

GLOBAL VALUE CHAIN DEVELOPMENT REPORT 2017

MEASURING AND ANALYZING THE IMPACT OF GVCs ON ECONOMIC DEVELOPMENT



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1818 H Street NW
Washington DC 20433
Telephone: 202-473-1000
Internet: www.worldbank.org

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ISBN 978-92-870-4125-8

This publication uses U.S. spelling. All mentions of dollars refer to U.S. dollars, unless otherwise indicated. The term "billion" refers to a thousand million.

The Research Center of Global Value Chains acknowledges the financial support from the Bill & Melinda Gates Foundation.

Foreword by Michael Spence

The global economy is evolving rapidly. It presents a complex and ever-changing picture. And it is important. The trends, opportunities, and challenges affect the lives of every person on the planet. But the forces at work and the results for trade, the structure of economies and employment, incomes, and human capital values have been and still are at best incompletely understood.

There is a growing body of research on the impacts of globalization and digital technology on individual economies. And there has been a huge and productive effort to reconfigure and refine trade data so as to expose the complex value-added structure of trade in goods and services, led by the Organisation for Economic Co-operation and Development, the World Bank, the World Trade Organization, and a number of other institutions.

What has been largely missing is a comprehensive and detailed picture of the dynamic network structure of the global economy. How economies are linked, specialize, and grow (or not) is captured in the way global value chains (GVCs) are put together. That is what this report is about. It is a huge contribution to our deepening understanding of what the global economy really means and how it is changing. One can think of it as a different viewpoint, complementary to the single-economy studies that focus on structural shifts and economic performance at the national level and that try to capture the impacts of trade and technology on growth, incomes, jobs, and more.

The insights in this volume are far too numerous to document in a foreword. I encourage everyone, scholars, policymakers, and leaders in business and civil society organizations as well as curious and at times concerned citizens, to read the studies. If we do this, it will expand our shared understanding of the forces at work and facilitate productive discussion of how to adapt and benefit from the global economy and how to deal with some of the distributional challenges that come with it. It is natural to see globalization through the lens of its effects on the domestic economy. But it is eye opening to see it also as a complex evolving network.

Here is a small sample of the insights that emerge from this valuable collection of studies.

Global trade looks very different when detailed quantitatively in value-added terms rather than as gross flows of exports and imports. Complex value chains (a growing fraction of global trade, especially trade in high-value manufacturing and services),

with multiple participants and numerous cross-border flows, are literally invisible when the focus is on gross flows.

Bilateral trade balances shift in a major way when viewed in value-added terms. While economists may deem these to be not so important, they are politically salient and strongly influence public sentiment and hence attitudes toward trade, trade agreements, and indeed fairness.

Services are extremely important and represent a growing fraction of trade. But to see that in detail, one needs to break down manufacturing value chains to expose the very large services components that are embedded in them. This point deserves emphasis. A careful study of GVCs in sectors classified as manufacturing (presumably because a physical product is delivered to the final consumer—which may be a firm that is producing something else) reveals that a large fraction of the value added is in services, broadly defined, with the fraction depending on the industry. These services are both upstream and downstream from the physical production of components and from assembly. Advanced economies, where the higher valued-added components tend to be located, thus show up in GVCs in the upstream and downstream components. This gives rise to a picture of GVCs composed of the participants along the value chain correlated with their stage of development, referred to as a “smile curve” because of its shape. This report does a superb job of moving the quantitative analysis forward on this front.

Barriers to trade in services are declining, slowly, but are much higher than those in the movement of goods, narrowly construed. These barriers have multiple sources, including regulation, legal institutions, infrastructure, and simple capacity.

The patterns of specialization across countries are much more visible and clearly defined when viewed through the lens of complex value-added chains. Through this lens you can detect, with much greater precision, where employment is created, what drives productivity growth, and what factors are affecting income distribution in a wide range of developed and developing countries.

As China’s incomes rise and the tradables side of its economy shifts away from labor-intensive process manufacturing and assembly, one would think that these components of complex GVCs would shift to lower income countries, creating growth and development opportunities and momentum. To some extent, this is happening and will expand. But there are impediments. This volume makes it clear that low wages are not enough.

Connectivity and, with it, reasonably efficient processes for logistics and for meeting standards and regulatory requirements are critical. And lots of countries currently lose out on this front. In the report, these issues are brought into sharp focus by distinguishing between wages and unit labor costs and by highlighting the factors that can differentially drive a wedge between the two. Clearly, for competitiveness, unit labor costs are the critical factor.

There are many more insights in this volume. I was especially interested in the way the evolving pattern of specialization in production and services within global supply chains helps explain the divergent distributional impacts of globalization across developed and developing countries.

The report helpfully distinguishes elements of an economy that are tradable and the large set that are nontradable. Clearly the tradables set is expanding with the support of enabling technology. For example, small and medium-size businesses can access global markets in a way that was simply impossible before because the transaction costs of doing so were prohibitively high. But the nontradables part of any economy remains very large. The linkages between the tradables and nontradables parts of an economy on both the supply and demand sides are crucial in understanding the growth patterns. This volume makes a good start at exposing the linkages between the tradables and nontradables sides of an economy. These linkages are complex. On the supply side they come through labor market shifts, and on the demand side through spillover effects of rapid income growth arising from specialization and growth on the tradables side. There is more to do here, but this volume is a very good start.

In trade and in economies generally, your neighborhood matters. Michael Porter and others in the classic book, *The Competitive Advantage of Nations*, documented that in virtually every industry there are a relatively small number of concentrated centers of excellence where efficiency and innovation are high. Proximity and agglomeration benefits matter. We continue to see these patterns today, whether they be in autos, electronics, financial centers, or in innovation hubs like that in Shenzhen in southern China. This has obvious implications for trade, particularly in services, including those contributing to manufacturing GVCs.

The report argues that connectivity in the networks that define the evolving architecture of GVCs is important. This is another aspect of neighborhood mattering. GVCs properly documented in value-added terms provide a detailed picture of the network connectivity of an individual economy and hence of which parts of the global economy will strongly influence that economy and its various sectors.

Under the heading of neighborhood effects, the authors find that even well-structured and connected economies with relatively low unit labor costs and high connectivity will suffer if their immediate neighbors fall short on the same metrics. “Bad neighbors” have a depressing effect on trade and presumably on growth. This may result from depressing effects on local trade or other factors. One suspects this negative spillover is more significant in the case of landlocked countries, but that is speculation on my part.

The *Global Value Chain Development Report* is the result of intensive and detailed work in assembling and analyzing data on the structure of economies and on how they are linked. It creates a much clearer picture of evolving patterns of independence. It also presents a much clearer picture of comparative advantage.


No country has a comparative advantage in making iPhones. What they do have is comparative advantage in generating elements of the iPhone GVC, in key services, components, and assembly. The multinationals are the architects of the supply chains. And there are firms that are specialists in structuring GVCs in various groups of industries—firms that are not associated with the production of a particular set of products. One might think of them as pure GVC architects.

Trade is a microeconomic phenomenon. Countries don’t trade GDP. They specialize in trade in goods and services. And now we see that specialization for much of trade needs to be thought of in terms of components of GVCs. With value-added trade and GVCs you can see in detail, really for the first time, how trade catalyzes growth, especially in developing countries, and how it relates to employment, productivity, and income growth.

I learned a tremendous amount from the research reported in this volume, and I highly recommend it to all who are interested in growth and development, in trade and international investment, and in policies that promote or retard growth and development.

Michael Spence
Nobel Laureate in Economics

Foreword by Pol Antràs

 On 19 April 2017, international trade economists celebrated the 200th birthday of their field. The date marks the publication of David Ricardo's *Principles of Political Economy and Taxation*. Its landmark chapter 7, "On Foreign Trade," introduced the concept of comparative advantage to economics. In his famous example, David Ricardo demonstrated that it was in England's interest to exchange cloth for wine with Portugal even if English workers could produce both goods more efficiently than workers in Portugal could.

Although the concept of comparative advantage is as relevant today as it was 200 years ago, the nature of international trade flows has changed dramatically in recent decades. The information and communication revolution (and the attendant radical decline in the cost of processing and transmitting information at long distances), a wave of regional trade agreements in various corners of the world, and the fall of the Berlin Wall (which brought into the capitalist system hundreds of millions of workers) led to the disintegration of production processes across borders, as firms found it more profitable to organize production on a global scale. World production is now structured into global value chains (GVCs) in which firms source parts, components, and services from producers in several countries and in turn sell their output to firms and consumers worldwide. The typical "Made in" labels in manufactured goods have become archaic symbols of an old era. Today, most goods are "Made in the World."

The rise of GVCs has naturally captured the attention of international trade economists eager to bridge the apparent gap between the new characteristics of the international organization of production and the standard methods used to collect,

manipulate, and interpret international trade statistics. In particular, a remarkable body of work has devised ingenious empirical methods to disentangle the value-added and intermediate input contents of gross bilateral international trade flows. It has also developed theoretical models for interpreting the new data and offering insights into the likely consequences of future trade liberalization episodes.

This report offers a superb overview of some of the key developments in this body of work and breaks new ground on the study of the rise of GVCs. I have spent the better part of my academic career thinking about the growing disintegration of production processes across countries, and yet the various chapters here have revealed a great number of new insights.

