cn/en/participants/participants_announcement/58568/index.html).

## Annex 3. Multilateral and Plurilateral Initiatives to Advance the Trade Agenda<sup>1</sup>

Global trade tensions surged over the past decade and are rooted in three interlinked factors: the changing nature of trade policy, the changing nature of trade, and the changing composition of WTO membership:

- **Changing nature of trade policy:** When the General Agreement on Trade and Tariffs (GATT) was signed in 1947, most policy impediments were in the form of tariffs and other border measures ([Irwin, Mavroidis, and Sykes 2008](#)). As border barriers declined through successive negotiating rounds, behind-the-border measures, such as regulations and subsidies, became important components of trade costs and spillovers. These developments brought new complexities to the negotiating agenda, shifting the goal from reducing measures to converging on policies and regulations where preferences across countries may differ widely.
- **Changing nature of trade:** The information technology revolution of the 1980s combined with the reduction in border barriers led to a surge in foreign direct investment and the rise of global value chains (Baldwin, 2019). The slicing of stages of production across multiple countries further increased the importance of cooperation on behind-the-border policies as these measures—amid global value chains—directly impact foreign entities and thus create new cross-border spillover effects ([Antras and Staiger 2012](#)).
- **Changing composition of WTO membership:** While the original signatories of the GATT were 23 members, the WTO currently has 164 members. This expansion of the membership implied more heterogeneous policy preferences. These extended to negotiations on tariff reduction and other border-measures but were particularly pronounced when it came to behind-the-border matters such as regulations.

**A multi-pronged approach is required to reinject momentum into multilateral trade reforms and curb GEF risks:**

- *First*, rules in areas that have fomented tensions in the trading system must be strengthened (e.g., technology transfer policies and practices, and subsidies). Stronger subsidy rules should also reduce the need for unilateral responses—which can themselves be a source of tension.
- *Second*, new market-opening agreements are needed, especially in areas that are relevant for today's global economy, such as e-commerce, services, and trade in environmentally friendly goods.
- *Third*, restoring the full functioning of the dispute settlement system is critical to ensuring adherence to rules and guaranteeing trade policy predictability.
- *Fourth*, it will be important to strengthen the WTO's transparency and monitoring function, which is critical for markets to operate efficiently.

**Plurilateral approaches could be used to advance trade reforms when international negotiations have stalled.** When a fully multilateral approach (among all WTO members) is not possible, progress can sometimes be made through alternative approaches involving smaller groups of countries. The main options are “deep” regional trade agreements (RTAs) (done outside the WTO but consistent with the WTO requirements), and WTO-based plurilateral agreements (done inside the WTO among subsets of the WTO members).

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<sup>1</sup> Prepared by Michele Ruta

**Ideally, agreements through alternative approaches should be “open” and “non-discriminatory”.**

Agreements are “open” when members keep an open-door policy for others who are willing and able to commit to the same rules and norms of conduct. They are “non-discriminatory” when members apply most-favored-nation (MFN) treatment, meaning they do not discriminate between different foreign producers or service providers.

**Under certain rules, regional trade agreements are a WTO-allowed exception to non-discrimination, as provisions in an RTA apply only to members.** The flexibility granted to RTAs in the multilateral trade system is partly the reason behind their popularity in recent years. There are over 300 agreements today, up from 50 in 1990. Most importantly, many of these agreements have become “deep”. While the average RTA 70 years ago covered eight policy areas, mostly tariffs and other border measures, in recent years they have averaged 17 (Mattoo and others 2020). These provisions cover policy areas such as investment, competition, subsidies, and domestic regulations. Recent examples of “deep” RTAs include the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) and the African Continental Free Trade Area (AfCFTA).

**Evidence shows that the deepening of trade agreements has contributed to trade growth among members, but also had a positive effect on trade with non-members** (Mattoo and others 2022; Lee and others 2022). The reason is that rules in areas such as domestic regulation, competition or subsidies are substantially different from tariffs: even when they apply only to the members of an RTA, these rules are often inherently non-discriminatory and not easily tailored to specific trade partners. The non-discriminatory nature of many behind-the-border provisions in deep RTAs implies that these agreements have a public good aspect that exists alongside the discriminatory component of tariffs.

