



## Consequences for development

### Key findings

- **Hyperspecialization and durable firm-to-firm relationships promote efficient production and the diffusion of technology, as well as access to capital and inputs along value chains.** The result is increased productivity and income growth—more so than what countries achieve through domestic production but also than what they achieve through trade in finished goods.
- **How countries participate in global value chains (GVCs) matters for the impact on development.** Countries experience the biggest growth spurt during the transition out of commodities into basic manufacturing activities.
- **GVCs deliver more productive jobs, primarily through scale effects that result from increased productivity and expanded output.** Because they boost income and productive employment, participation in GVCs is associated with reduced poverty.
- **The gains from GVC participation are not distributed equally across and within countries.** Inequalities arise in the distribution of firm markups across countries; in the distribution of capital and labor, between skilled and unskilled workers as well as between male and female workers; and geographically within countries.
- **The expansion of GVCs has magnified the challenges facing the international tax system.** The tax revenue losses from profit shifting and tax competition are substantial, particularly for lower-income countries.

Bangladesh is a powerful example of how participation in global value chains (GVCs) has supported economic growth and structural change. In 1988 Bangladesh's exports of apparel and footwear were negligible, accounting for less than 1 percent of the global total. Since then, the business of exporting apparel made from imported textiles has grown on average by nearly 18 percent a year. Bangladesh now exports 7 percent of the world's apparel and footwear—third only to China (which increasingly sources from Bangladesh) and Vietnam.<sup>1</sup> The sector accounts for 89 percent of the country's exports and 14 percent of GDP, and it employs 3.6 million workers, 55 percent of them women.<sup>2</sup> Diversification is also under way. The plastics sector has benefited from complementarities with the ready-made garment sector because garments are enclosed in plastic packaging. Leather goods and footwear are growing rapidly (second-largest export category). Meanwhile, agriculture's share of GDP fell from 70 percent in 1988 to 38 percent in 2018, and the share of people in extreme poverty from 44 percent to 15 percent in 2016.<sup>3</sup>

Navigating globalization has been challenging. Low wages drive Bangladesh's export success, and in the past 30 years there has been little upgrading to better-paid tasks. Demands for higher wages in the factories recently spilled into social unrest in the streets in the form of strikes and protests.<sup>4</sup> Tragic incidents, such as the April 2013 collapse of the Rana Plaza building in Dhaka and the garment factory it housed, where 1,134 lives were lost, highlighted the poor safety conditions in some parts of the value chain, particularly in the more peripheral but numerous contractor factories. Moreover, unplanned growth of the sector has strained scarce land resources as well as water resources—the sector consumes nearly twice as much water as the entire population of the capital, Dhaka, and groundwater levels are dropping at more than 2 meters a year.

The relational nature of GVCs may help gradually to mitigate these problems. Large, formal exporters in GVCs tend to pay well and offer safe conditions, unlike the less visible subcontractors further up the value chain. But because those suppliers are associated with global brands, poor working conditions, safety and environmental concerns, and worker dissatisfaction have captured the attention of global consumers and civil society, who are urging improvement. With the support of donors and in coordination with local public institutions, some international buyers have ramped up monitoring of indirect suppliers and undertaken a series of initiatives to improve the governance of the value chain, together with social and environmental practices. Among others, they have begun to enforce

better fire, building, and worker safety, and they have taken steps to reduce water waste and environmental damage.<sup>5</sup> In response to demands from international buyers, and learning from international best practices, Bangladeshi producers are increasingly recognizing that they must not only improve their practices, but also ensure that improvements can be independently verified by third parties.

Is Bangladesh an isolated experience? This chapter examines whether GVC participation promotes development beyond what countries can achieve through standard trade, or whether it makes the development path harder. It considers cross-country evidence, but also dives deeper into firm-level evidence from a few countries—especially Ethiopia, Mexico, and Vietnam—to demonstrate the complexities of GVC participation. The evidence indicates that the challenges, opportunities, successes, and failures of Bangladesh reflect how other countries are forging their development path in a GVC world. However, their outcomes are also shaped by national choices about policies, institutions, and other factors.

