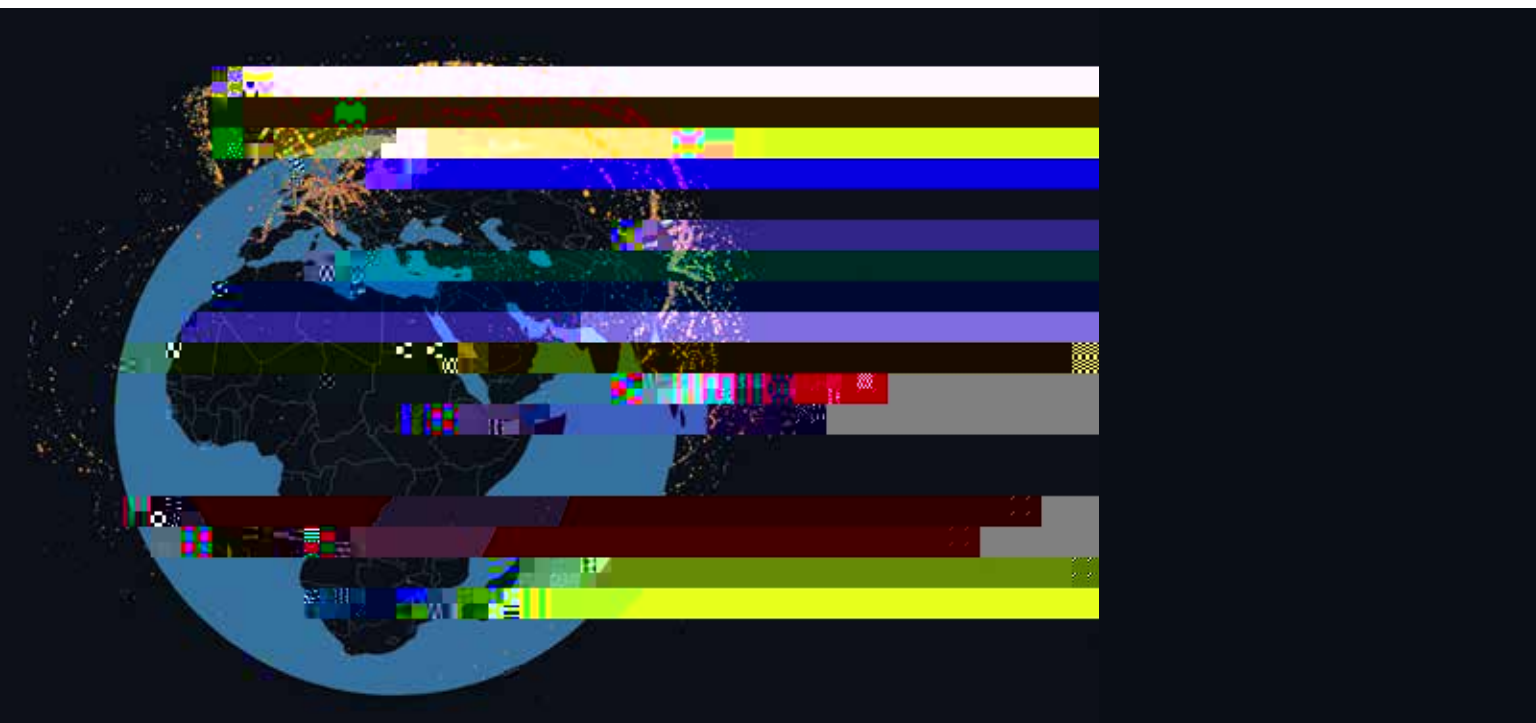


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**214 Part V: How can international cooperation help?**







- 4.4 107 GVCs are associated with greater inflation synchrony in some countries
- 4.5 107 Trade in intermediate inputs increased the weight of global factors in inflation formation from 1983 to 2006
- 4.6 108 Export boosts tend to coincide with import boosts—more now than 30 years ago
- 4.7 109 With GVCs, devaluations can have complex consequences
- 4.8 109 GVCs dampen the reaction of export volumes to currency movements
- B4.3.1 110 Computing bilateral trade balance in gross exports or in value-added exports matters
- 4.9 114 The multilateral dimension of the U.S.–China trade war
- 4.10 115 Impact of U.S. tariffs on imports from China



**6.1** 141 Ten largeses13.2(, bs)5y 1

Around the world, the process of delivering goods and services to consumers has become specialized to a degree no one could have ever imagined. Businesses focus on what they do best in their home markets and outsource the rest. Samsung makes its mobile phones with parts from 2,500 suppliers across the globe. One country—Vietnam—produces more than a third of those phones, and it has reaped the benefits. The provinces in which the phones are produced, Thai



# Preface

The growth of international trade and the expansion of global value chains (GVCs) over the last 30 years have had remarkable effects on development. Incomes have risen, productivity has





This year's World Development Report (WDR) was prepared by a team led by co-directors Caroline Freund and Aaditya Mattoo (World Bank) and Pol Antràs (Harvard University). Daria Taglioni served as task team leader of the project and as a member of the Report's leadership. Overall guidance was provided by the chief economist of the World Bank, Pinelopi Koujianou Goldberg. The Report is sponsored by the Bank's Development Economics Vice Presidency.

The core team was composed of Erhan Artuc, Paulo Bastos, Davida Connon, François de Soyres, Thomas Farole, Ana Margarida Fernandes, Michael J. Ferrantino, Bernard Hoekman, Claire H. Hollweg, Melise Jaud, Hiau Looi Kee, Bob Rijkers, and Deborah Winkler.

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for International Development, and World Trade Organization. An event kindly organized by GIZ and BMZ gave the WDR team a unique opportunity to discuss the Report's themes with a





PEA	Privacy Enforcement Authority
PHE	pollution haven effect
PHH	pollution haven hypothesis
PPP	purchasing power parity
PSDC	Penang Skills Development Centre
PTA	











## Overview

3D printing could draw production closer to the consumer and reduce the demand for labor at home and abroad. Second, trade conflict among large countries could lead to a retrenchment or a segmentation of GVCs.

What does all this mean for developing countries seeking to link to GVCs, acquire new technologies, and grow? Is there still a path to development through GVCs? Those are the central questions explored in

lower trade barriers induced manufacturers to extend production processes beyond national borders (figure O.1). GVC growth was concentrated in machinery, electronics, and transportation, and in the regions specializing in those sectors: East Asia, North America, and Western Europe. Most countries in these regions

trade. In Mexico and Vietnam, for example, the regions that saw more intensive GVC participation also saw a greater reduction in poverty.