**Beyond RTAs, several initiatives are currently underway at the WTO that could lead to significant plurilateral agreements.** At the 2017 WTO Ministerial Conference in Buenos Aires, some WTO members launched 'open-plurilateral' discussions on e-commerce, investment facilitation, services domestic regulation, and micro, small, and medium-sized enterprises (MSMEs). In December 2021, 70 WTO members agreed on a WTO-based plurilateral on domestic regulation of services.

**These WTO plurilateral agreements are important developments for several reasons** ([Hoekman and Mavroidis 2015](#)). First, these agreements have legal and institutional links to the WTO and provide a clear path for expanded membership and possibly evolution to a full multilateral agreement. Second, since their objective is seemingly not to exchange market access 'concessions' but to improve regulatory coordination—in order to minimize policy frictions and advance shared goals in a "least trade restrictive" way—they could lead to a more cooperative, less mercantilist, approach to WTO negotiations in the future. Finally, and similarly to the “deep” RTAs, new rules in these areas would likely be inherently non-discriminatory—making concerns about “discrimination” less relevant.

## Annex 4: International Frameworks for Consideration of Policy Measures Imposed for Security Reasons<sup>1</sup>

**International organizations have different frameworks for consideration of policy measures adopted for national or international security reasons.** Examples include the WTO’s “national security exception” (such as under GATT Article XXI); the OECD guidelines on investment policies relating to national security, and the Wassenaar Arrangement – one of the four main multilateral export control regimes. These national security provisions were conceived at a different time and the extent to which they are adequate for the current environment is an open question ([Hoekman and others 2022](#)).

**IMF.** The approval of restrictions on current international payments and transfers imposed solely for the preservation of national or international security are subject to a process detailed in Decision No. 144-(52/51).<sup>2</sup> This special approval process, based on non-objection, was established because the IMF decided that it did not provide a suitable forum for discussions of the political and military considerations leading to the imposition of such type of restrictions. Under this process, members are required, whenever possible, to notify the IMF before imposing such restrictions, but ordinarily, to do so no later than 30 days after imposing them. Unless the IMF informs the member within 30 days after receiving the notification that it is not satisfied that such restrictions are proposed solely to preserve national or international security, such restrictions are deemed to be approved. The practice has been not to assess or challenge the authorities’ representations that measures are introduced for security reasons.

**WTO.** WTO rules allow the imposition of trade measures for national security reasons explicitly recognizing that states may impose trade restrictions to protect their national security interests (“Security Exceptions”),<sup>3</sup> as part of a broader framework on trade-related national security measures.<sup>4</sup> While WTO dispute panels have recently had to interpret these security exception provisions, some WTO members hold different views as to the circumstances under which a member country is free to assert its right to national security over its commitments to liberal trade ([Hoekman, Mavroidis, and Nelson 2022](#)) and the extent to which the WTO should defer to a member country that invokes the security exception. While WTO members are encouraged to remove or modify a measure found to be non-compliant, they may choose instead to retain the measure and compensate other members (e.g., through trade policy changes) negatively impacted by the measure.

**OECD.** Restrictions imposed for reasons of national security are excluded from coverage under the OECD Liberalization Codes. However, since 2006 the OECD Investment Committee hosts the Freedom of Investment process—an intergovernmental forum to facilitate the sharing of information and experience on investment policies through regular roundtables. This process covers discussions on the implementation of the Guidelines for Recipient Country Investment Policies Relating to National Security adopted by the OECD Council in 2009. Governments that adhere to the [Declaration on International Investment and Multinational Enterprises](#) have also agreed to notify any new policy in this area and to make this [information publicly available](#).

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<sup>1</sup> Sources: OECD, and IMF staff.

<sup>2</sup> See [https://www.imf.org/en/publications/selected-decisions/description?decision=144-\(52%2F51\)](https://www.imf.org/en/publications/selected-decisions/description?decision=144-(52%2F51))

<sup>3</sup> The Use and Abuse of the National Security Exception under Article XXI(b)(iii) of the GATT 1994. WTI Working Paper No. 03/2020 by Peter Van den Bossche and Sarah Akpofure. “The three principal WTO agreements, the General Agreement on Tariffs and Trade 1994 (‘GATT 1994’), the General Agreement on Trade in Services (‘GATS’), and the Agreement on Trade-Related Aspects of Intellectual Property Rights (‘TRIPS Agreement’), provide for a national security exception in Article XXI of the GATT 1994, Article XIV bis of the GATS and Article 73 of the TRIPS Agreement respectively.”