GVCs support productivity gains and income growth because of their two defining characteristics: long-term firm-to-firm relationships and hyperspecialization in specific tasks. In cross-country studies, a 10 percent increase in the level of GVC participation is estimated to increase average productivity by close to 1.6 percent and per capita GDP by 11–14 percent—or much more than the 2 percent income gain from increasing trade in products fully produced in one country by a comparable amount.

In GVCs, domestic firms become interdependent with foreign firms that share know-how and technology with their buyers and suppliers. Because of hyperspecialization, exporting no longer requires mastering the entire production process of a good; countries can specialize in only a few tasks in the production process. For these two important reasons, firms in developing countries that participate in GVCs tend to be more productive, and all forms of GVC participation are associated with higher income growth than standard trade. The biggest growth spurt, however, comes when countries such as Bangladesh, Cambodia, and Vietnam break out of commodities or agriculture into basic manufacturing. Empirical evidence suggests that within three years of joining a manufacturing GVC, a country is more than 20 percent richer on a per capita basis.

Alongside the productivity and income gains, GVCs deliver more and better jobs. Production is more capital-intensive, perhaps because machines allow production on a large scale and can deliver the precision

required for compatible parts. Because of the greater reliance on machinery, GVC exports require fewer units of human work per unit of production compared with non-GVC exports. But the overall effects on employment in the relevant firms and sectors have been positive because of the large boost to exports. The new activities that GVCs bring to countries pull workers out of less productive tasks and into more productive manufacturing jobs. Between 2000 and 2014, for example, the labor force of Ethiopian firms that became importers and exporters—a measure of GVC participation—grew by 39 percent relative to when they were nontraders, despite the fact that they also utilized 145 percent more capital per worker than nontrading firms.

GVC firms also tend to employ more women than other firms, improving their livelihoods and those of their families. In Bangladesh, for example, young women in villages exposed to the GVC-dominated garment sector delay marriage and childbirth, and young girls gain an additional 1.5 years of schooling.

By boosting income and employment growth, GVC participation also reduces poverty. Because economic growth and employment gains from GVCs are larger than from conventional trade, poverty reduction from GVCs can also be expected to be larger than that produced by such trade.

GVCs, however, create some challenges. First, the gains from GVC participation may be distributed unequally within and across countries. Large corporations that outsource parts and tasks to developing countries have seen an increase in markups, suggesting that cost reductions are not being passed on to consumers.<sup>6</sup> At the same time, markups for the producers of these inputs in developing countries are declining. So, too, is the share of income accruing to labor in both developed and developing countries. Technological change and higher markups reallocate value added from labor to capital within countries. Inequality can also arise within the labor market, with growing premiums for skills. Women are generally employed in lower-value-added segments, and women owners and managers are largely missing in GVCs. Inequality has a geographic dimension too, with GVCs concentrated in urban agglomerations and in border regions for countries neighboring GVC partners.

Second, in some countries and sectors, firms could be stuck in dead-end tasks with few opportunities to innovate, upgrade, and diversify. The skill mix of the domestic workforce, the organization and governance of some value chains, and the nature of certain technologies may not favor the process of learning and innovation typical of relational GVCs.

Finally, GVCs do not cause tax avoidance and tax competition, but their evolution has magnified the challenges facing the international tax system. The growth of intangibles in global business and the digital delivery of services are further exacerbating a preexisting problem. Moreover, in GVCs that involve affiliates of the same firm, fragmentation of production also leads to greater intrafirm trade and more opportunities for tax avoidance by manipulating where profits are recognized for tax purposes. The tax revenue losses from profit shifting are substantial, and they are particularly large for developing countries. In 2013 non-OECD (Organisation for Economic Co-operation and Development) countries missed out on \$200 billion in tax revenue as a result of this practice.