**The gains from GVCs are not**



Overvalued exchange rates and restrictive labor regulations raise the cost of labor, preventing labor-abundant countries from taking advantage of their







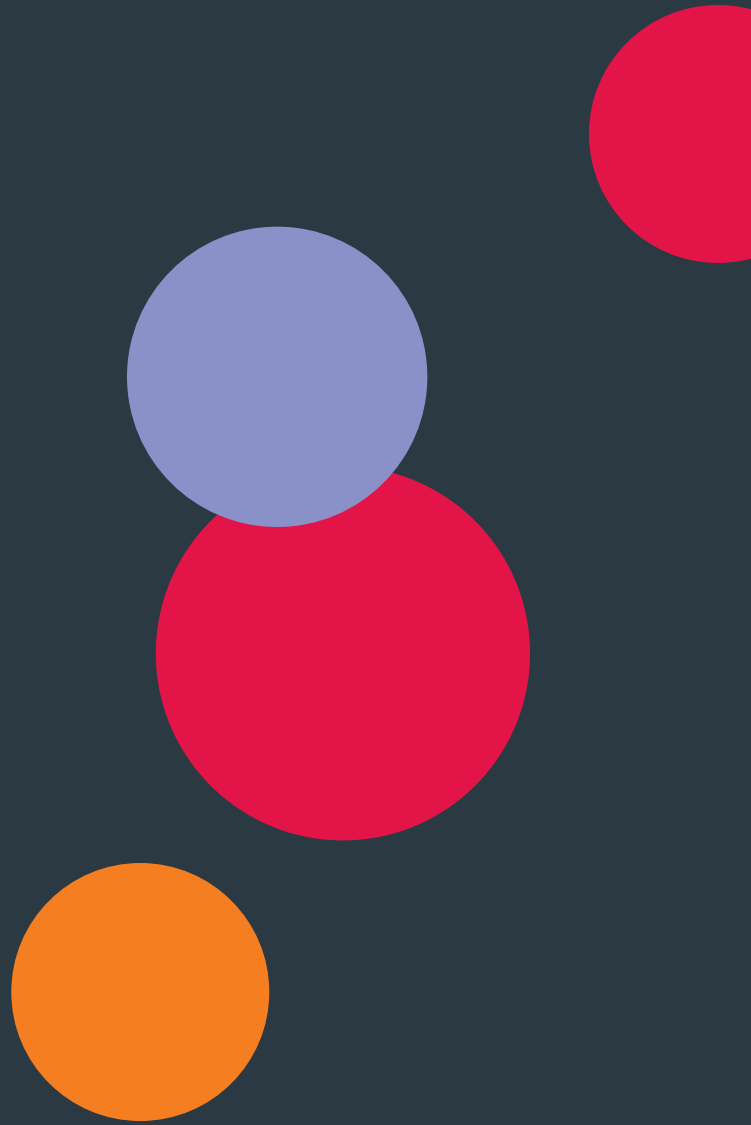




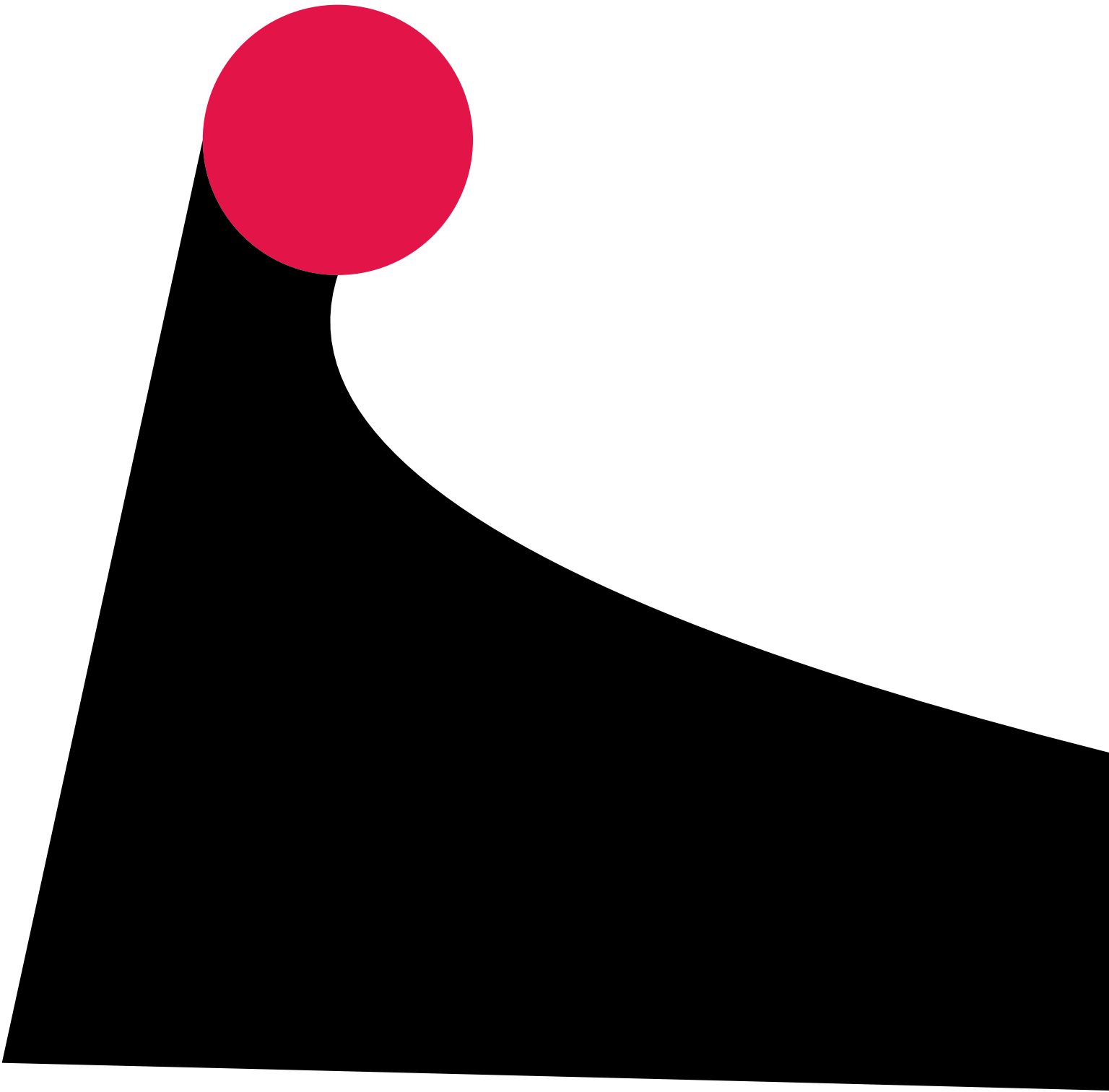
Kluwer Competition Law Blog, November 30, Wolters Kluwer, Alphen aan den Rijn, The Netherlands. <http://competitionlawblog.kluwercompetitionlaw.com/2018/11/30/the-eus-competition-investigation-into-amazon-marketplace/>.

ILO (International Labour Organization) and IFC (International Finance Corporation). 2016. "Progress and









**P**roduction of goods and services was increasingly globalized from 1990 to 2008. The process was more pronounced in some regions and sectors than in others as firms began to organize their production in complex global value chains (GVCs). They designed products in one country, procured parts and components from several countries, and assembled the final products in yet another country.

such as that through multinational corporations, is especially important.

Third, more-complex value chains tend to have especially strong regional linkages, although the expansion of GVCs has been both global and regional. Europe is the most integrated region, with four times as many regional linkages as global linkages. In East Asia, linkages are more regional than global, and the regional linkages have intensified substantially since 1990. By contrast, GVCs in North America depend somewhat more on global partners than regional partners, and integration has been increasing on both fronts. Elsewhere, GVC integration has been mostly global and has been increasing primarily with global partners. Importantly, in recent decades the differences in GVC participation across regions have been far greater than the changes within regions. The same dynamic applies to sectors.