<sup>4</sup> A 1982 [GATT Council decision](#) on transparency of measures adopted under GATT Article XXI provides background on fully informing other members of trade-related national security decisions. WTO Trade Policy Reviews of individual WTO members also discuss trade-related national security measures.

## References

- Abramitzky, Ran, Philipp Ager, Leah Boustan, Elior Cohen, and Casper W. Hansen. Forthcoming. "The Effect of Immigration Restrictions on Local Labor Markets: Lessons from the 1920s Border Closure." *American Economic Journal: Applied Economics*.
- Acemoglu, Daron, Gino Gancia, and Fabrizio Zilibotti. 2015. "Offshoring and Directed Technical Change." *American Economic Journal: Macroeconomics* 7 (3): 84–122.
- Acemoglu, Daron, and Pascual Restrepo. 2020. "Robots and Jobs: Evidence from US Labor Markets." *Journal of Political Economy* 128 (6): 2188–44.
- Acemoglu, Daron, James A. Robinson, and Thierry Verdier. 2017. "Asymmetric Growth and Institutions in an Interdependent World." *Journal of Political Economy* 125 (5): 1245–305.
- Adam, C., Subacchi, P., and Vines, D. 2012. "International Macroeconomic Policy Coordination: An Overview." *Oxford Review of Economic Policy* 28 (3): 395–410.
- Agarwal, Ruchir, and Patrick Gaule P. 2022. "What Drives Innovation? Lessons from COVID-19 R&D." *Journal of Health Economics* 82: 102591.
- Aghion, Philippe, Céline Antonin, Simon Bunel, and Xavier Jaravel. 2020. "What Are the Labor and Product Market Effects of Automation?: New Evidence from France." CEPR Working Paper, Centre for Economic Policy Research, London.
- Aiyar, S. 2012. "From Financial Crisis To Great Recession: The Role Of Globalized Banks." *American Economic Review* 102 (3): 225–30.
- Aiyar, S., Malacrino, D., Mohommad, A., and Presbitero, A. 2022. "International Trade Spillovers from Domestic COVID-19 Lockdowns." IMF Working Paper, WP/22/120, International Monetary Fund, Washington, DC.
- Alfaro, Laura, Sebnem Kalemli-Ozcan, and Selin Sayek. 2009. "FDI, Productivity, and Financial Development." Special Issue on Multinational Enterprises and Foreign Direct Investment. *World Economy* 32 (1): 111–35.
- Amiti, Mary, Stephen J. Redding, and David E. Weinstein. 2019. "The Impact of the 2018 Tariffs on Prices and Welfare." *Journal of Economic Perspectives* 33 (4): 187–210.
- Antràs, Pol, de Gortari, Alonso, and Oleg Itskhoki. 2017. "Globalization, Inequality and Welfare." *Journal of International Economics* 108: 387–412.
- Antràs, Pol, and Robert W. Staiger. 2012. "Offshoring and the Role of Trade Agreements." *American Economic Review* 102 (7): 3140–83.
- Arslanalp, Serkan, Barry Eichengreen, and Chima Simpson-Bell. 2022. "The Stealth Erosion of Dollar Dominance and the Rise of Nontraditional Reserve Currencies." *Journal of International Economics* 138: 103655.
- Artuc, Erhan, Alexander Copestake, Paulo Bastos, and Bob Rijkers. 2022. *Robots and AI: A New Economic Era*. Oxon and New York: Routledge.
- Bahar, Dany, Prithwiraj Choudhury, and Britta Glennon. 2020. "An Executive Order Worth \$100 Billion: The Impact of an Immigration Ban's Announcement on Fortune 500 Firms' Valuation." NBER Working Paper Series No. 27997, National Bureau of Economic Research, Cambridge, MA.
- Baier, Scott, and Jeffrey Bergstrand. 2001. "The Growth of World Trade: Tariffs, Transport Costs, and Income Similarity." *Journal of International Economics* 53 (1): 1–27.

Balli, F., and F. Rana, 2015. "Determinants of Risk Sharing Through Remittances." *Journal of Banking & Finance* 55: 107–16.

Banerjee, Abhijit, V., and Esther Duflo. 2007. "The Economic Lives of the Poor." *Journal of Economic Perspectives* 21 (1): 141–68.

Barattieri, Alessandro, and Matteo Cacciatore. Forthcoming. "Self-Harming Trade Policy? Protectionism and Production Networks." *American Economic Journal: Macroeconomics*.