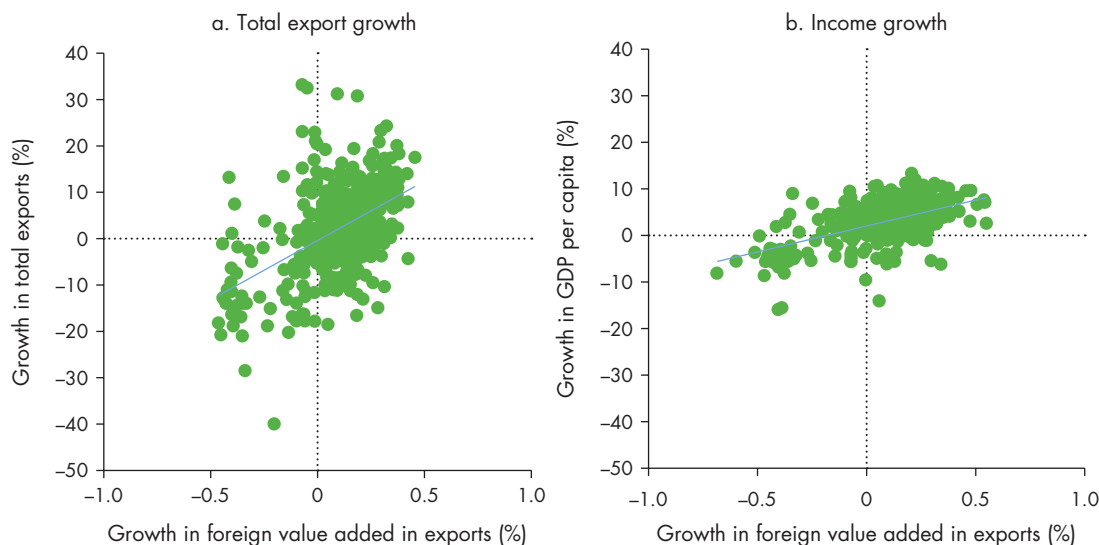
Policy intervention is important to address the challenges, attenuate the costs, and share the benefits of GVC participation. Although GVCs have been able to drive pro-poor growth over the past 30 years, with the steepest declines in poverty occurring in precisely those countries that became integral to GVCs, only additional efforts can pull the remaining 2 billion people out of poverty without exceeding environmental limits. The policy chapters of this Report discuss these considerations in detail.

## Economic growth

Trade openness and GVC integration are contributing to better economic performance (figure 3.1).<sup>7</sup> The rise of GVCs has generated even greater income gains than a commensurate expansion of traditional trade.<sup>8</sup> These gains stem from the productivity effects of GVCs. Figure 3.2 depicts the positive association between growth in manufacturing productivity and growth in GVC participation. Backward participation in GVCs is particularly important—a 10 percent increase in the level of GVC participation increases in turn average productivity by close to 1.6 percent.<sup>9</sup>

Because GVCs are a firm-level phenomenon, the greater productivity gains are attributable to firms becoming more productive. In the cashew value chain in Mozambique, for example, processors for international brands introduced new semiautomatic equipment that increased capacity, reduced costs, and boosted productivity.<sup>10</sup> Firm-level empirical evidence supports the association of GVC participation with higher productivity observed in cross-country data and anecdotally. Firm-level data can identify the set of firms in a country that participate in trade, further distinguishing between firms that export, firms that import, and firms that both export and import. When a given firm in a country both imports and exports,

**Figure 3.1** GVC participation is associated with growth in exports and incomes



Source: WDR 2020 team, using data from World Bank's WDI database. See appendix A for a description of the databases used in this Report.