## What is a global value chain?

The bicycle is the world's most popular form of transport. Invented in Germany in the early 19th century, bicycles were mass-produced by the Dutch at the end of that century, sometimes with frames imported from England. Global production later grew from about 10 million units in 1950 to more than 130 million units today.

Bicycles are heavily traded. They are assembled using parts and components from all over the world, especially Asia and Europe (figure 1.1). For example, Bianchi carries out all of its design, prototyping, and conception work in Italy, and then assembles most of its bicycles in Taiwan, China, using parts and components from China, Italy, Japan, Malaysia, and many other parts of the world. Each parts producer has niche expertise—

**Figure 1.1** Where do bicycles come from?







of their inputs. In addition, firms were able to disperse production across the world because transport costs fell significantly (figure 1.3, panel b). Declining air and

**Figure 1.3**















in exports. India, Kenya, and the Philippines also have rapidly expanding ICT and business service sectors.





export. Similarly, firms that both import and export dominate GVC participation (figure 1.14).

Because firms are the main actors in GVCs, another way to illustrate an individual country's GVC partici-







Intrafirm trade flows in world trade flows also exemplify the relational aspects of the growth of GVCs. For example, U.S. Census data from 2016 show that more than 40 percent of U.S. goods trade involves related-party transactions. At the global level, intra-firm trade has been estimated to be about one-third of world trade flows. In addition to having their own affiliates abroad, multinational companies rely on independent suppliers, including small firms in domestic and foreign markets.

The hierarchy and direction of knowledge flows between the multinational (or lead) firm and its suppliers vary across types of GVCs, depending on the complexity of products, the ability to codify transactions, and the capabilities of supply firms.<sup>14</sup> In



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# Drivers of participation

## Key findings

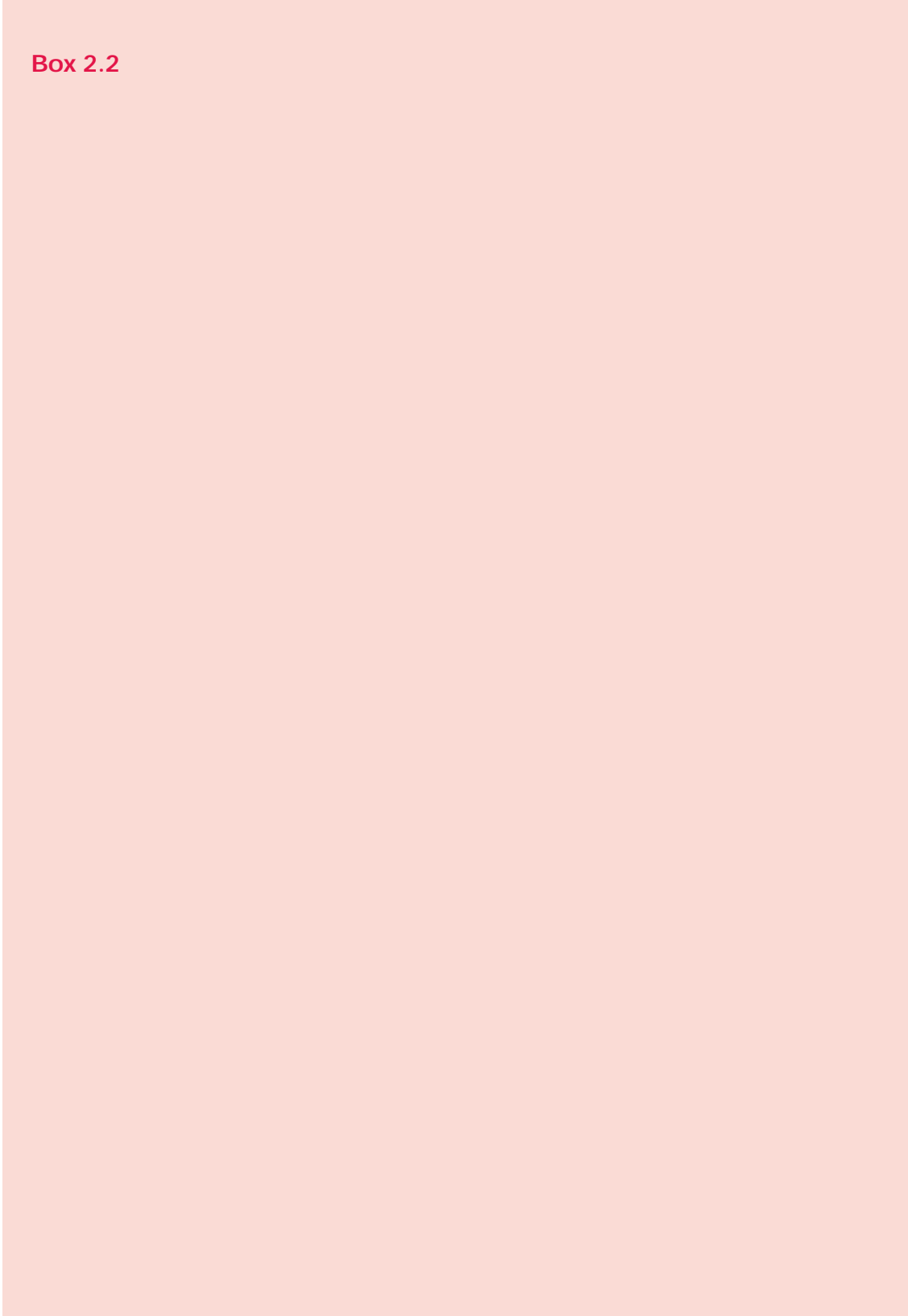
- Global value chain (GVC) participation is determined by fundamentals such as factor

**V**ietnam's electronics sector expanded dramati





**Box 2.2**







integration can mutually reinforce one another. But the link between firm GVC participation and female corporate leadership is negative. Majority female-owned and female-managed firms are less likely to

close to the end markets, such as the 3D printing of shoes. Producers in lower-income countries typically rely more on low-skilled manual labor than do producers in higher-income countries. But this could

capital FDI offers a solution. Cross-country cross-sector evidence from the Eora database shows that a relative scarcity of capital deters stronger GVC participation in capital-intensive sectors (see box 2.2). Countries moving from commodities to limited







participation is especially acute.





its GVC participation in the electronics sector (see box 2.1). Has remoteness prevented countries in Latin America and Sub-Saharan Africa from participating in GVCs? The total distance from Argentina or Chile to the GVC hubs is almost 40,000 kilometers and that from Malawi or Mozambique is more than 30,000 kilometers. These distances contrast with those for countries specialized in advanced manufacturing and





in the face of higher uncertainty in bilateral international transport times.<sup>55</sup> Evidence from the Eora data-



integration for their members, and a positive if weak effect is also found for the North American Free Trade