From the initial chapters that masterfully overview and document several empirical facts related to the participation of various countries in GVCs and their relative positioning within those chains, to the subsequent five chapters focused on specific topics, the report offers an enormous amount of food for thought. What are the consequences of the cascading effects of trade costs along GVCs? What is the role of GVC participation in escaping the middle-income trap? How does services trade complement and support merchandise trade in GVCs? What are the consequences of variation in institutional quality for the geography of GVCs? And how should one design trade policy in the new age of GVCs?

These are questions I feel much better equipped to answer after working through this fascinating report. I am sure it will be a very useful reference for academics and practitioners for years to come.

Pol Antràs
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Partners

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The Organisation for Economic Co-operation and Development (OECD) is an international and intergovernmental organization comprising the world's main industrialized market economies

whose mission is to promote policies that will improve the economic and social well-being of people around the world: Better Policies for Better Lives. The OECD does this by providing a forum for governments to share experiences and seek solutions to common problems.

The Research Center of Global Value Chains is a global academic think tank headquartered at the University of International Business and Economics, focusing on basic and interdisciplinary research on the development of global value chains and their implications for global economies.

The World Trade Organization (WTO) is an international organization that deals with the global rules of trade between countries. It administers agreements, negotiated and signed by its members, which provide the legal ground rules for international commerce. The purpose is to help trade flow as freely as possible for the economic development and the welfare of its members' citizens. The WTO is serviced by a secretariat that provides expert, impartial, and independent support to member governments, including research, analysis, and statistical information related to the role and developments of trade in the global economy.

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Acknowledgments

The Global Value Chains Development Report is a joint publication of the World Bank Group, the Institute of Developing Economies (IDE–JETRO), the Organisation for Economic Co-operation and Development (OECD), the Research Center of Global Value Chains (RCGVC–UIBE), and the World Trade Organization (WTO), based on joint research efforts to better understand the ongoing development and evolution of global value chains and their implications for economic development.

This first report draws contributions from 16 background papers presented and discussed at the conference “Making Global Value Chains Work for Economic Development and Shared Prosperity” in Beijing during March 17–18, 2016, organized by the RCGVC and the China Development Research Foundation. Drafts of the eight chapters of the report were presented and discussed at the second Authors’ Conference in Washington, DC, during November 28–29, 2016, organized by the World Bank. The editors thank the authors of background papers and individual chapters and the discussants and participants in the two conferences for insightful comments and suggestions that helped draft and improve the chapters (see appendix 1 for the programs).

Special thanks go to our external reviewers: Laura Alfaro (professor at Harvard Business School), Zhigang Tao (professor at the

University of Hong Kong), Maggie Chen (professor at the George Washington University), Marcel Timmer (professor at the University of Groningen), Gary Hufbauer (senior fellow at the Peterson Institute for International Economics), and Nicholas C. Hope (director of the China program at the Stanford Center for International Development). The editors are grateful to Michael Spence, Pol Antràs, and Shang-Jin Wei for their invaluable expertise and advice on the overall narrative of the report.

The editors also thank Anabel Gonzalez, senior director of the World Bank Group’s Trade and Competitiveness Global Practice, and Robert Koopman, chief economist of the World Trade Organization, for their guidance and support during the joint research process as well as research contributions from the Asian Development Bank, Inter-American Development Bank, United Nations Industrial Development Organization, and International Center for Trade and Sustainable Development.

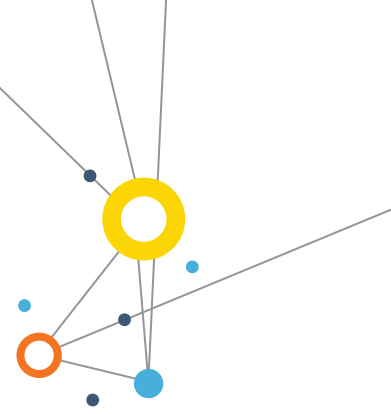
The editors are grateful to a team at Communications Development Incorporated, led by Bruce Ross-Larson and including Jonathan Aspin, Joe Caponio, Mike Crumplar, Meta de Coquereau-mont, Debra Naylor, Christopher Trott, John Wagley, and Elaine Wilson, who edited, designed, and produced the report.

The RCGVC would like to acknowledge the financial support from the Bill & Melinda Gates Foundation.

Editors: David Dollar, Jose Guilherme Reis, and Zhi Wang.

Abbreviations and acronyms

ADB	Asian Development Bank
ASEAN	Association of Southeast Asian Nations
CEPII	Institute for Research on the International Economy
EU	European Union
FDI	Foreign direct investment
G7	Group of Seven
G20	Group of Twenty
GDP	Gross domestic product
GVC	Global value chain
ICT	Information and communication technology
IDE–JETRO	Institute of Developing Economies–Japan External Trade Organization
NAFTA	North American Free Trade Area
OECD	Organisation for Economic Co-operation and Development
UN	United Nations
WTO	World Trade Organization



Executive summary

DAVID DOLLAR

Global value chains (GVCs) break up the production process so different steps can be carried out in different countries. Many smart phones and televisions, for example, are designed in the United States or Japan. They have sophisticated inputs, such as semiconductors and processors, which are produced in the Republic of Korea or Chinese Taipei. And they are assembled in China. They are then marketed and receive after-sale servicing in Europe and the United States. These complex global production arrangements have transformed the nature of trade. But their complexity has also created difficulties in understanding trade and in formulating policies that allow firms and governments to capitalize on GVCs and to mitigate negative side effects.

Today's official statistical information systems, designed to measure economic activity in a pre-GVC world, have struggled to keep pace with these changes. Conventional measures of trade, important though they remain, measure the gross value of transactions between partners and so are not able to reveal how foreign producers, upstream in the value chain, are connected to final consumers at the end of the value chain. For example, conventional statistics suggest that the Republic of Korea exports a lot to China. In fact, much of this trade consists of components that are ultimately destined for the European and U.S. markets. So it would be more accurate to say for these products that Korea exports a lot to advanced consumer markets.

The importance of the GVC phenomenon has stimulated researchers to develop statistics and analysis based on the value added in trade. The GVC phenomenon also demands that researchers analyze the discrete tasks or phases in the

production process. Data are now available on the value added traded among major economies during 1995–2014. This first *Global Value Chain Development Report* draws on the expanding research that uses data on the value added in trade. Its main objective is to reveal the changing nature of international trade that can be seen only by analyzing it in terms of value added and value chains.

A natural place to start is with the theoretical foundation of GVCs (chapter 1). Why do we care about analyzing GVCs? For two main reasons. First, GVCs provide new opportunities for developing countries to increase their participation in global trade and to diversify their exports. Without GVCs, a developing country would have to be able to produce a complete product in order to expand into a new line of business. Historically, developing countries have tended to export unprocessed raw materials, suggesting that the jump to producing finished goods was difficult. Today, because of the opportunities for integrating in specific parts of the value chain, many developing countries are exporting primarily manufactured goods. (In the spirit of this report, it would be more accurate to say that they export primarily manufacturing value added.) The development of GVCs has no doubt contributed to this diversification of exports. Still, only a small number of developing economies are deeply involved in GVCs, China being the best example. So how can developing countries deepen their involvement in GVCs? And how can they move up the value chain?

A second reason to analyze value added in trade and GVCs is that data on the gross value of trade can be misleading. This report highlights how shifting the analysis to value added radically changes the picture.

Characterizing global value chains

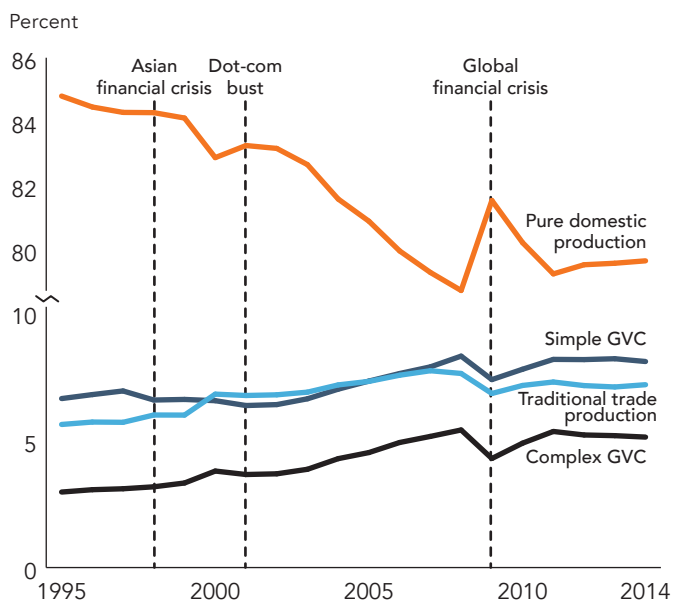
To capture the variation in the extent of offshoring and production sharing by sector and country, the report develops a GVC index system that includes three indexes to characterize the nature of GVCs: a production length index for the average number of production stages and complexity of the value chain, a participation index for the intensity of a country-sector's engagement in GVCs, and a position index for the location of a country-sector pair on a GVC—that is, the relative distance of a particular production stage to both ends of a GVC (chapter 2). All these indexes are built through a system of global input-output tables that underpin all trade in value added data and that provide the basis for decomposing gross domestic product (GDP) into broad categories of activity based on forward industrial linkages.