Barattieri, Alessandro, Cacciatore, Matteo, and Fabio Ghironi. 2021. "Protectionism and the Business Cycle." *Journal of International Economics* 129: 103417.

Barrett, Philip. 2021. "Can International Technological Diffusion Substitute for Coordinated Global Policies to Mitigate Climate Change?." IMF Working Paper No. 2021/173, International Monetary Fund, Washington, DC.

Basu, Suman S, Emine Boz, Gita Gopinath, Francisco Roch, and Filiz D Unsal. 2020. "A Conceptual Model for the Integrated Policy Framework." IMF Working Paper No. 2020/121, International Monetary Fund, Washington, DC.

Ben-David, Dan. 1996. "Trade and Convergence Among Countries." *Journal of International Economics* 40 (3-4): 279–98.

Bhagwati, Jagdish, and T. N. Srinivasan. 2002. "Trade and Poverty in the Poor Countries." *American Economic Review* 92 (2): 180–83.

Bank for International Settlements (BIS). 2021. "Central Bank Digital Currencies for Cross-Border Payments. Report to the G20." Joint report, BIS Innovation Hub, IMF, World Bank.

Bank for International Settlements (BIS). 2022. "Options for Access to and Interoperability of CBDCs for Cross-Border Payments. Report to the G20." Joint report, Bank for International Settlements, BIS Innovation Hub, IMF, World Bank.

Black, Simon, Ian W.H. Parry, James Roaf, and Karlygash Zhunussova. 2021. "Not Yet on Track to Net Zero: The Urgent Need for Greater Ambition and Policy Action to Achieve Paris Temperature Goals." IMF Working Paper No. 2021/005, International Monetary Fund, Washington, DC.

Bloom, Nicholas, Bunn, Philip, Chen, Scarlet, Mizen, Paul, Smietanka, Pawel, and Thwaites, Gregory. 2019. "The Impact of Brexit on UK Firms." NBER Working Paper Series No. 26218, National Bureau of Economic Research, Cambridge, MA.

Bloom, Nicholas, Mirko Draca, John Van Reenen. 2016. "Trade Induced Technical Change? The Impact of Chinese Imports on Innovation, IT and Productivity". *The Review of Economic Studies*, 83(1): 87–117.

Bloom, David E., Mathew McKenna, and Klaus Prettnner. 2018. "Demography, Unemployment, Automation, and Digitalization: Implications for the Creation." NBER Working Paper Series No. 24835, National Bureau of Economic Research, Cambridge, MA.

Boehm, C. E., Levchenko, A. A., and Pandalai-Nayar, N. Forthcoming. "The Long and Short (Run) of Trade Elasticities." *American Economic Review*.

Bolhuis, Marijn A., Jiaqian Chen, and Benjamin Kett. Forthcoming. "Fragmentation in Global Trade: Accounting for Commodities." IMF Working Paper, International Monetary Fund, Washington, DC.

Bracke, Thierry, and Martin Schmitz. 2011. "Channels of International Risk-Sharing: Capital Gains versus Income Flows." *International Economics and Economic Policy* 8: 45–78.

Branstetter, Lee, Britta Glennon, and J. Bradford Jensen. 2018. "Knowledge Transfer Abroad: The Role of U.S. Inventors within Global R&D Networks." NBER Working Paper Series No. 24453, National Bureau of Economic Research, Cambridge, MA.