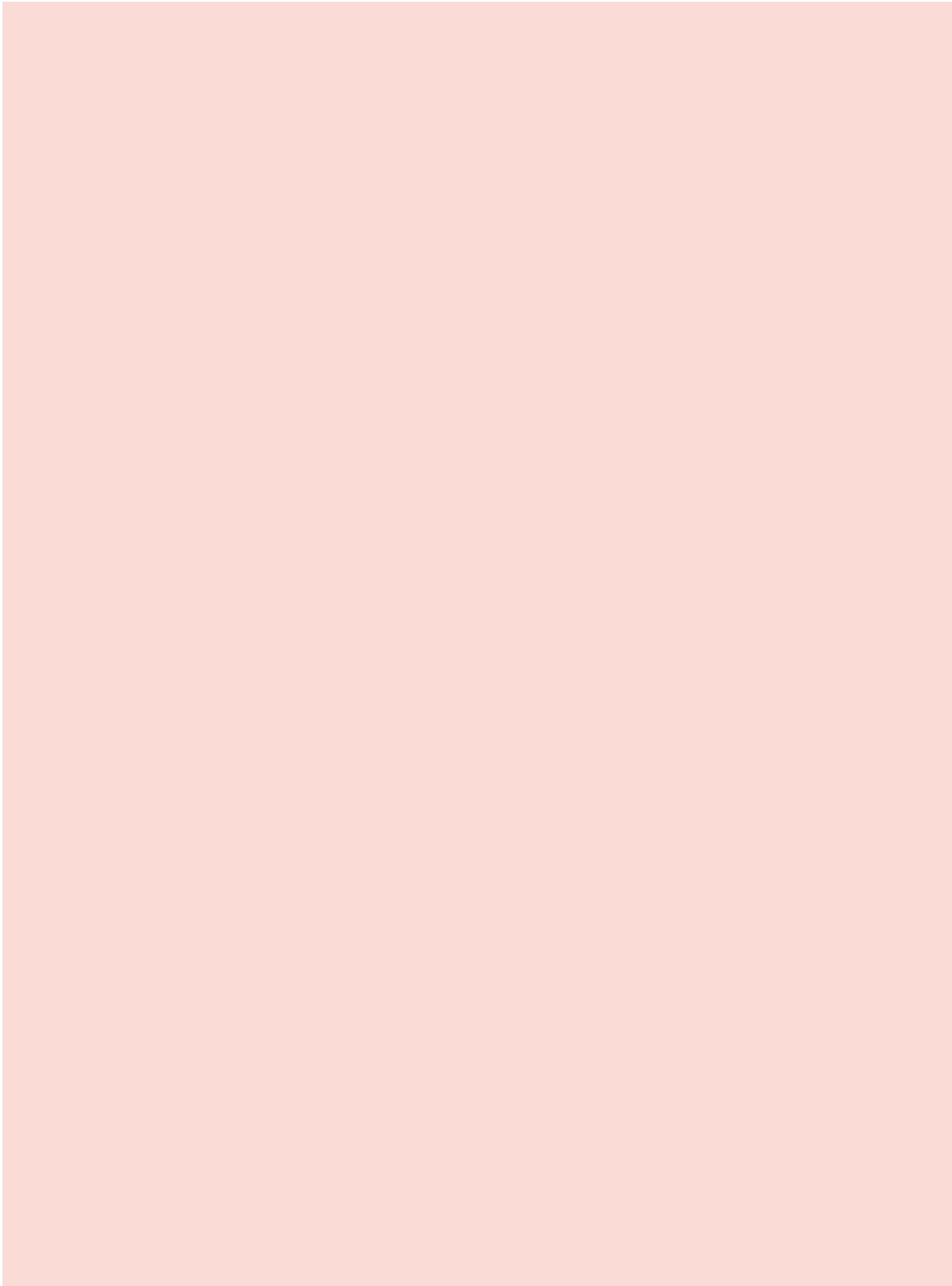


including tariffs, FDI, political stability, customs,



**Box 2.7**









Economist. 2018. "Why Samsung of South Korea Is the Biggest

Olam. 2016. Olam:











**B**angladesh is a powerful example of how participation in global value chains (GVCs) has sup-

Finally, GVCs do not cause tax avoidance and tax





growth, and wage increases: a 1 percent increase in training is associated with 0.6 percent increase in value added per hour and a 0.3 percent increase in the hourly wage.<sup>19</sup> A case study of the impact of a Japanese multinational company on skilled labor in Malaysia









strategies: strong connectivity to international technology ecosystems, and investments in design and marketing capabilities. These strategies allowed firms to develop innovative and cost-efficient products compatible with global markets by using cutting-edge technologies and capabilities in marketing and design to respond rapidly to changes in market demand and consumer taste. A few successful companies started developing their own research and development (R&D) capabilities and high-technology expertise, but they did so as part of the global ecosystem of technology, not through just indigenous innovation.

Because of deepening global integration, Whit





share of total employment increased 11 percentage points, from 25 to 36 percent. Formal employment (jobs covered by social security) in the manufacturing sector also grew as GVC firms assumed greater importance in formal manufacturing employment in Vietnam.<sup>41</sup> However, as discussed shortly, informal or noncontract work can also be important in agriculture and manufacturing value chains.

The overall result is that GVCs are associated with structural transformation, with exports pulling people out of less productive activities and into more productive manufacturing jobs. In Vietnam, manufacturing absorbed nearly 2.5 million workers between 2005 and 2014, increasing its share of the country's total employment from 12 to 14 percent.<sup>42</sup> This is not unique to Vietnam. The 2016 World Bank report *Stitches to Riches?* reveals that, based on data on the apparel sector in South Asia between 2000 and 2010, when a country experienced a 1 percent increase



trade creates growth, better jobs, and higher incomes, which reduces poverty. However, GVCs may have additional channels through which trade affects poverty. Labor-saving productivity growth through the hyperspecialization of GVCs may directly displace jobs. However, adoption of techniques and technologies that save on labor can spur job creation through three indirect channels that are more challenging to conceptualize and measure. First, productivity gains in supplier industries can yield steep increases in the demand for labor because of input–output linkages.



Openness affects poverty primarily through growth, the main driver of the remarkable reduction in global poverty since 1990.<sup>54</sup> Where economic growth from GVCs is larger than from conventional trade, poverty reduction from GVCs will also likely be larger.

In Mexico, municipalities with a larger share of employees in internationalized firms experienced a greater reduction in poverty between 1993 and 2013

Agriculture value chains can be a particularly powerful factor in poverty reduction by integrating rural households and smallholder farmers into supply chains. In Madagascar and Senegal, more high-value



Firms that import and export are not constrained by



In South Africa, markups charged by manufacturing

share,<sup>71</sup> but the rise in GVC activity appears to be a contributor. By increasing the profit rate of companies, GVCs also generate a force that results in a lower share of an economy's income being paid to labor. In the United States, superstar firms that are more productive and earn higher profits also have lower labor shares, and their increasing concentration has contributed to the declining labor share within industries.<sup>72</sup>

firms in GVCs tend to adopt more capital-intensive techniques than comparable domestic firms.<sup>80</sup> Physi-







processing workforce, but they are poorly represented in enterprise management. The trends are similar in aquaculture in Nigeria and Vietnam,<sup>100</sup> cocoa and coffee in Papua New Guinea,<sup>101</sup> and horticulture in Azerbaijan<sup>102</sup> and Afghanistan.<sup>103</sup> In the cashew value chain in Mozambique, lack of gender equality limits the access of women farmers to agricultural inputs, credit services, and markets. Despite the fact that more than half of the industry's workforce are women, almost no women hold leadership positions within factories.<sup>104</sup>





Other avenues for international tax avoidance include debt transactions between affiliated parties in low-tax jurisdictions (lender) and high-tax jurisdictions (borrower), locating intangible assets in low-tax jurisdictions, and treaty shopping.<sup>115</sup>

Tax revenue losses from profit shifting are sub-





Other studies link GVC participation to increased wage disparity between skilled and unskilled labor in developed countries, although little literature exists for developing countries. Using matched employer-employee data for Denmark for 1995–2006, Hummels et al. (2014) characterize the link between offshoring and wages across skill levels and find that offshoring increases (lowers) the high-skilled (low-skilled) wage. Similarly, using matched employer-employee data for Italy, Borghi and Crinò (2013) confirm that offshoring contributes to widening the wage gap between skilled and less skilled employees.