Pure domestic value-added production activities are those that are completely produced and consumed within one country, such as a haircut. When these goods or services are exported to another country, that transaction conforms to the classical idea of trade, with production occurring completely in one country and consumption in another. República Bolivariana de Venezuela exporting oil to the United States is an example. Value added created by production across national borders (embodied in intermediate trade flows) are GVC activities, which can be further decomposed into simple and complex cross-border production-sharing activities based on the number of border crossings. In simple GVCs value added crosses national borders only once during the production process, with no indirect exports via third countries or re-exports or re-imports. In complex GVCs value added crosses national borders at least twice (Wang and others 2017). Using the GVC index system, the report characterizes cross-border production-sharing patterns and GVC activities for 35 sectors and more than 40 countries over 20 years based on the World Input-Output Database (Timmer and others 2015).

Global value chains were expanding until the global financial crisis

It will come as no surprise that, in general, GVC production has been increasing during the modern era of globalization. Most value added is still domestically produced and consumed, but the share of this part of GDP declined markedly until the global financial crisis, shrinking from 85% of global value added in 1995 to less than 80% in 2008 (figure 1). Different types of trade all expanded their shares during this period, but the most rapid increase was for complex GVCs. The 2008–09 global financial crisis was naturally a disruption, but trade rebounded fairly quickly. What is surprising is the lack of further expansion in the shares of either traditional trade or GVC trade since 2011. The share of purely domestic value added has increased slightly since 2008. It is too soon to know for sure, but it may be that the process of deeper integration associated with GVCs has stalled or even started to reverse. Still, throughout this period, GVC trade

FIGURE 1 Global value chains were expanding, until the financial crisis

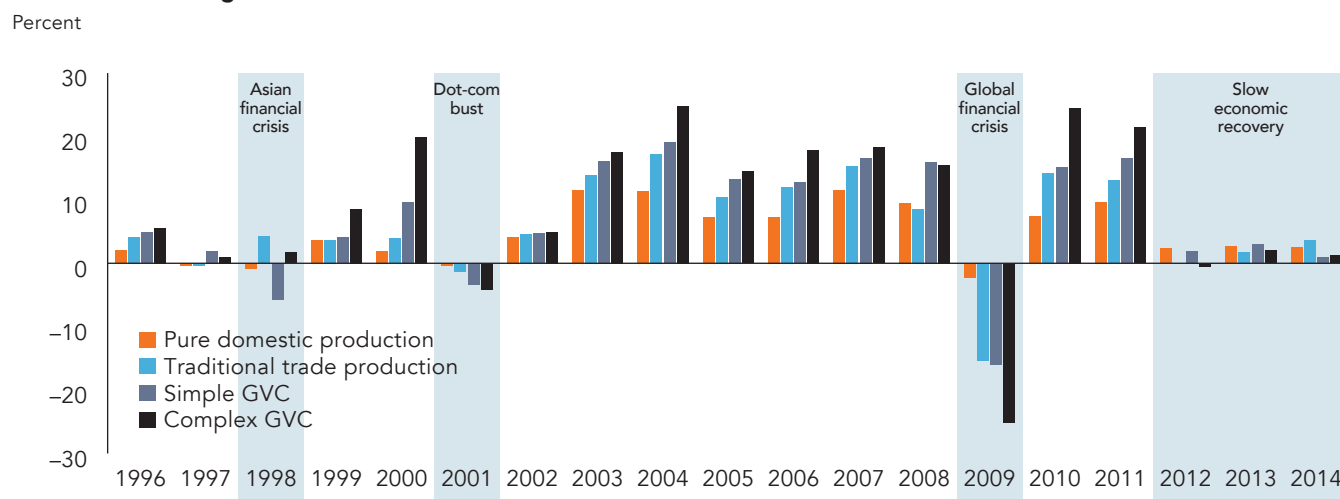


Source: University of International Business and Economics global value chain indexes derived from the 2016 World Input-Output Database.

(simple and complex combined) accounted for 60–67% of global trade in value-added terms, reflecting the importance of the GVC phenomenon.

Further insight into the changing pattern of value-added creation can be gained by looking at the nominal growth of value added separately for purely domestic production, traditional trade, and GVCs between 1995 and 2014 (figure 2). From 1996 through 2007 value added in complex GVCs grew faster than other components of GDP (so its share was rising). This was especially pronounced in 2002–08, the heyday of GVC expansion. The acceleration of GVC expansion occurred shortly after China joined the World Trade Organization (WTO), and China's growing participation in GVCs is probably one factor at work here. During 2002–08 not only was the share of GVCs rising, but the rate of nominal value-added growth was also very high in all parts of value added because of rapid real growth, moderate inflation, and appreciation of most currencies against the U.S. dollar. The period 2009–11 then represents the crisis and initial rebound. What is striking since 2011, however, is how slowing rates of GDP growth appear to have had a disproportionate impact on GVC channels, particularly for complex GVCs, which were the key driver of growth in preceding economic cycles.

The decomposition also allows for the characterization of different stages along GVCs: at each stage value added is counted as the gross output of some industry. This report also draws new insights on the changing pattern of GVCs through a new type of "smile curve" (chapter 2). The smile curve is best explained through an example, as in figure 3. For China's exports of

FIGURE 2 Nominal growth rates of different value-added creation activities, 1996–2014

Source: University of International Business and Economics global value chain indexes derived from the 2016 World Input-Output Database.

electrical and optical equipment in 1995 and again in 2009, the data points are represented by circles indicating country-sector pairs that contribute in production, with the letters denoting the country and the number the industry. The size of the circles represents the absolute value added gained by joining the value chain (in millions of constant U.S. dollars). An estimated curve is fitted through these points, and the shape of the curve is that of a “U” or a “smile.” The vertical axis plots labor compensation per hour in the country-sector, indicating high- versus low-value-added activities. The horizontal axis plots the total forward linkage-based production length between global consumers of electrical and optical equipment and a specific participating industry in the corresponding GVC.

The logic of the smile shape is as follows. Research and design activities for critical components of the electrical and optical equipment occur early in the production process (left side of the figure). These knowledge activities tend to be high-value-added activities in GVCs and tend to be carried out in more advanced economies. For example, in the 1995 curve Japan and the United States (JPN28 and USA28) are in the upper left corner, reflecting the high-value-added contributions from these two countries’ financial services sector. The Chinese industry that manufactures the good, Chinese electrical and optical (CHN14), is at the bottom point of the curve, reflecting assembly activity at low wages. The activities closest to the consumer are marketing, logistics, and after-product servicing. These market knowledge industries are also high value added, as shown by the upward-sloping part of the smile curve on the right. And they tend to be carried out in advanced economies, where the mass consumption products are eventually purchased by households.

The comparison of the same country-sector export in 1995 and 2009 reveals that the smile curve for this product has deepened. Compensation in the USA28 industry rose from about \$25 an hour to \$60 an hour, whereas Chinese wages

remained very low on the smile curve. But the bubble that shows the total value added produced by CHN14 expanded about 10-fold. China may have held a low position in the value chain throughout this period, but it brought a huge number of workers from its impoverished countryside to work in the related factories.

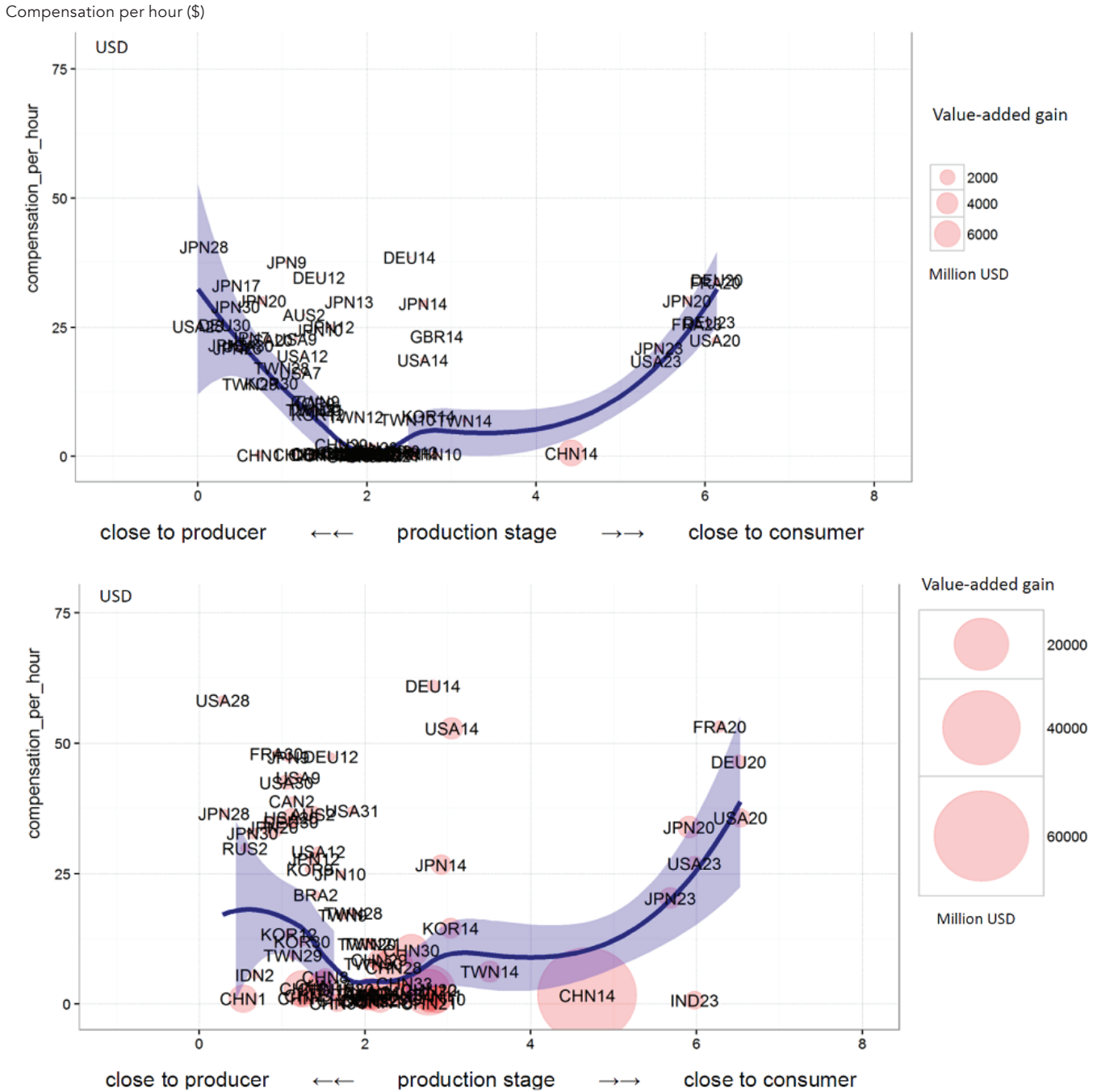
Figure 3 captures anxieties felt by both rich and poor countries in contemplating contemporary trade. Rich-country electorates worry that manufacturing is being hollowed out—that is, that semiskilled production jobs have moved to developing countries or, to the extent that such jobs still remain in advanced economies, have suffered downward pressure on wages. Poor countries worry that they are trapped in low-value-added activities and are locked out of the higher value-added activities in design, key technological inputs, and marketing.