- Brunnermeier, Markus, and others. 2012. "Banks and Cross-Border Capital Flows: Policy Challenges and Regulatory Responses." Committee on International Economic Policy Reform, Brookings, Washington, DC.
- Buchholz, Wolfgang, and Todd Sandler. 2021. "Global Public Goods: A Survey." *Journal of Economic Literature* 59 (2): 488–545.
- Buera, Francisco J., and Ezra Oberfield. 2020. "The Global Diffusion of Ideas." *Econometrica* 88: 83–114.
- Cavallo, Alberto, Gita Gopinath, Brent Neiman, and Jenny Tang. 2021. "Tariff Pass-Through at the Border and at the Store: Evidence from US Trade Policy." *American Economic Review: Insights* 3 (1): 19–34.
- Cerdeiro, Diego A, Johannes Eugster, Dirk Muir, and Shanaka Peiris. 2021. "Sizing Up the Effects of Technological Decoupling." IMF Working Paper 2021/069. International Monetary Fund, Washington, DC.
- Cevik, Serhan, and João Tovar Jalles. 2022. "For Whom the Bell Tolls: Climate Change and Inequality." IMF Working Paper No. 2022/103, International Monetary Fund, Washington, DC.
- Christelis, Dimitris, Dimitris Georgarakos, Tullio Jappelli, and Maarten van Rooij. 2020. "Consumption Uncertainty and Precautionary Saving." *The Review of Economics and Statistics* 102 (1): 148–61.
- Clemens, Michael A., Ethan G. Lewis, and Hannah M. Postel. 2018. "Immigration Restrictions as Active Labor Market Policy: Evidence from the Mexican Bracero Exclusion." *American Economic Review* 108 (6): 1468–87.
- Cline, William R. 2010. "Financial Globalization, Economic Growth, and the Crisis of 2007-09." Washington, DC: Peterson Institute for International Economics.
- Constantinescu, Cristina, Aaditya Mattoo, and Michele Ruta. 2019. "Policy Uncertainty, Trade, and Global Value Chains: Some Facts Many Questions." World Bank Policy Research Working Paper No. 9048. World Bank, Washington, DC.
- Constantinescu, Cristina, Aaditya Mattoo, and Michele Ruta. 2020. "The Global Trade Slowdown: Cyclical or Structural?" *The World Bank Economic Review*, 34 (1): 121–42.
- Devereux, M.B., and C. Yu. 2020. "International Financial Integration and Crisis Contagion," *Review of Economic Studies* 87 1174–212.
- Dixit, Avinash and Victor Norman. 1986. "Gains from Trade without Lump-Sum Compensation." *Journal of International Economics* 21 (1-2): 111–22.
- Dollar, D., and Kraay, A. 2004. "Trade, Growth, and Poverty." *The Economic Journal* 114 (493): F22–F49.
- Dollar, D., and Kraay, A. 2002. "Growth is Good for the Poor." *Journal of Economic Growth* 7 (3): 195–225.
- Dollar, D. 1992. "Outward-Oriented Developing Economies Really Do Grow More Rapidly: Evidence from 95 LDCs, 1976-1985." *Economic Development and Cultural Change* 40 (3): 523–44.
- Dornbusch, Rudiger. 1992. "The Case for Trade Liberalization in Developing Countries." *Journal of Economic Perspectives* 6 (1): 69–85.
- Drake, William J., Vinton G. Cerf, and Wolfgang Kleinwächter. 2016. "Internet Fragmentation: An Overview." Future of the Internet Initiative White Paper, World Economic Forum, Cologne.
- Eichengreen, B.. 2022. "The Monetary Consequences of Vladimir Putin." Project Syndicate, March 10.
- Eichengreen, Barry J., Balazs Csonto, Asmaa A ElGanainy, and Zsoka Koczan. 2021. "Financial Globalization and Inequality: Capital Flows as a Two-Edged Sword." IMF Working Paper No. 2021/004, International Monetary Fund, Washington, DC.