84.







Jensen, Robert. 2012. "Do Labor Market Opportunities Affect Young Women's Work and Family Decisions? Experimental Evidence from India." *Quarterly Journal of Economics* 127 (2): 753–92.

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# Global value chain(16(V









reduces the change in export price in response to exchange rate movements, thereby lessening the associated change in export volumes.

- A greater share of exports that return as imports to





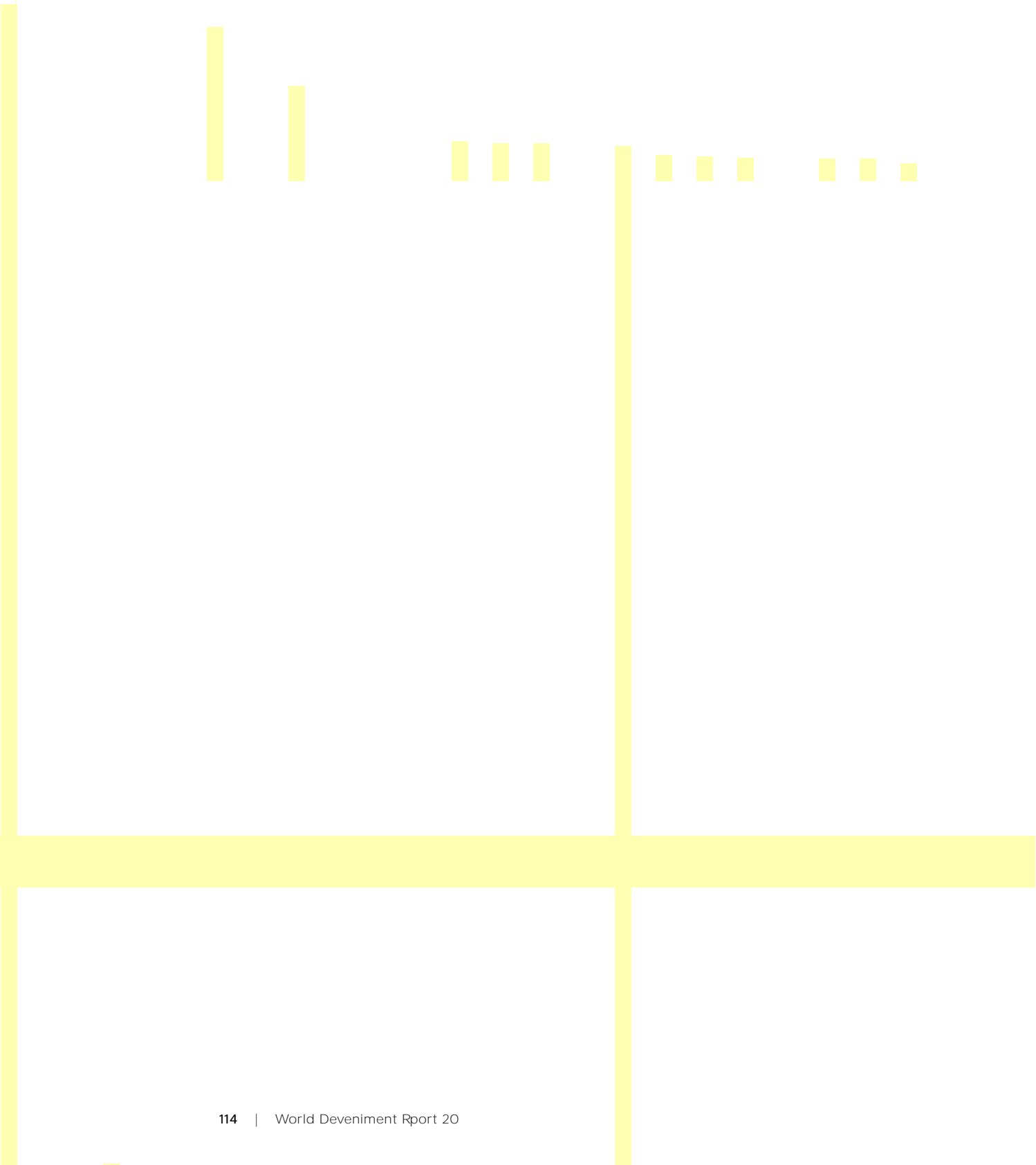
is smaller when measured in trade in value added than when measured in gross trade. The reason? China buys many of the inputs for its exports from other countries. But U.S. bilateral trade deficits with many of those other countries are larger (or U.S. trade sur-













[economics.newyorkfed.org/2017/04/why-renegotiating-nafta-could-disrupt-supply-chains.html](https://economics.newyorkfed.org/2017/04/why-renegotiating-nafta-could-disrupt-supply-chains.html).

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## Key findings









transportation, fuels in international transportation



## Changes in the composition of production

**Falling trade costs, tighter environmental regulations, and pollution havens**

10 percent increase in pollution abatement costs in the United States leads to a 0.6 percent increase in net imports from Mexico and a 5 percent increase in net imports from Canada.<sup>27</sup>

The association of falling trade costs and tighter environmental regulations could drive polluters to



Certification schemes are one possible means of





sustainability index. Levi's has a comparable arrangement with its suppliers through the International

## Green goods

One of the biggest contributions of GVCs to the environment may be the many new and innovative environmental products they make possible. Trade and GVCs have a positive impact on the environment by promoting innovation and by making these clean technologies and environmental goods more afford



24. See Copeland and Taylor (2004) for a formulation of the pollution haven hypothesis.
25. Cherniwchan, Copeland, and Taylor (2017); Dechezleprêtre

/industries/automotive-and-assembly/our-insights/the





## Key findings

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are predominantly from North America and East Asia; Africa and Latin America are greatly under-

















produced in 2017. Adidas's competitor Nike has several automated platforms under development.

**Robotization and 3D printing have promoted North–South trade with heterogeneous impacts across countries**

Despite the concerns about the effects of automation, the evidence that reshoring will result is very limited.<sup>34</sup> Moreover, these technologies may enhance GVCs and boost trade. The spread of automation in richer countries can improve productivity and income, thereby raising the demand for inputs and final goods from countries with large pools of low-wage labor as a comparative advantage. Furthermore, developed countries with similar factor endowments and technologies trade a great deal among themselves. Even if the labor advantage of low-income countries is (partially) canceled out by robotization, there will still be opportunities for trade in differentiated goods and for specialization in some stages of production.