Within-country distributional impacts

The changes in technology and global trade highlighted by the smile curves can also be seen in statistics on factor use and income distribution in developed and developing countries. Here, this is shown using the information and communication technology industry in the United States and China as examples (figures 4 and 5).

For the United States the left panel in figure 4 tracks the evolution of factor return shares (left scale) and labor productivity (right scale). Labor’s share in returns rose from 60% to more than 70%, highlighting the important role of human capital in this high-tech industry. Over 15 years the share of medium- and low-skilled workers in the total number of hours worked declined (middle panel), while the share of high-skilled workers (college educated and above) increased sharply, from about a third to a half of total hours worked. The distribution of compensation across skill levels (right panel) reveals that proportionally more of the benefit went

FIGURE 3 The estimated smile curve for China’s exports of electrical and optical equipment deepened between 1995 and 2009

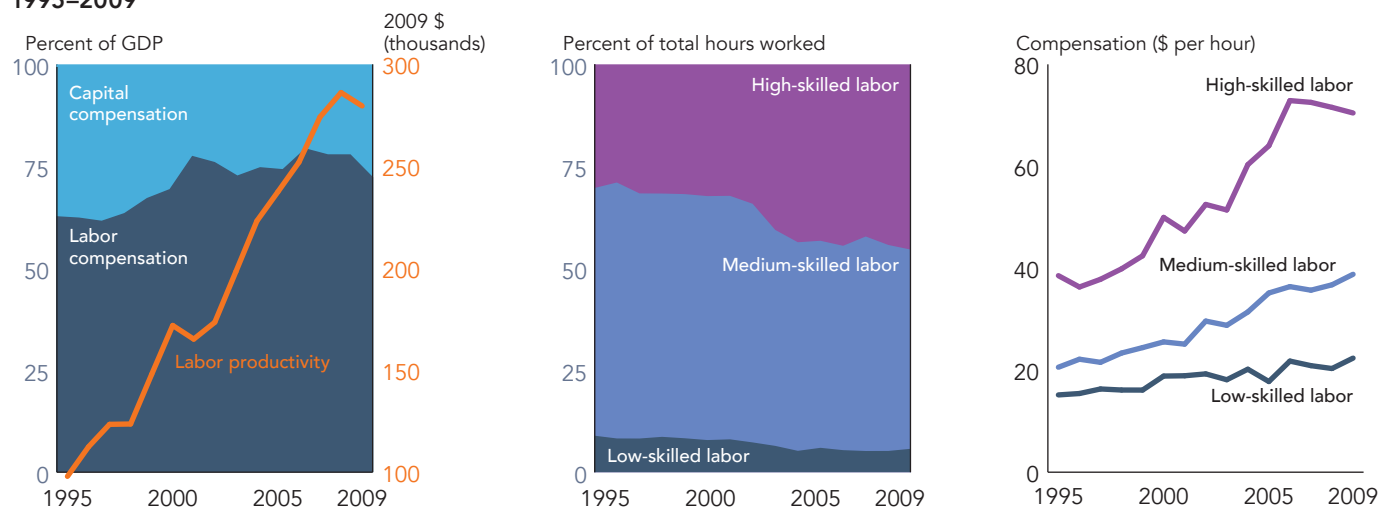


Source: Meng, Ye, and Wei 2017.

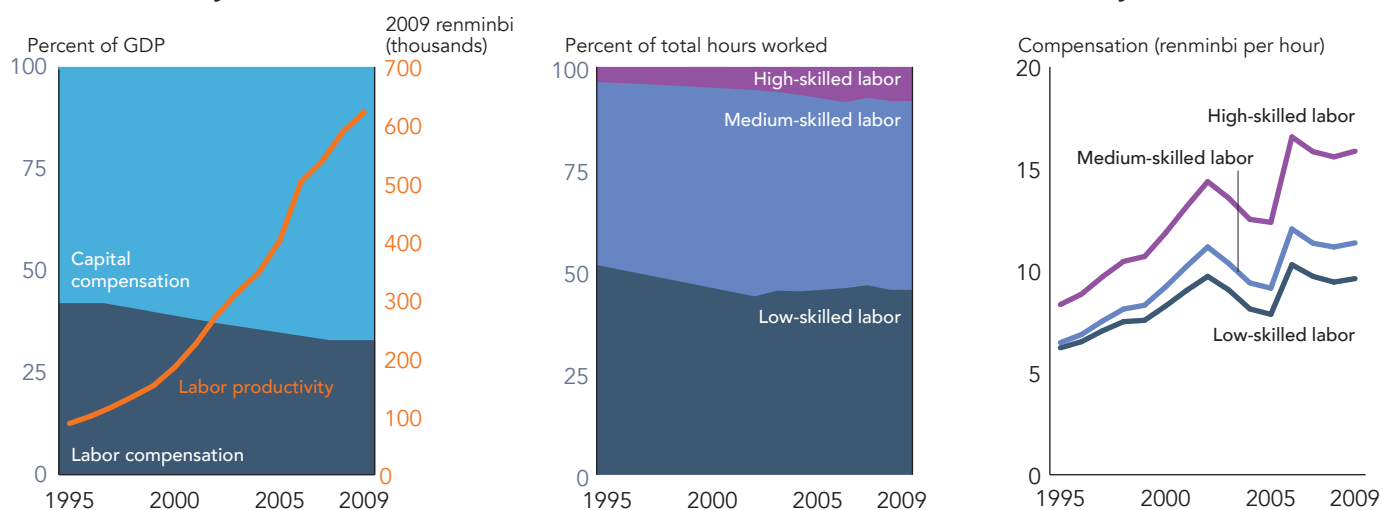
Note: See annex 2.2 in chapter 2 for a key to country abbreviations and sector codes.

to high-skilled workers; compensation was flat for low-skilled workers and increased only slightly for medium-skilled workers. These shifts are consistent with the overall transformation of the information and communication technology industry in the United States over the period, which went from producing goods to primarily designing and providing support services.

Now consider the analogous analysis for China’s information and communication technology industry (see figure 5). The first thing to notice is that labor productivity growth was phenomenal, increasing some six times over 15 years (right scale, left panel). During the period, labor’s share dropped from more than 40% to about 30%, while capital’s share rose from less than 60% to nearly

FIGURE 4 Efficiency and factor income distribution in the information and communication industry in the United States, 1995–2009

Source: Meng, Ye, and Wei 2017.

FIGURE 5 Efficiency and factor income distribution in the information and communication industry in China, 1995–2009

Source: Meng, Ye, and Wei 2017.

70% (left scale). Clearly, capital was able to reap much of the benefit of the productivity gain. It should be emphasized that the gain accrued to the capital deployed in China, and that included multinational corporations engaged in GVCs. Other research has shown that most of the value added in China's exports has come from the domestic private sector, and multinational corporations produce a substantial amount as well. Thus, much of the benefit from the expansion of Chinese GVCs has gone to private owners of capital. But there have also been significant wage increases for all workers—albeit starting from a very low base (right panel). The big proportional gain went to skilled labor, whose compensation nearly doubled (right panel). Compensation for medium-skilled

workers (with high school degrees) went up about 80%. Even low-skilled workers saw their pay rise more than 50%. The distribution of hours worked by different skill classes in China is basically a mirror image of that for the United States. The overwhelming share of labor input in China's information and communication technology industry over the period was low- and medium-skilled, though their shares did decline somewhat, from more than 95% of hours to 90% (middle panel of figure 5). High-skilled input was very small, about 5% of hours by the end of the period.