- Eichengreen, Barry J., and Douglas A. Irwin. 1995. "Trade Blocs, Currency Blocs and the Reorientation of World Trade in the 1930s." *Journal of International Economics* 38 (1-2): 1–24.
- Evenett, Simon J. 2021. "What Caused the Resurgence in FDI Screening?" SUERF Policy Note No. 240, The European Money & Finance Forum, Vienna.
- Evenett, Simon J., and Johannes Fritz. 2021. "The 28th Global Trade Alert Report: Subsidies and Market Access: Towards an Inventory of Corporate Subsidies by China, the European Union and the United States." Global Trade Alert. Centre for Economic Policy Research, London.
- Fajgelbaum, Pablo D., and Amit K. Khandelwal. 2016. "Measuring the Unequal Gains from Trade." *Quarterly Journal of Economics* 131 (3): 1113–80.
- Fajgelbaum, Pablo D., Pinelopi K. Goldberg, Patrick J. Kennedy, and Amit K. Khandelwal. 2020. "The Return to Protectionism". *The Quarterly Journal of Economics*, 135 (1): 1–55.
- Feyrer, James. 2019. "Trade and Income—Exploiting Time Series in Geography." *American Economic Journal: Applied Economics* 11 (4): 1–35.
- Feyrer, James. 2021. "Distance, Trade, and Income — The 1967 to 1975 Closing of the Suez Canal as a Natural Experiment." *Journal of Development Economics* 153: 102708.
- Flaen, Aaron, and Justin Pierce. 2019. "Disentangling the Effects of the 2018-2019 Tariffs on a Globally Connected U.S. Manufacturing Sector." Finance and Economics Discussion Series No. 86, Federal Reserve Board, Washington, DC.
- Fouquin, Michel, and Jules Hugot. 2016. "Two Centuries of Bilateral Trade and Gravity Data: 1827-2014." CEPII Working Paper No. 2016-14, Centre d'Études Prospectives et d'Informations Internationales, Paris.
- Frankel, Jeffrey, A., and David H. Romer. 1999. "Does Trade Cause Growth?" *American Economic Review* 89 (3): 379–99.
- Financial Stability Board (FSB). 2020. "G20 Roadmap for Enhancing Cross-Border Payments: Priorities for the Next Phase of Work." Basel.
- Gacia-Macia, David and Rishi Goyal. 2020. "Technological and Economic Decoupling in the Cyber Era". IMF Working Paper No. 2020/257. International Monetary Fund, Washington, DC.
- Gardberg, M., 2018, "Determinants of International Consumption Risk Sharing in Developing Countries," IFN Working Paper No. 1261. <https://www.econstor.eu/bitstream/10419/210902/1/1049125908.pdf>
- Georgieva, Kristalina. 2022. "Confronting Fragmentation: How to Modernize the International Payment System. Remarks at the IMF-Swiss National Bank High-Level Conference, Zurich, May 10.
- Glennon, Britta. 2020. "How Do Restrictions on High-Skilled Immigration Affect Offshoring? Evidence from the H-1B Program." NBER Working Paper Series No. 27538, National Bureau of Economic Research, Cambridge, MA.
- Global Trade Alert. Centre for Economic Policy Research: London. <https://www.globaltradealert.org/reports/gta-28-report>.
- Goes, Carlos, and Eddy Bekkers. 2022. "The Impact of Geopolitical Conflicts on Trade, Growth, and Innovation." WTO Staff Working Paper ERSD-2022-09. World Trade Organization, Geneva.
- Gourinchas, P.-O., and Jeanne, O. 2006. "The Elusive Gains from International Financial Integration." *Review of Economic Studies*. 73 (3): 715–41.

Gourinchas, P.-O., and Rey, H. 2007. "From World Banker to World Venture Capitalist: US External Adjustment and the Exorbitant Privilege." *G7 Current Account Imbalances: Sustainability and Adjustment*, Chicago: University of Chicago Press, 11–66.

Gourinchas, P.-O., Rey, H., and Sauzet, M. 2019. "The International Monetary and Financial System." NBER Working Paper 25782, National Bureau of Economic Research, Cambridge, MA.

Handley, Kyle, Kamal, Fariha, and Ryan Monarch. 2020. "Rising Import Tariffs, Falling Export Growth: When Modern Supply Chains Meet Old-Style Protectionism." NBER Working Paper Series No. 26611, National Bureau of Economic Research, Cambridge, MA.

Hanson, Gordon H. 2012. "The Rise of Middle Kingdoms: Emerging Economies in Global Trade." *Journal of Economic Perspectives* 26 (2): 41–64.

Helpman, Elhanan. 2016. "Globalization and Wage Inequality". NBER Working Paper Series No. 22944, National Bureau of Economic Research, Cambridge, MA.

Hoekman, Bernard M., and Petros C. Mavroidis. 2015. "WTO 'À La Carte' or 'Menu Du Jour'? Assessing the Case for More Plurilateral Agreements." *European Journal of International Law* 26 (2): 319–43.

Hoekman, Bernard M., Petros C. Mavroidis, and Douglas R. Nelson. 2022. "Geopolitical Competition, Globalization and WTO Reform." Unpublished, European University Institute.

Hollweg, Claire H., Daniel Lederman, Diego Rojas, and Elizabeth Ruppert Bulmer. 2014. "Sticky Feet: How Labor Market Frictions Shape the Impact of International Trade on Jobs and Wages. Directions in Development." Washington, DC: World Bank.

Hervia C., and L. Serven. 2018. "Assessing the Degree of International Consumption Risk Sharing." *Journal of Development Economics* 134.

International Monetary Fund (IMF). 2011. "Strengthening the International Monetary System: Taking Stock and Looking Ahead." IMF Policy Paper, Washington, DC.