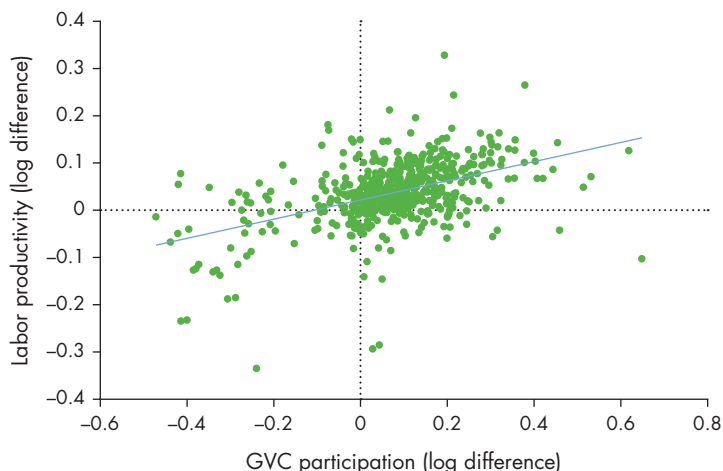
Note: Each dot is a country-year observation. In both panels, the x-axis is the average annual growth in foreign value added in exports between 1990 and 2015. In panel a, the y-axis is the average annual growth in total exports between 1990 and 2015. Total export growth includes exports of goods and services. In panel b, the y-axis is the average annual growth in per capita GDP in purchasing power parity terms between 1990 and 2015. *R*-squared is 0.73 for total export growth and 0.25 for GDP per capita growth.

the likely conclusion is that this firm participates in GVCs. In Ethiopia and across a large sample of countries, GVC firms in manufacturing show higher productivity (labor productivity, controlling for capital intensity) than one-way traders or nontraders (figure 3.3). Firms that both import and export are 76 percent more productive than nontrading firms, compared with a 42 percent difference for export-only firms and a 20 percent difference for import-only firms.<sup>11</sup> In Vietnam, this relationship holds across firms in all sectors: manufacturing, services, and agriculture alike.

Intuitively, there are two complementary explanations for higher growth and productivity. First, GVCs allow countries to benefit from the efficiency gained from a much finer international division of labor. GVCs exploit the fact that countries have different comparative advantages not only in different sectors, but also in different stages of production within sectors. By breaking up complex products, GVCs allow countries to specialize in specific parts or tasks of production, escaping domestic supply and demand constraints. China's "Button Town," where hundreds of factories produce more than 60 percent of all buttons on Earth, is an extreme example.<sup>12</sup>

Second, growth and productivity gains stem from better access to a greater variety of higher-quality or less costly intermediate inputs.<sup>13</sup> In traditional trade, where products cross borders only as finished products, greater openness to imports entails greater

**Figure 3.2** GVC participation is associated with growth in productivity

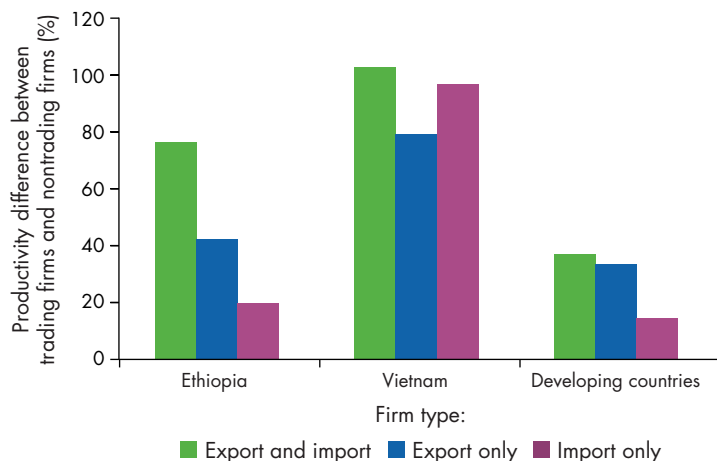


Source: Constantinescu, Mattoo, and Ruta 2019.

Note: Each dot represents a country-year combination for 1995–2009. GVC participation is measured as the sum of the foreign value added embodied in a country's gross exports (backward linkages) and the country's domestic value added embodied in other countries' gross exports (forward linkages). Labor productivity is computed as the real value added divided by the number of persons employed in manufacturing (excluding petrochemicals). *R*-squared is 0.22.

competition for domestic producers. In GVC trade, openness also increases imports of intermediate inputs, and domestic firms using those inputs observe positive effects on their productivity. Because of these mechanisms, export growth can be expected to raise domestic income and employment even when exports

**Figure 3.3 Firms that both export and import are more productive**



Sources: Ethiopia: Choi, Fukase, and Zeufack (2019), based on 2000–2014 manufacturing census (firms with 10 or more employees). Vietnam: WDR 2020 team, based on 2014 Enterprise Surveys (firms with more than five employees). Developing countries: WDR 2020 team, based on World Bank's Enterprise Surveys (sample of 81 developing countries).