These distributional findings shed some light on the growing protectionist sentiment in some advanced economies—and on the fact that globalization remains popular in developing

countries that are deeply involved in GVCs, such as China, Mexico, and Viet Nam. These findings do not permit drawing strong causal conclusions, but the analysis is consistent with a story in which the benefits from GVC-related trade have been distributed highly unevenly. For the United States the big winners appear to be high-skilled workers and multinational corporations. GVCs have enabled them to benefit from enormous productivity gains in developing countries such as China. Ordinary workers in the United States have not seen much (if any) benefit. In China ordinary workers have benefited. Even at the beginning of the period factory wages in China were far ahead of rural incomes. And those wages doubled over 15 years. The wage gains are a driving factor behind the impressive decline of absolute poverty in China. Relatively speaking, however, the big benefits in China accrued to the small number of high-skilled workers and to the owners of capital, including foreign investors.

Developing country participation in global value chains

Witnessing this rise of GVCs, stakeholders in developing countries typically want to see their country more involved in value chains and moving to higher value-added activities within the chains over time. GVC research can help identify factors associated with integration into GVCs, such as the related issues of developing country involvement in GVCs, trade costs, and the middle-income trap (chapters 3, 4, and 5).

For the involvement of developing countries in GVCs, geography clearly matters. The world seems to have three interconnected production hubs for the extensive trade in parts and components (figure 6): one centered on the United States, one on Asia (China, Japan, Republic of Korea), and one on Europe (especially Germany). Figure 6 shows the important bilateral flows of parts and components, with the countries that are most deeply involved highlighted in red. China aside, developing countries are generally on the periphery and tend to trade with the hub that is geographically closest. Many developing regions are barely involved at all. Most African countries are far from existing hubs. And within developing countries, it is large firms that tend to be involved in global production networks. In Latin America, for instance, small firms rarely trade outside the region.

Unit labor costs and trade costs

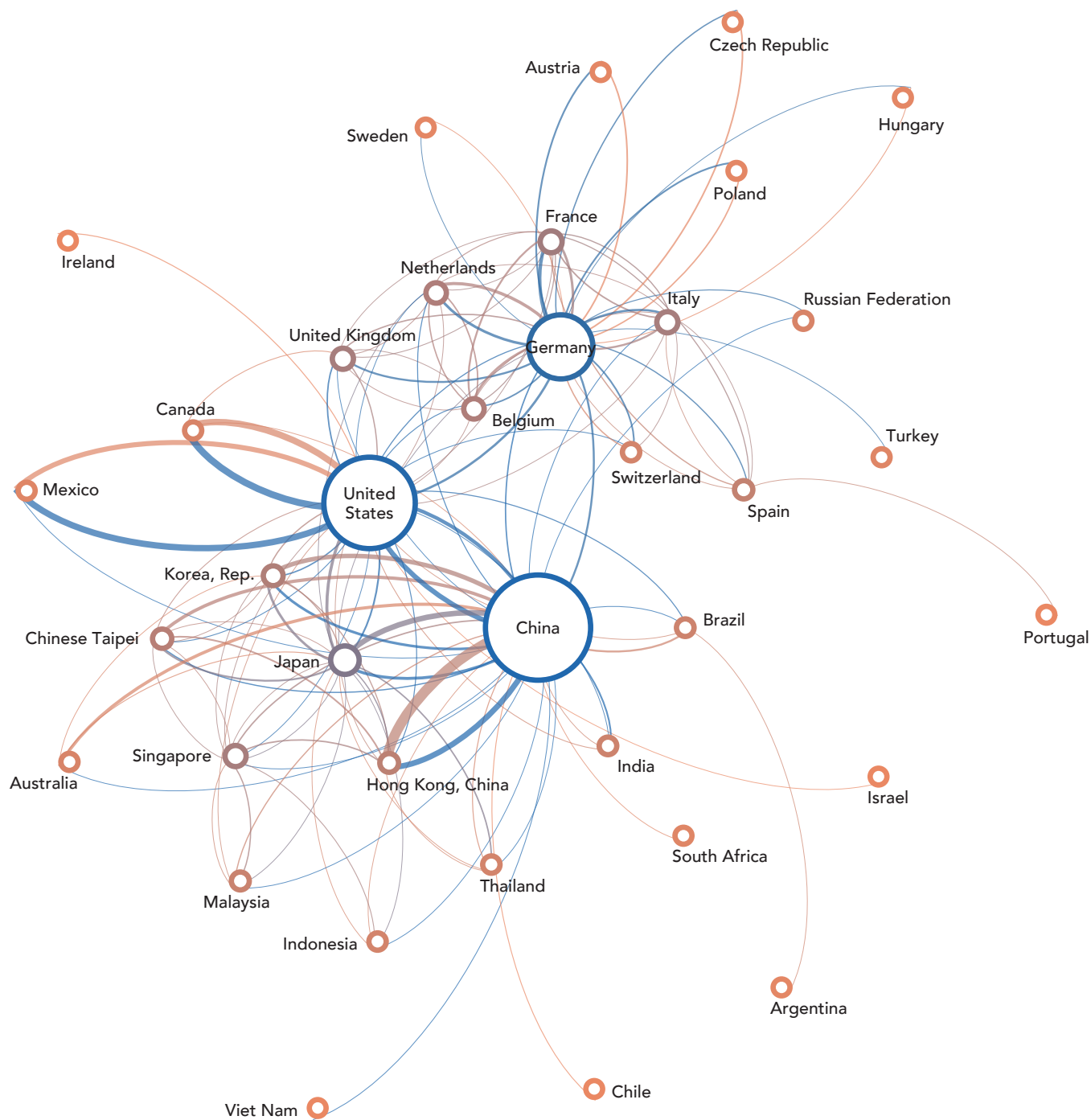
How to explain the differential participation of developing countries in GVCs? Low wages are often thought to be an important factor. But low wages exist across developing countries, yet only a few locations are involved in GVCs. Low unit labor costs (the ratio of average wages to per capita GDP) turn out to be much more important than low wages. Figure 7, which plots unit labor costs against wages in 2000 and 2010 for a large number of developing countries, show no positive relationship between them because labor productivity varies so much across countries.

Countries with high labor productivity will have higher wages and still be low-cost producers. The countries more deeply involved in GVCs (identified in orange in figure 7) all stand out as having low unit labor costs, but not necessarily low wages. In contrast, in each time period there is a circle of countries that have very low wages but high unit labor costs. These are mostly African economies. Other costs in the production process offset any potential advantage from low wages.

One of the most important impediments for developing countries is trade costs, examined in chapter 4. Today, nontariff trade costs (freight, insurance, and other cross-border-related fees) tend to be much larger than any remaining import tariffs as products travel through production stages. Those trade costs, which vary by country and sector, have a monetary dimension (for example, transportation, insurance, and other fees) but also a more intangible dimension that encompasses information costs, nonmonetary barriers (regulation, licensing, and so on), insecure contracts, and weak trade governance leading to uncertainty. These impediments to trade can be expressed as ad valorem tariff equivalents and are generally much higher than tariffs. In sectors with complex value chains, such as motor vehicles, computers, and machinery, trade costs are more than four times higher than tariffs. In traditional traded goods, such as agricultural products, minerals, and wood, these trade costs tend to be less of an impediment.

So while weak transportation links, inefficient customs clearance, bureaucracy, and red tape all tend to impede trade, their effects are most pernicious in sectors requiring that parts move back and forth across borders. The costs of impediments cascade. Countries with very high trade costs will not be able to participate in GVCs, and any exports are likely to be traditional goods, often primary products. Developing countries try to address this problem by establishing special export processing zones, which have superior logistics and expedited customs clearance (as well as through duty drawbacks on any remaining import tariffs). The problem with this second-best approach is that it limits participation in GVCs to the small number of firms in the export processing zones, while other domestic firms, especially small ones that might become parts suppliers, are left to stumble in a world with high transaction costs. A better approach is to improve trade facilitation for all firms in the economy.

China provides some interesting lessons. China is known for having started its economic reform with four special economic zones that fit the model of export processing zones, with favored infrastructure and customs clearance. What is less known is that within a short time China had expanded these benefits to more than 30 cities nationwide. Competition among the cities has enabled quite a few of them to emerge as locations with low trade costs and deep participation in GVCs. Research into the value added of trade has shown that the majority of the domestic value added in China's exports comes from private domestic firms. Foreign firms are often the processing exporters from China, but the successful expansion of value chains to domestic firms within China has resulted in most of the value added coming from the domestic private sector.

FIGURE 6 Trade in components shows three interrelated production hubs

Source: Diakantoni and others 2017, based on the UN Comtrade database (<https://comtrade.un.org>).