Thus far, the rising adoption of industrial robots and 3D printing seems to have promoted North–South trade. Greater robot intensity in production has led to

**Automation is compressing labor's income share but not necessarily reducing employment**

As automation improves productivity, it also compresses labor's share of income in advanced economies. Higher robot density at the industry level is associated with a lower labor share of income, defined as total labor compensation over sales (figure 6.8). This pattern has implications for inequality because it suggests that the primary beneficiaries of automation are the own-









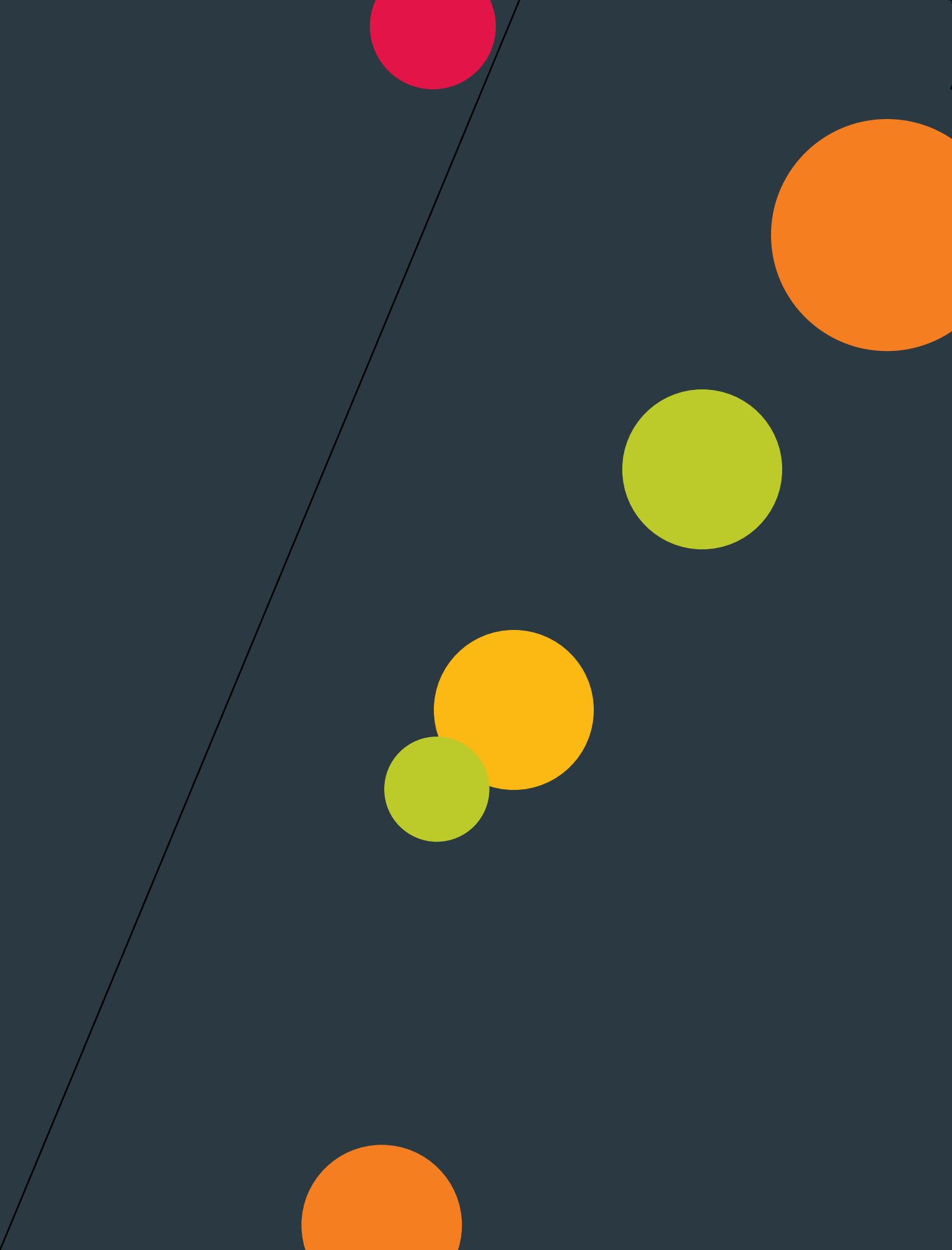
would be much more expensive to import goods produced in developed countries using these technologies. But this does not mean that protectionism stimulates innovation. Instead, it likely prevents efficiency-enhancing specialization across countries.













## Key findings

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They raise the prices of domestic resources relative to imports, thereby deterring international investments in labor-intensive activities and making domestic investors more likely to import capital equipment to substitute for high-priced domestic labor. Historically, countries with competitive or undervalued exchange rates have undergone greater structural change<sup>6</sup>—the experiences of China and the Republic of Korea stand out here. Because overvalued exchange rates are common in 5(tors mor5 ut he)5(a)22(iely r)3(ey monrnaturaa)-5( )ITJ0.055 TwTres





in FDI inflows, for a cost of just \$78 to create one job in the promoted sectors.<sup>12</sup> IPAs can also improve the quality of investments and contribute to economic transformation by exploiting comparative advantage.

is still scope for an international effort to lower tariffs—bilaterally, regionally, or in a multilateral round (chapter 8)—the scope for countries to engage in unilateral liberalization remains substantial.

Tariff schedules that place higher duties on processed goods than on unprocessed goods—a feature

(now Eswatini); and Mauritian investors established





**Map 7.1** Services trade remains restricted in many countries

*Source:* Borchert, Gootiiz, and Mattoo 2014.

*Note:*

countries can take measures unilaterally to promote increased connectivity and cost-effectiveness:

- Rebalance and repurpose trade infrastructure. For many developing countries, particularly in Sub-Saharan Africa, Central Asia, and parts of Latin America, trade infrastructure has been established primarily around extractive sectors. Such infrastructure, built around bulk and direct connections between often rural areas (such as mining locations) and ports, may not be supportive of the environment needed for value chain-oriented sectors, which may require denser, multimodal infrastructure. A study of port costs in South Africa found that, although export charges for mining commodities were well below the global average in 2014, charges for containerized exports were almost twice the global average.<sup>22</sup>
- Improve port infrastructure and governance.<sup>23</sup> There are vast differences between the world's most and least efficient ports in terms of the time it takes to









weaker bargaining power than that of the global lead firms, there is a significant risk that subsidies will amount largely to a transfer of rents to private investors at the expense of social returns. Second, subsidies may distort market outcomes (even when they seek to address a market failure). And, third, subsidies often

linkages many countries employ local content requirements either as conditions for foreign investments or as requirements that foreign investors must meet to access public procurement (box 7.3). In the absence of quality local suppliers, however, such requirements can backfire, restricting investment.