International Monetary Fund (IMF). 2016a. "Strengthening the International Monetary System: A Stocktaking." IMF Policy Paper, Washington, DC.

International Monetary Fund (IMF). 2016b. "Adequacy of the Global Financial Safety Net," IMF Policy Paper, Washington, DC.

International Monetary Fund (IMF). 2017a. *World Economic Outlook*. Washington, DC, April.

International Monetary Fund (IMF). 2017b. "Fostering Inclusive Growth". IMF Staff Note prepared for the G20 Leaders' Summit, July 7-8 2017, Hamburg, Germany. International Monetary Fund, Washington, DC.

International Monetary Fund (IMF). 2020a. "Toward an Integrated Policy Framework." IMF Policy Paper, Washington, DC.

International Monetary Fund (IMF). 2021. "The Rise of Public and Private Digital Money – A Strategy to Continue to Deliber on the IMF's Mandate." Policy Paper No. 2021/055, Washington, DC.

International Monetary Fund (IMF). 2022a. *Regional Economic Outlook: Asia and Pacific*. Washington, DC.

International Monetary Fund (IMF). 2022b. *World Economic Outlook*. Washington, DC, April.

International Monetary Fund (IMF). 2022c. "Review of The Institutional View on The Liberalization and Management of Capital Flows." IMF Policy Paper. Washington, DC.

Irwin, D., Mavroidis, P., and Sykes, A. 2008. *The Genesis of the GATT*. Cambridge, UK: Cambridge University Press.

- Islamaj, Ergys, and M. Ayhan Kose. 2022. "What Types of Capital Flows Help Improve International Risk Sharing?" *Journal of International Money and Finance* 122: 102544.
- Jaravel, X., and E. Sage. 2019. "What are the Price Effects of Trade? Evidence from the U.S. and Implications for Quantitative Trade Models." CEPR Press Discussion Paper No. 13902, Center for Economic and Policy Research, Washington, DC.
- Jorda, Oscar, Moritz Schularick, and Alan M. Taylor. 2017. "Macrofinancial History and the New Business Cycle Facts." *NBER Macroeconomics Annual*, 31: 213–63.
- Kanbur, Ravi. 2015. "Globalization and Inequality." In *Handbook of Income Distribution*, edited by Anthony Atkinson and Francois Bourguignon, 1845–81.
- Kato, Takao, and Chad Sparber. 2013. "Quotas and Quality: The Effect of H-1B Visa Restrictions on the Pool of Prospective Undergraduate Students from Abroad." *The Review of Economics and Statistics* 95 (1): 109–26.
- Kim, S., Miksjuk, A., Suryakumar, N., Tuladhar, A., Velculescu, D., Wu, Y., Zuniga J., and N. Hallmark. Forthcoming. "Initial Considerations of the Implications of Digital Money for the international Monetary System." IMF Departmental Paper.
- Kose, M. Ayhan, Eswar S. Prasad, and Marco E. Terrones. 2009. "Does Financial Globalization Promote Risk Sharing?" *Journal of Development Economics* 89 (2): 258–70.
- Laeven, Luc, and Fabian Valencia. 2018. "Systemic Banking Crises Revisited." IMF Working Paper no. 2018/206. International Monetary Fund., Washington, DC.
- Lee, Woori, Alen Mulabdic, and Michele Ruta. 2022. "Third-Country Effects of Regional Trade Agreements: A Firm-Level Analysis." *Journal of International Economics* 140: 103688.
- Leruth, Luc, Adnan Mazarei, Pierre Régibeau, and Luc Renneboog. 2022. "Green Energy Depends on Critical Minerals. Who Controls the Supply Chains?" Peterson Institute for International Economics Working Paper 22-12, Washington, DC.
- Leland, Hayne E. 1968. "Saving and Uncertainty: The Precautionary Demand for Saving." *The Quarterly Journal of Economics* 82 (3): 465–73.
- Lewis, K., and Liu, E. 2015. "Evaluating International Consumption Risk Sharing Gains: An Asset Return View." *Journal of Monetary Economics* 71: 84–98.
- Linsenmeier, Manuel, Adil Mohommad, and Gregor Schwerhoff. 2022. "The International Diffusion of Policies for Climate Change Mitigation." IMF Working Paper No. 2022/115, International Monetary Fund, Washington, DC.
- Lyon, Spencer G., and Michael E. Waugh. 2018. "Redistributing the Gains from Trade through Progressive Taxation." *Journal of International Economics* 115: 185–202.
- Mattoo, Aaditya, Alen Mulabdic, and Michele Ruta. 2022. Trade Creation and Trade Diversion in Deep Agreements. *Canadian Journal of Economics/Revue canadienne d'économique* 55: 1598–637.
- Mattoo, Aaditya, Nadia Rocha, Michele Ruta. 2020. *Handbook of Deep Trade Agreements*. Washington, DC: World Bank.
- Melitz, Marc J., and Redding, Stephen J. 2021. "Trade and Innovation." NBER Working Paper Series No. 28945, National Bureau of Economic Research, Cambridge, MA.
- Morten, Melanie. 2019. "Temporary Migration and Endogenous Risk Sharing in Village India." *Journal of Political Economy* 127 (1): 1–46.