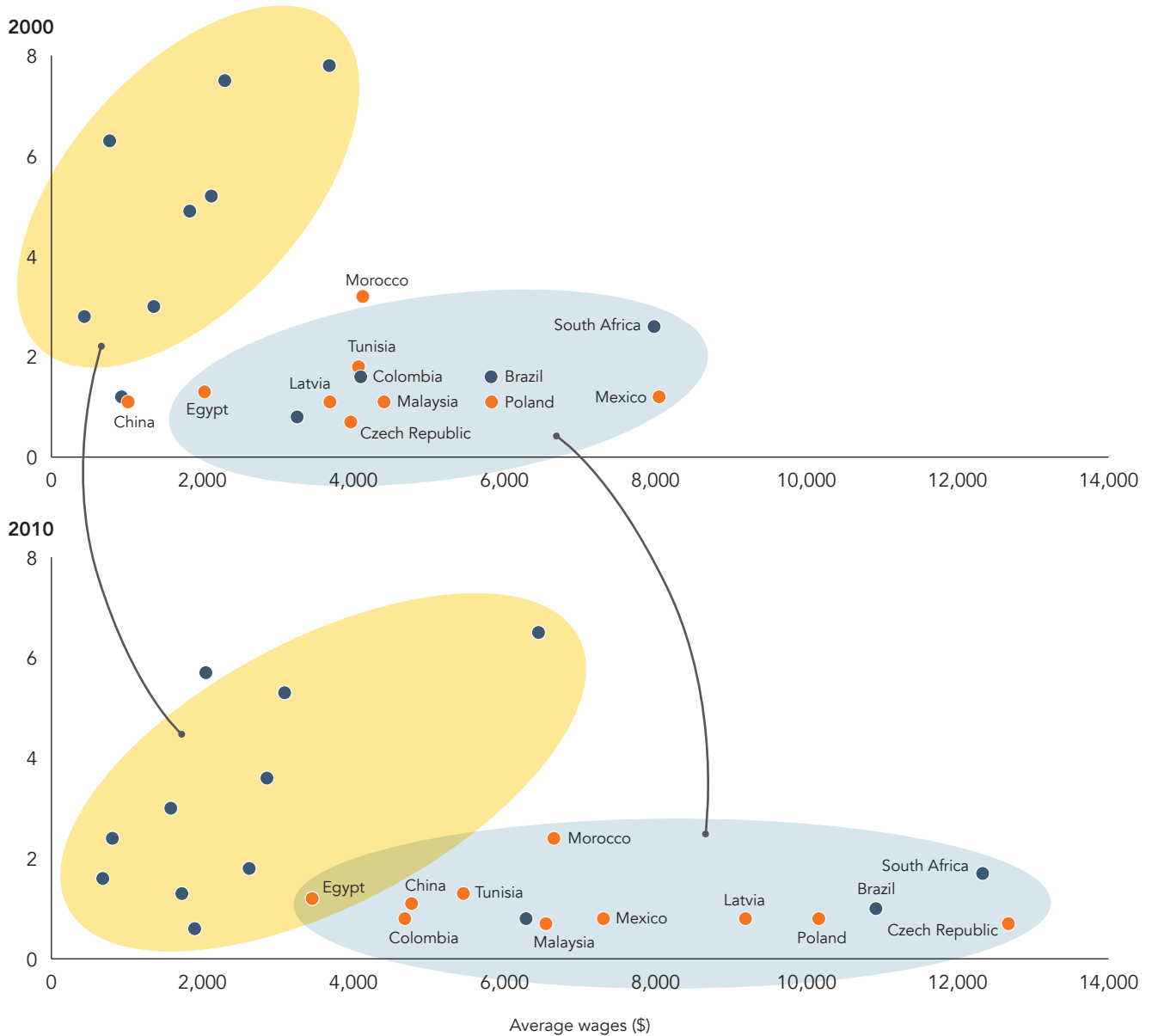
Note: Includes the 61 economies in the Organisation for Economic Co-operation and Development–World Trade Organization Trade in Value-Added database and their most important bilateral gross trade flows. The color of the nodes (and their export flows) is from blue to red, blue indicating the highest degree of centrality.

Further evidence on the importance of reducing transactions costs comes from the World Bank's Logistics Performance Index, which captures how well infrastructure and bureaucracy work together to move goods through the production process and

on to consumers. A clear relationship emerges between better logistics performance and deeper involvement in GVCs when the Logistics Performance Index is plotted against a centrality indicator of each country's role in GVCs (an indicator that ranks

FIGURE 7 Developing countries deeply involved in global value chains have low unit labor costs but not low wages, 2000 and 2010

Unit labor costs (ratio of average wages to GDP per capita)



Source: Ceglowski and others 2015.

Note: Unit labor costs are the ratio of average wages to per capita GDP.

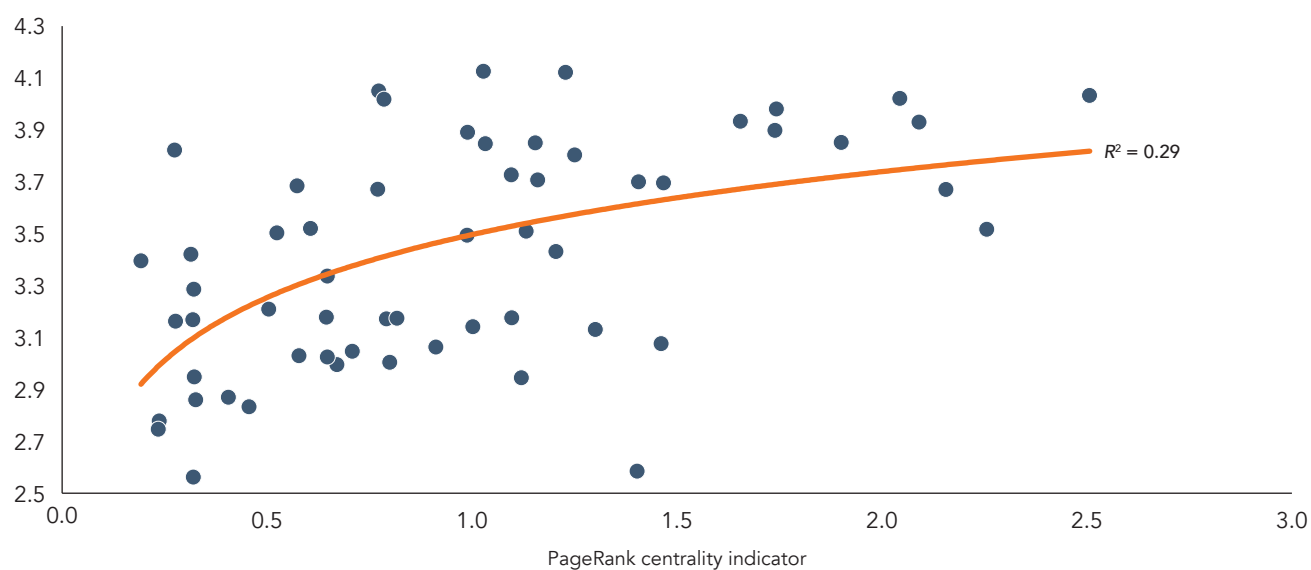
a country or industry's centrality to GVCs taking into account direct and indirect trade flows to and from trading partners in the global production network; figure 8). The link is not that tight ($R^2 = 0.29$), however, indicating that other factors are at work as well. But it is interesting that there are no countries in the lower-right quadrant: no countries with poor logistics performance are central to GVCs. For countries that want to get more involved in GVCs, trade facilitation and infrastructure are obvious places to start.

Global value chains and the middle-income trap

One of the most hotly debated issues in development is the "middle-income trap" (chapter 5). This is the idea that it is relatively easy to grow from low income to middle income, by imitating successful countries and expanding factors of production (labor force growth and investment). But it is harder to move from middle income to high income, which in general is based more on innovation and creativity than on extensive growth.

FIGURE 8 Relationship between the Logistics Performance Index and a centrality measure of country involvement in global value chains

Logistics Performance Index



Source: Diakantoni and others 2017.

Note: The centrality indicator ranks a country's centrality to global value chains, taking into account direct and indirect trade flows to and from trading partners in the global production network.

It turns out that there is mixed empirical evidence for a middle-income trap. Chapter 5 finds substantial upward mobility between 2000 and 2015, particularly for middle-income countries, with 79 of 133 countries that were low or middle income in 2000 improving their income status and none declining.

While there is only weak evidence for a generalized growth slowdown in middle-income countries, there is still the concern that in any period some countries are moving ahead rapidly while others are stagnating or moving ahead less rapidly. Furthermore, problems of the structural transformation of industries are quite specific to middle-income countries, and this more limited understanding of a middle-income trap is usefully explored in the chapter. One clear empirical regularity is that upwardly mobile countries have considerably more involvement in GVCs than do languishing countries. Care is required in interpreting this kind of association, but it is consistent with the notion that GVCs have given developing countries new opportunities to participate in a global division of labor. For the countries that have been able to respond effectively to the opportunities, that has in turn led to faster productivity growth and economic advance.

Services and trade restrictiveness

A key perception of international trade that changes when value added replaces gross value in the analysis concerns the relative role of goods and services (chapter 6). In 1980 the split between trade in goods and direct trade in services was 80:20. By 2008

that ratio had barely changed (left panel of figure 9). Most of the goods trade was manufactures, with the remainder being agricultural and mining products. Economists refer to many services as "nontradables," meaning that they cannot be directly traded internationally. Haircuts and dry cleaning are common examples. Higher end services such as health care and legal advice are also hard to directly trade internationally. That is starting to change with some remote services trade, but statistically the share is very small.