Note: The figure reports the percentage difference in productivity between nontrading firms and (1) firms that both export and import or (2) firms that only export or (3) firms that only import. The results are obtained by regressing firm labor productivity (log sales per worker) on dummy variables marking the type of firm (export and import, export only, or import only), controlling for log capital per worker and fixed effects. The Ethiopia estimation controls for sector, year, and region fixed effects, as well as for whether the firm is state owned. The Vietnam estimation controls for sector and region fixed effects as well as for whether the firm is state- or foreign-owned. The developing countries estimation controls for country-sector, subnational region, and year fixed effects. All coefficient estimates are statistically significant. The percent differences reported in the graph are obtained as 100 multiplied by the exponential of the coefficient estimates minus 1.

have lower domestic content (discussed shortly).<sup>14</sup> Reinforcing this productivity enhancement is the fact that exporting to the global market allows for greater economies of scale.<sup>15</sup>

These observations are consistent with empirical findings. Increasing direct and indirect exports and imports of goods, services, parts, and components produced through GVCs has been associated with much larger per capita income growth than other forms of trade openness (box 3.1).

### Relational GVCs are a vehicle for technology transfer

It is well accepted that real income grows when episodes of trade liberalization boost the diffusion of new technology.<sup>16</sup> Those positive effects are even greater in relational GVC trade. As observed in chapter 1, in contrast to “standard” trade carried out in anonymous markets, GVCs typically involve longer-term firm-to-firm relationships. This relational nature of GVCs makes them a particularly powerful vehicle for technology transfer along the value chain. Firms have a shared interest in specializing in specific tasks, exchanging technology, and learning from each other.

Interdependent firms may share know-how and technology with suppliers because such sharing boosts their own productivity and sales, leading to faster catch-up growth across countries. Unlike in traditional trade in which firms in different countries compete, GVCs are networks of firms with common goals. Those goals include minimizing the costs of production or maximizing the profits of the entire production chain of which they are part.<sup>17</sup> Downstream firms typically benefit when their suppliers become more productive and vice versa. A direct implication of this simple observation is that firms from countries specializing in innovation-intensive GVC tasks might find it beneficial to share process and product innovations with their GVC coparticipants specializing in simple or advanced manufacturing and services GVC tasks. Furthermore, the stickiness—or long-term nature—of relational GVCs makes firms particularly prone to benefit from learning-by-importing and learning-by-exporting through repeated interactions with highly productive firms at the global frontier of knowledge.

In Kenya, South Africa, and Uganda, for example, improved processes in horticulture were induced by demand for higher quality and sourcing requirements by global and regional supermarket chains, allowing in turn diversification and higher yields of fresh fruit and vegetable exports.<sup>18</sup> In Kenya, incomes increased after contract farmers adopted the quality standards demanded by their international buyers, and these firms supported better traceability of the product along the entire supplier network.<sup>19</sup>

Trade between firms engaging in GVCs has characteristics very similar to those of intrafirm trade because external international sourcing requires the same high levels of coordination, intense bilateral information flows, and harmonization and integration of many business services as intrafirm internationally fragmented production.<sup>20</sup> In the coffee value chain in Costa Rica, trade transactions conducted within integrated firms (intrafirm) and those conducted within long-term relationships with other firms (interfirm) are similar to one another but starkly different from trade transactions conducted between anonymous firms.<sup>21</sup>

Additional empirical evidence supports the hypothesis that firms in GVCs work toward common goals. A 2018 survey of 1,476 apparel, textile, and information and communication technology (ICT) firms in Ethiopia and Vietnam found that the probability of a buyer providing its suppliers with some form of assistance is greater in strongly relational GVCs—that