suppressed indefinitely. This scenario is apparent



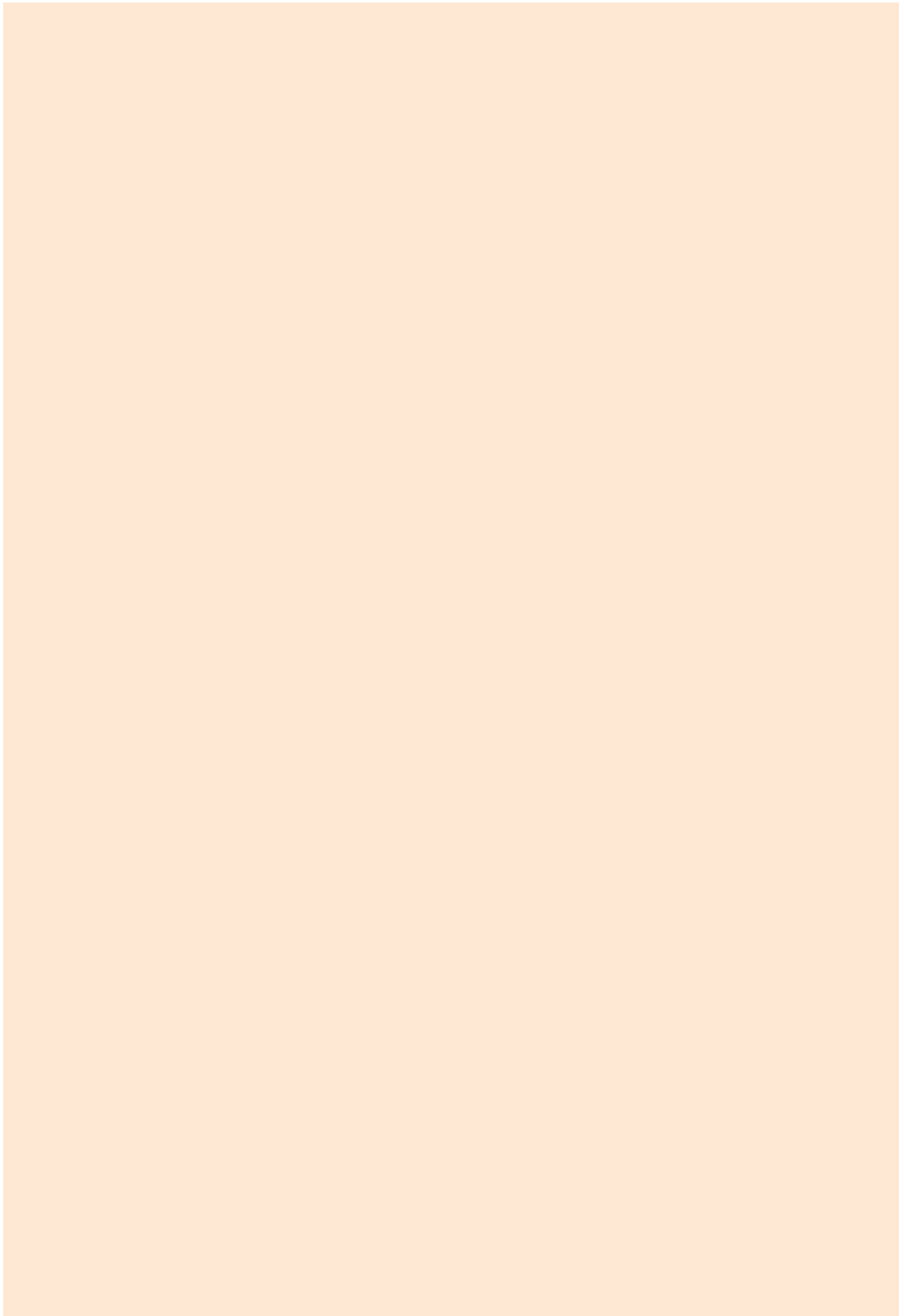
For local SMEs to absorb spillovers from GVC

















state-owned or other domestic firms. One particular area in which services inputs matter is transport and logistics. At this stage of GVC development, trade facilitation becomes more complex and critical, requiring the development of a competitive logistics services sector. Linked to this is the need for high-quality, competitively priced ICT infrastructure and services to help coordinate increasingly complex activities and value chains.

### **Box 7.8** Costa Rica moves into the medical devices GVC

As part of a concerted strategy to upgrade beyond basic light manufacturing exports (notably apparel), Costa Rica

that supports start-ups and SMEs is also essential—many service firms are small start-ups that are “born global.”<sup>62</sup>

Innovation and advanced services GVCs also require a high-quality institutional environment that includes intellectual property rights protection and strong contract enforcement capabilities. They require, as well, policies that support a high-quality and flexible innovation ecosystem, including advanced ICT infrastructure and services; strong academic, private sector, and government partnerships; and a supportive R&D policy that incentivizes collaborative research and development.

## Notes



Black, Anthony, Justin Barnes, and Lorenza Monaco. 2018. "Structural Transformation in the Auto Sector: Industrial Policy, State-Business Bargaining, and Supply Chain Development." Draft Project Report (March 15), Industrial Development Think Tank, Center for Competition, Reg





In and Moving Up: New Industrial Challenges for the Bottom Billion and the Middle-Income Countries. Vienna: UNIDO.  
USAID (U.S. Agency for International Development). 2007.  
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## Key findings

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28 apparel factories. Of the 144 women who attended the training program, 92 were offered a promotion and higher salary within weeks of completing the



levels. Minimum wages also play an important role. Virtually all countries have some minimum wage for regular workers, although it varies dramatically (even considering differences in purchasing power) from just er) from





standards. In recent years, the limitations of unilateral brand initiatives have been addressed somewhat by multistakeholder initiatives that bring together lead firms and suppliers, trade unions, civil society, and, in some cases, national governments. One example is the ILO-IFC Better Work program noted earlier and described in box 8.3.<sup>14</sup>

Despite the success of private and public-private



infrastructure gaps and regulatory barriers prevent the integration of domestic markets.<sup>22</sup>

As a result, the dislocations that come with GVC



harming external competitiveness and in compliance with trade law.<sup>31</sup>

The same policy design could be used for taxing









information on how firms produce is not available.

22. Farole (2013).
23. Dix-Carneiro and Kovak (2017).
24. World Bank (2009).
25. Rodriguez-Pose and Arbix (2001).
26. Austin, Glaeser, and Summers (2018); Hendrickson, Muro, and Galston (2018).
27. IMO (2018a, 2018b).
28. The estimates are based on a price gap analysis that takes as the reference price a calculation of externalities based on detailed country data. This calculation controls for the true comparative advantages for hosting

Know What Workers Want? Manager-Worker Information Asymmetries and Pareto Optimal Working

edited by Don Fullerton and Catherine Wolfram. Chicago: University of Chicago Press.  
Neumayer, Eric. 2001. "Do Countries Fail to Raise Environ-







## Key findings

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in other countries. International cooperation can help address the policy spillovers and achieve better development outcomes in several ways.