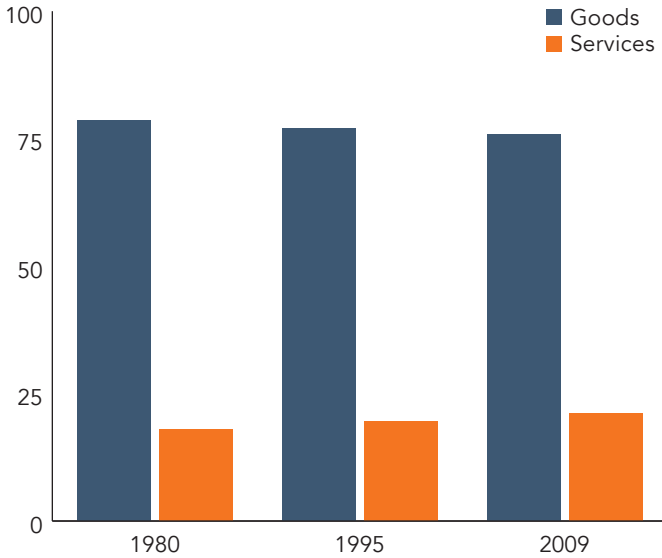
However, analysis of value added shows that the share of services in trade nearly doubled between 1980 and 2008 (right panel of figure 9). Another way of looking at this statistic is that much of the value in manufactured goods comes from inputs of services industries. The reasons for these developments are variants of the older arguments for why the share of services in GDP tends to grow: the splintering or outsourcing of services activities from manufacturing firms; the growing importance in a GVC world of connecting services like telecommunications and transport; the growing services component in sophisticated manufacturing goods, such as software in cars; and the increase in relative prices of services tasks because manufacturing tasks are easier to offshore to lower cost locations.

This tendency for value-added exports of services to be greater than the direct export of services is true in all major economies, though the share varies considerably. Figure 10 ranks countries in the services share of value added exported and in the services share of gross exports, which is smaller in every case. In general, developed countries have services shares in

FIGURE 9 The share of services is higher and has increased more sharply in trade in value added than in trade in gross terms, 1980, 1995, and 2009

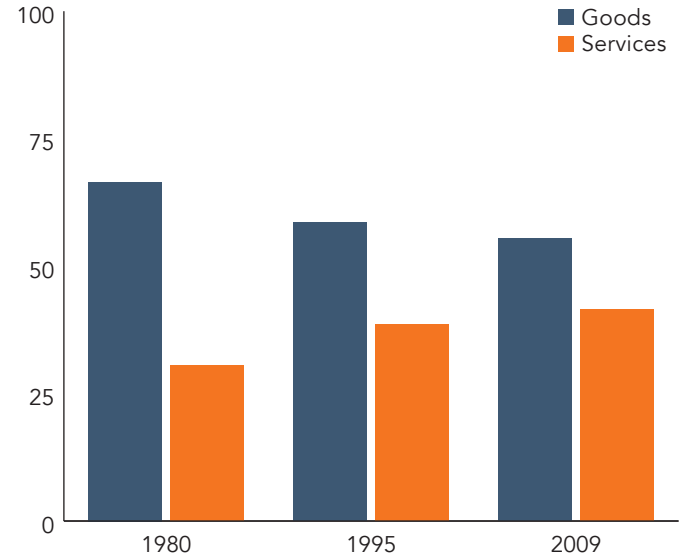
Gross exports of goods and services

Share of total world gross exports (%)



Value-added exports of goods and services

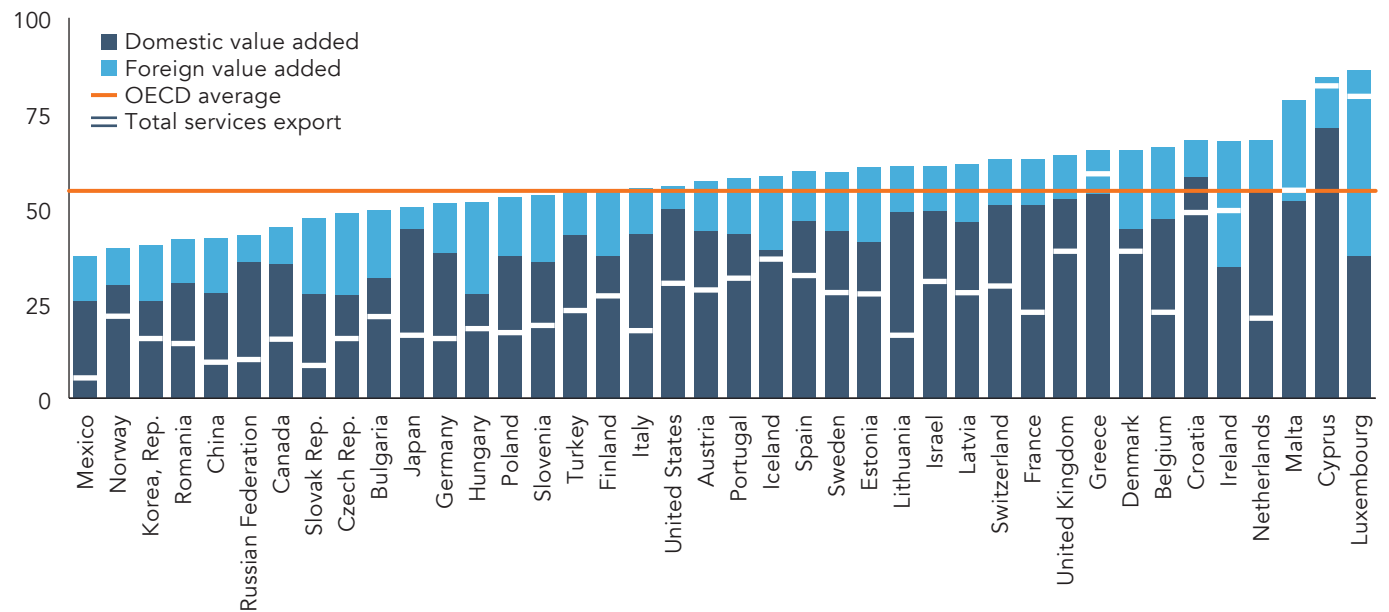
Share of total world value-added exports (%)



Source: Authors' calculations based on Johnson and Noguera 2016.

FIGURE 10 The share of services in exports is higher for developed countries, 2011

Percent



Source: Organisation for Economic Co-operation and Development–World Trade Organization Trade in Value-Added database 2015.

value-added exports above 50%. About 55% of the value added exported from the United States comes from services sectors. The shares are even higher for European economies. For the Netherlands, well known as an exporter of agricultural products and manufactures, services account for nearly 70% of the value of its gross exports.

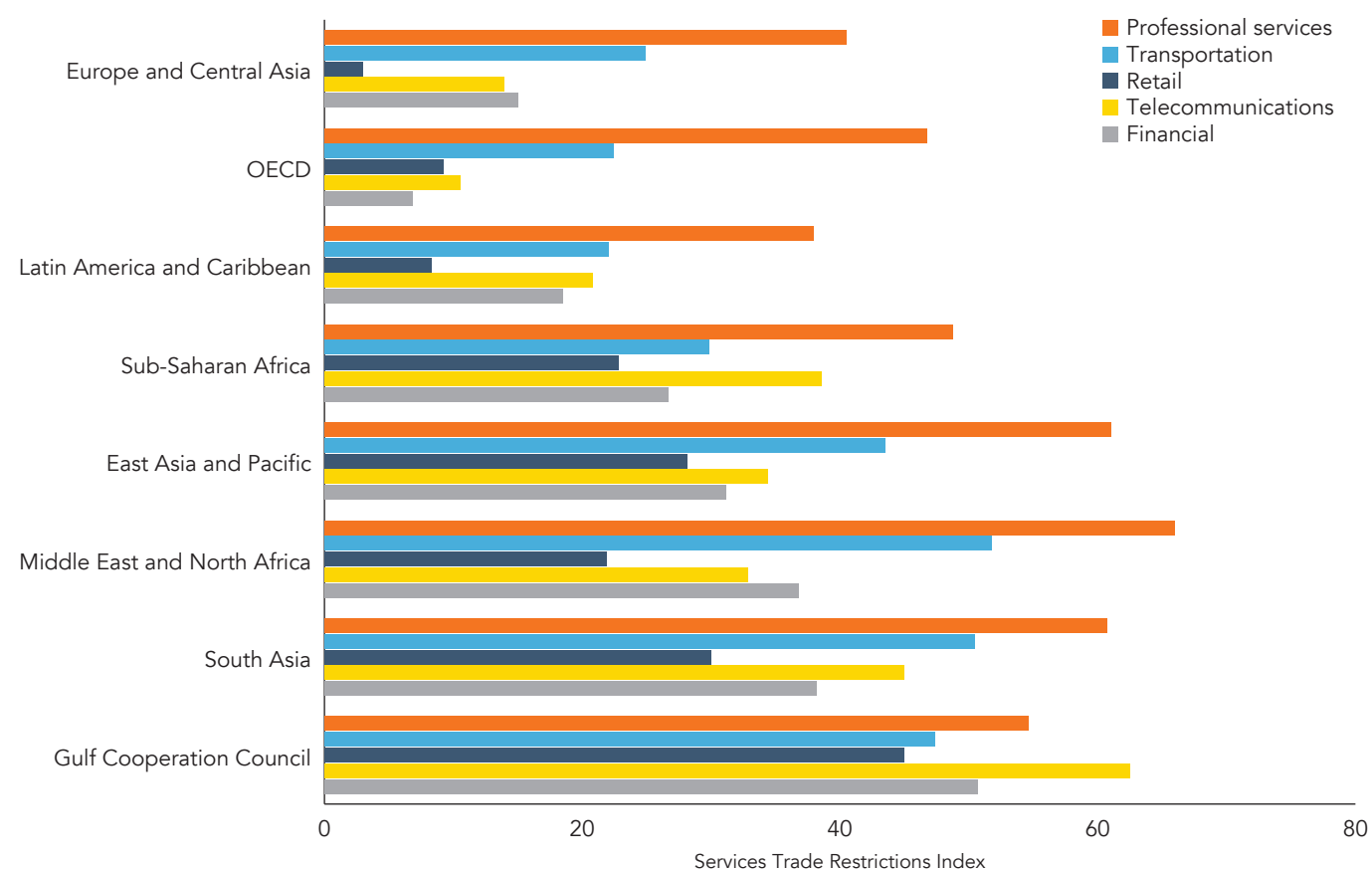
Emerging market economies that are major exporters of manufactured products have somewhat lower but still surprisingly high services shares. For example, China, Mexico, and Viet Nam have very little direct export of services, but in value added terms about 40% of their exports come from services. They can expect that share to rise as they develop further and move up the value chain.