### Box 3.1 Dynamic estimations of the relationship between GVC participation and per capita income growth

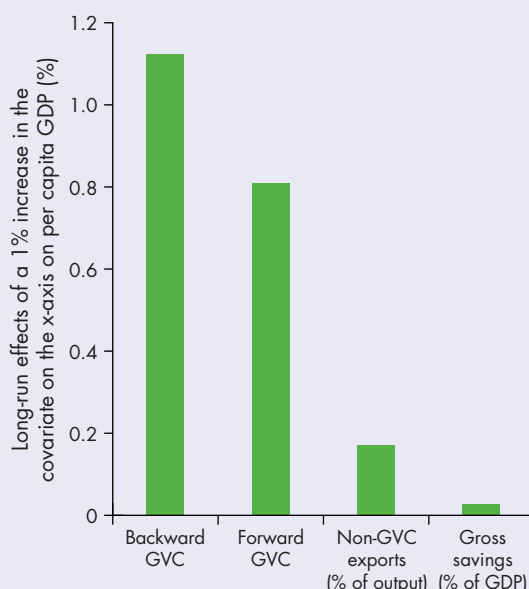
Growth regressions have been estimated for a panel of 100 countries across income groups for the period 1990–2015. A standard Solow growth model was augmented with measures of GVC participation. Specifically, the log GDP per capita was regressed on its lagged value, a vector of the standard determinants of growth, and measures of backward and forward GVC participation. To reflect the dynamic nature of growth, the equation was estimated in a dynamic panel setting, through a System Generalized Method of Moments (System-GMM).

A 1 percent increase in GVC participation is associated with a more than 1 percent increase in per capita income in the long run. The point estimates of the relationship are reported in figure B3.1.1.

The estimation is robust to various statistical tests, including reverse causality, diagnostic tests for weak instruments, and those for the strength of the chosen instruments.

The difference in coefficients for backward and forward GVC integration suggests that the development impact for a commodity producer integrated in GVCs only through forward linkages is much lower than that for a country producing intermediate inputs, which benefits from both forward and backward linkages.

**Figure B3.1.1** GVC trade is associated with larger per capita income than non-GVC trade



Sources: WDR 2020 team, using data from World Bank's WDI database.

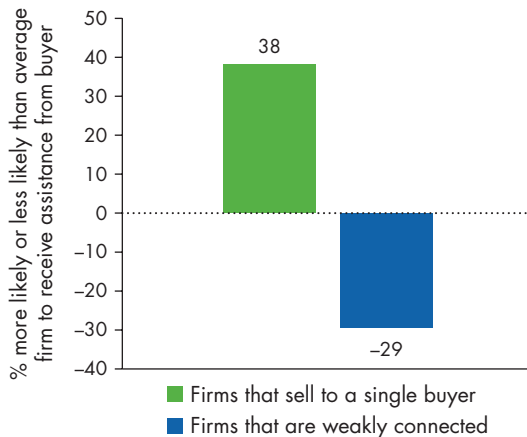
is, firms selling exclusively to a single buyer are 38 percent more likely to receive assistance than firms with a diversified client base. Firms without strong relationships are 29 percent less likely to receive assistance from a client (figure 3.4). The survey also asked about know-how assistance specifically: firms selling exclusively to a single buyer are 34 percent more likely to receive know-how than firms with a diversified client base, while firms without strong relationships are 31 percent less likely. Lead firms may be more willing to share knowledge and know-how that benefit the supplier firm if they believe those benefits will not be passed on to other buyers. The survey also shows that suppliers' main support from their foreign partner is in capacity building, which may help firms overcome skill constraints.