First, because the costs of protection are magnified when goods and services cross borders multiple times, the gains from a coordinated reduction of barriers to trade are even larger for GVCs than for standard trade. Because foreign investment and GVCs are inextricably linked, creating an open and secure climate for















counterfeit imports; and rules to establish the origin of products needed in applying trade preference programs and PTAs. Both WTO and PTA disciplines ensure that traders know what the rules are and



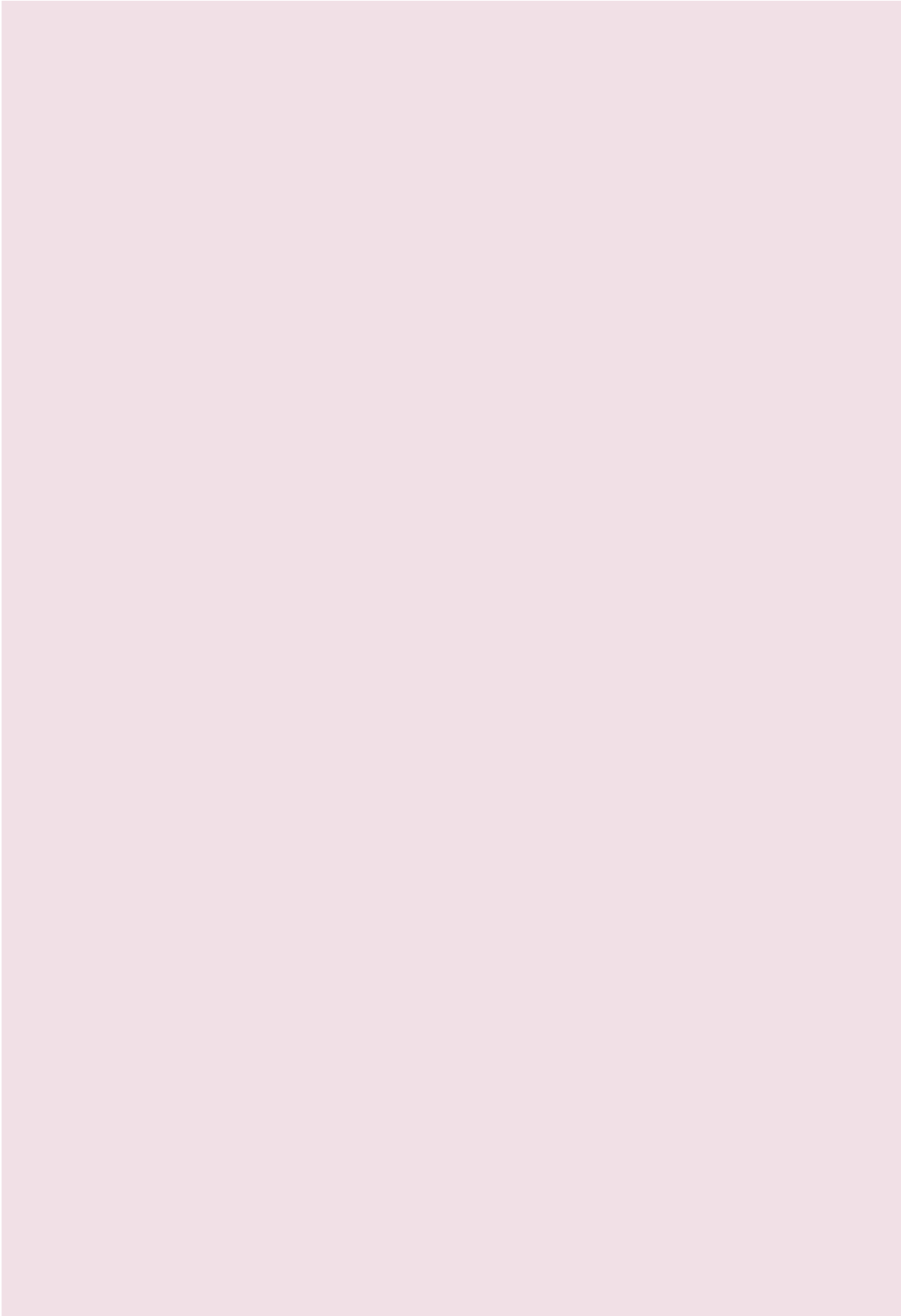
What types of subsidies generate the greatest adverse effects for other countries and for the trade system?

the Chinese economy has resulted in a substantial

*Substantive disciplines*

such as OECD and the Asia-Pacific Economic Cooperation forum.

Deep integration agreements can fill some of the



**Box 9.3** The impact of Brexit on GVC trade *(continued)*









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“Trading Off a ‘Soft’ and ‘Hard’ Brexit.” VOX CEPR  
Policy Portal, January 23, Centre for Economic Policy

## Key findings

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## Regulation

In the conventional producer-centric view, regulatory cooperation is a complement to liberalization. In the alternative consumer-centric view, regulatory cooperation is a precondition for liberalization. Both are important in facilitating the operation of GVCs.





In 2016 the United States and the European Union concluded the Privacy Shield—an arrangement that the EU Commission has deemed “adequate” under the EU Data Protection Directive—thereby enabling the transfer of personal information from the European Union to U.S. participating businesses.<sup>48</sup>



benefits accruing to participants at another stage of production. The cross-border nature of GVCs means that restrictive practices often also have a cross-border dimension. For example, in 2009 the South African Competition Commission detected a cartel among four large cement producers involving market allocation and price-fixing in South African provinces as well as in Botswana and Namibia. Since the cartel was broken up, prices and margins for downstream firms in the region have declined by 7.5–9.7 percent.<sup>55</sup> In 2015 Colombia's Superintendence of Industry and Commerce fined 12 sugar mills, 14 individuals, two companies, and three business associations a total of \$91 million for agreeing to prevent sugar imports from Bolivia, Costa Rica, El Salvador, and Guatemala and for allocating clients.<sup>56</sup> Food processing associations in Colombia had reported sugar overcharges of 45 percent<sup>57</sup> affecting food value chains and confectionary exports that account for 13 percent of overall food exports.<sup>58</sup>

In 2016 the European Commission prosecuted a cartel case against major European truck producers that had colluded on pricing and the timing to introduce new emissions technologies—and had agreed to pass on the cost of such systems to buyers.<sup>55</sup>









the Eastern Caribbean Telecommunications Authority (ECTEL), the world's first regional telecommunications authority. Although the member countries retained their sovereign power over licensing and regulation, ECTEL provides technical expertise, advice,

### **Box 10.1** International cooperation on transport infrastructure

Of the many examples of international cooperation on

are two sets of checks: one for exit and one for entry. The same is true for goods, but the delays tend to be even longer than those for people because of complex regulations and taxes that differ across products and

## Notes

1. This section is on direct taxation. GVCs also pose chal-









Simpson Thacher. 2019. "2018 Global Cartel Enforcement Report." January, Simpson Thacher, New York. <https://www.stblaw.com/docs/default-source/Publications>

Country-specific and firm-level databases are used in some chapters.

**China Customs Statistics**

**ENAPROCE (Mexico)**

The National Survey on Productivity and Competitiveness of Micro, Small and Medium Enterprises



**TIVA**

The Trade in Value Added (TiVA) database, compiled by the Organisation for Economic Co-operation and Development (OECD), considers the value added by each country in the production of goods and services that

**Women, Business, and the Law**

Women, Business, and the Law is a World Bank Group project collecting unique data on the laws and regulations that restrict women's economic opportunities. The data offer objective and measurable benchmarks for global progress toward gender equality and cover 187 economies over the period 2009–18.

<https://datacatalog.worldbank.org/dataset/women-business-and-law>







**GVC participation (or integration).**



ECO-AUDIT

*Environmental Benefits Statement*

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