While the links between manufacturing and services are deepening, many developing countries continue to carry out dualistic policies between manufacturing and services. Protection tends to be stronger against imports of services, even though more-open policies would help countries develop more-competitive and more-productive services sectors, which in turn

would feed into more-competitive and more-productive manufacturing sectors. Figure 11 shows measure of import protection in key services sectors for different regions. As the benchmark, Organisation for Economic Co-operation and Development (OECD) countries are very open to imports of financial, telecommunications, and retailing services and moderately open to trade in transportation services. Professional services, such as law, medicine, and architecture, on the other hand, remain relatively protected. For many services it is difficult to trade internationally without investment in establishing a local presence. OECD economies are also very open to direct investment in services sectors, contributing to their competitive character and high-productivity outcomes.

Developing countries have embraced import openness for manufactured products, especially machinery and parts that enable them to participate in the international division of labor. But they continue to protect imports of services (see figure 11). Countries in East Asia and Pacific have much higher levels of protection than OECD countries. Countries in Latin America and

FIGURE 11 Developing countries maintain high restrictions on services trade



Source: Borchert, Gootiiz, and Mattoo 2014.

Note: This figure compares the restrictiveness of services trade policy across countries based on the World Bank Services Trade Restrictions Index, which ranges from 0 (completely open) to 100 (completely closed).

Central Asia are modestly more open but still less open than OECD countries. Countries in Africa and South Asia, home to most of the world's remaining extreme poor, are generally the most closed. For developing countries wishing to participate more in GVCs and to move up the value chain, one obvious measure is to open services to import competition and direct foreign investment. Improved access to finance, communications, transport, and other services, through reform in general foreign direct investment in particular, enhances manufacturing firms' productivity and other aspects of the performance of downstream firms.

Institutions and deep trade agreements

Another way to think about products that have complex value chains is that they are contract-intensive goods. That is, they often involve many exchanges among different firms, each facing some risk of contract nonperformance by others in the chain. GVC research shows that, other things equal, countries with better institutions such as stronger property rights and rule of law participate more in GVCs (chapter 7). Research for this report found a similar result within China across a large number of cities. Cities with better measures of contract enforcement, faster customs clearance, and deeper financial systems participated more in GVCs.

The idea of improving institutions and lowering trade costs across the board through better infrastructure, control of corruption, reduction of red tape, and zero tariffs on imported inputs (including services) is clear. But developing country leaders naturally wonder how to pursue this agenda. It turns out that one effective route is through "deep" trade agreements, agreements that go beyond simple tariff cutting and involve legal commitments on laws and regulations (chapter 8). The different rounds of agreements within the framework of the WTO have involved primarily reducing import tariffs, and these have had the most effect on trade in manufactures. It has proved more difficult to go beyond tariff cutting in the WTO. Although significant progress has been made in recent years with the WTO Trade Facilitation Agreement, the abolition of agricultural export subsidies, and several other agreements, progress has stalled within the WTO on new global agreements. Preferential trade agreements—in which a group of like-minded countries negotiate agreements on policy areas that build on WTO commitments—have proliferated. In practice, the most important areas concern services trade, investment, competition policy, and intellectual property rights protection.

Between 1958 and 2014, 279 preferential trade agreements were notified to the WTO. This report rates the "depth" of each agreement based on the number and share of legally enforceable provisions. The North American Free-Trade Agreement among Canada, Mexico, and the United States is a deep agreement, as is the Trans-Pacific Partnership, which has been negotiated but not yet ratified or implemented among 12 Asia-Pacific economies. Because deep integration often involves leveling the playing field for investment, intellectual property, and competition

policy, participation in deep preferential trade agreements turns out to be an effective way to expand involvement in GVCs. The new areas covered in these agreements facilitate the operations of complex production structures that span multiple borders. Participating in deep preferential trade agreements increases a country's trade in parts and components, an important measure of GVC activity.

While strengthening institutions and reducing trade costs, perhaps through deep preferential trade agreements, are effective routes for developing countries to become more involved in GVCs, some sobering research shows that in addition to one's own institutions, the quality of neighboring countries' institutions matters as well. In contract-intensive sectors (such as those with complex value chains), countries with "bad" neighbors have fewer exports, even after controlling for the country's own institutions. This result implies that deep agreements would be more effective if a group of neighboring economies all signed up for the same agreement. In the case of the Trans-Pacific Partnership, for example, several countries in the Association of Southeast Asian Nations (ASEAN), such as Singapore and Viet Nam, are partners to the agreement, as are several Latin American countries (such as Chile, Mexico, and Peru). The benefits would be greater if all of ASEAN countries and the Pacific countries in Latin America signed on. In the wake of the 2016 U.S. presidential election, U.S. President Donald Trump pulled the United States out of the agreement, but the remaining 11 countries are discussing whether to proceed without the United States.

For developing countries the agenda of reform needed to participate more deeply in GVCs is challenging. Moreover, access to finance remains an issue in less advanced economies that are prone to market and public governance failures. While joining GVCs improves the prospects of attracting private foreign direct investment, the poorest countries may still require substantial additional financing, if only to improve the public transport and telecommunication infrastructure as well as trade facilitation. In this respect, the 2015 Addis Ababa Action Agenda provides a new global financing framework to mobilize and deliver the resources, technology, and partnerships needed to improve many of the structural and institutional conditions required for fostering export-oriented industrial activities (UN 2016).

Toward more inclusive globalization

This report provides some insight into how GVCs are advancing the development process and how they are creating distributional conflict, especially in advanced countries. The rapid productivity growth within GVCs shows that they are an efficient form of production. They have enabled developing countries in particular to move into new activities and rapidly raise their productivity. To be sustainable, however, globalization needs to become more inclusive in at least three dimensions.

First, in developing countries deeply involved in GVCs, virtually the entire population benefits from the expanded trade and faster growth, though not all to the same extent. In developed

countries, by contrast, the benefits of expanded international trade and investment are highly concentrated among the very skilled in the workforce and the owners of capital. Both groups are already high up in the income distribution, and globalization increases their share of the pie.

There is no simple agenda to spread the benefits more widely. A protectionist sentiment is arising in developed countries. Historical evidence suggests that cutting themselves off from the global market through import restrictions will almost certainly backfire. That is likely to lead to slower global growth and poor results all around. Evidence has shown that effective responses may include active labor market policies to provide training and retraining so that workers have the skills demanded in the market, a stronger safety net of minimum income support, and support to communities hit hard by changes in production arising from trade or technological change. Also important is developing more detailed official national data that can inform policymakers. Considerable improvements have been made on the data front in recent years, notably through trade in value added-type measures. But with few exceptions these provide a wide-angled view, whereas what is increasingly needed is a more granular view, at least a view that zooms in on workers, occupations, and skills.

Second, while GVCs have enabled many developing countries to increase their participation in global trade and raise their productivity, too many countries and regions are still left out.

East Asia, in particular, has taken advantage of the opportunities provided by globalization. But increasingly, the remaining extreme poor are concentrated in South Asia and Africa. Countries in these regions can help themselves through further trade and investment liberalization, especially trade facilitation that improves infrastructure and import or export processes so that goods can move easily around the world. One of the interesting trends identified in GVC research is that more and more of the value added traded in the world comes from services sectors. Opening services sectors to foreign trade and investment is a smart strategy for deepening integration. Participating in deep trade and investment agreements can advance that agenda, and such agreements will be most powerful if they involve several neighboring countries.

A third dimension of inclusion concerns small firms and the informal sector. Most job creation in the world is in small and medium-size firms, so GVC involvement by these firms is crucial for maximizing the positive impact from trade. Poor infrastructure, corruption, and red tape tends to hamstring smaller companies more than larger ones since large firms can often finance their own infrastructure and find ways to operate in corrupt and bureaucratic environments. Special export zones can be a way for a developing country to begin to participate in GVCs, but for the benefits to spread throughout the economy, it is important that the zones are seen as stepping-stones to economywide improvements.

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