- Munshi, Kaivan, and Mark Rosenzweig. 2016. "Networks and Misallocation: Insurance, Migration, and the Rural-Urban Wage Gap." *American Economic Review* 106 (1): 46–98.
- Mühleisen, Martin. 2022. "The International Role of the Euro and the Dollar." The Atlantic Council, Washington, DC .
- Obstfeld, Maurice. 1994a. "Evaluating Risky Consumption Paths: The Role of Intertemporal Substitutability." *European Economic Review* 38 (7): 1471–86.
- Obstfeld, Maurice. 1994b. "Risk-Taking, Global Diversification, and Growth." *American Economic Review* 84 (5): 1310–29.
- Ocampo, J., 2017, "Resetting the International Monetary (Non) System." Oxford University Press, Cambridge, UK.
- Perks, Michael, Yudong Rao, Jongsoon Shin, and Kiichi Tokuoka. 2021. "Evolution of Bilateral Swap Lines." IMF Working Paper No. 2021/210, International Monetary Fund, Washington, DC.
- Reinhart, Carmen, and Vincent Reinhart. 2009. "Capital Flow Bonanzas: An Encompassing View of the Past and Present." In *NBER International Seminar on Macroeconomics 2008*, edited by Jeffrey Frankel and Christopher Pissarides. Chicago: University of Chicago Press.
- Reinhart, Carmen M., and Kenneth S. Rogoff. 2008. "This Time is Different: A Panoramic View of Eight Centuries of Financial Crises." NBER Working Paper Series No. 13882, National Bureau of Economic Research, Cambridge, MA.
- Rey, Hélène. 2015. "Dilemma not Trilemma: The Global Financial Cycle and Monetary Policy Independence." NBER Working Paper Series No. 21162, National Bureau of Economic Research, Cambridge, MA.
- Rocha, Nadia, and Winkler, Deborah. 2019. "Trade and Female Labor Participation: Stylized Facts Using a Global Dataset." Policy Research Working Paper No. 9098. World Bank, Washington, DC.
- Rodrik, Dani. 2007. *One Economics, Many Recipes: Globalization, Institutions, and Economic Growth*. Princeton: Princeton University Press.
- Sachs, Jeffrey D., and Warner, Andrew. 1995. "Economic Reform and the Process of Global Integration." *Brookings Papers on Economic Activity* 26 (1): 1–118.
- Schularick, Moritz, and Alan M. Taylor. 2012. "Credit Booms Gone Bust: Monetary Policy, Leverage Cycles, and Financial Crises, 1870–2008." *American Economic Review* 102 (2): 1029–61.
- Smith, Michael D., and Maria S. Floro. 2020. "Food Insecurity, Gender, And International Migration in Low- And Middle-Income Countries." *Food Policy* 91: 101837.
- Smith, M. D., and Wesselbaum, D. 2022. "Food Insecurity and International Migration Flows." *International Migration Review* 56 (2): 615–35.
- United Nations Conference on Trade and Development (UNCTAD). 2018a. "Trade in Services and Employment." Geneva.
- United Nations Conference on Trade and Development (UNCTAD). 2018b. Trade and Development Report 2018: Power, Platforms And The Free Trade Delusion. Geneva.
- World Bank. 2020a. *Atlas of Sustainable Development Goals*. Washington, DC.
- World Bank. 2020b. *World Development Report 2020: Trading for Development in the Age of Global Value Chains*. Washington, DC.



# PUBLICATIONS

**Geoeconomic Fragmentation and the Future of the Multilateralism**  
Staff Discussion Note No. SDN/2023/001