Through firm-to-firm relationships, GVC firms can also play an important role in on-the-job learning, and employer-sponsored training within GVCs can be an effective mechanism for skill development, economic

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>22</sup> A case study of the impact of a Japanese multinational company on skilled labor in Malaysia shows that the integration of the subsidiary's production network into its GVC spurred greater needs for skill development, particularly in management and engineering services.<sup>23</sup> The development implications of GVC firm efforts in the on-the-job training in supplier companies are of primary importance: employer-sponsored training is the most important source of further education in OECD countries, and it is more effective than both government-financed active labor programs and training self-financed by employees.<sup>24</sup>

Buyer support can take other, sometimes surprising, forms. For example, Samsung, which in 2018 employed 160,000 people in Vietnam to produce its Galaxy smartphones, is trying to build a stronger local supplier base—not only through its own initiative, but

**Figure 3.4 GVC firms with relationships receive more assistance**



Source: WDR 2020 team, using data from a 2018 survey of 1,476 apparel, textile, and information and communication technology firms in Ethiopia and Vietnam.

Note: Survey question: "Is any type of assistance—financial, technology, know-how, or material assistance—provided by the largest client?" The survey further asks the respondent to characterize the largest client. *Single buyer* is a variable that takes the value of 1 for firms whose total sales (100 percent) are to a single client. Finally, the survey asks respondents to identify their "GVC connectedness." A *weakly connected firm* is a firm with no direct linkages to GVCs. The variable takes on a value of 1 when a firm is not connected to the industry leader as either buyer or supplier, and it does not participate in exporting activity or in trade with foreign entities directly or indirectly through intermediaries. The regressions control for country, sector, and size fixed effects. All coefficient estimates are statistically significant.

also by pushing its suppliers from other countries to help in the effort and instructing them to train local firms in customizing production to Samsung's needs. Sometimes, lead firm involvement benefits the wider educational system of the host country. For example, Synopsys, one of the world's leading companies in chip design and testing, established a presence in Armenia. Today, Synopsys is one of the largest information technology (IT) employers in the country, with 800 employees—mostly engineers—in Yerevan. With the goal of preparing qualified microelectronics specialists, it initiated bachelor's, master's, and PhD programs at both its own educational centers and five Armenian universities.

In the agri-food sector, long-term relational contracts can also be beneficial by helping improve connectivity, provide better access to technology and capital inputs that increase quality and yield for local producers, achieve higher and more stable prices for farmers, lead to new managerial practices, and achieve a better reputation. Recent research has investigated the effects of becoming a supplier to multinational corporations (MNCs) using administrative data tracking all firm-to-firm transactions in Costa Rica.<sup>25</sup> Estimates from event studies reveal that after starting to

supply MNCs, domestic firms experience strong and persistent improvements in performance, including gains in total factor productivity (TFP) of 6–9 percent four years later. Moreover, the sales of domestic firms to buyers other than the first MNC buyer grow by 20 percent through both a larger number of buyers and larger sales per buyer.

The relational nature of GVCs does not automatically result in technology transfer, however. Lead firms can use relational dependence to prevent technologies from spilling over from their supplier network to potential competitors. As a result, new capabilities may be especially difficult to gain when lead firms in GVCs tightly control their technology.

In the car industry, where production is complex, lead firms maintain control over the supply chain, and the technology is not easily diffused. Brands systematically coordinate production from start to finish, and incentives for suppliers to innovate, upgrade, and diversify into new market opportunities are relatively weak.

Recent research from the mining industry has similarly shown that the hierarchical form of governance typically prevailing in the mining sector has often served as an obstacle to learning and innovation.<sup>26</sup> Though the industry is evolving, rarely do mining companies forge long-term formal links with local suppliers or collaborate with them on innovation projects. When new technological challenges arise that offer new technological opportunities for the mining industry in developing countries, they rely on solutions from their headquarters abroad or international suppliers to the disadvantage of their new local suppliers (box 3.2).

The extent to which a GVC relationship supports the growth potential of GVC participants from developing countries is therefore likely to be determined by a multitude of factors. The sensitivity and value of the intellectual property embedded in a lead firm's relationship with its suppliers, technical dependence, codification of transactions, the complexity of both the product and the value chain, and the technical and managerial competence of suppliers all converge to determine suppliers' upgrading opportunities.<sup>27</sup>

### How countries participate in GVCs matters

Because of the forces just described, how countries participate in GVCs matters. Backward participation and forward participation drive the positive association between GVC participation and growth in per capita GDP. Inputs that are high in services content—a proxy for knowledge-intensive products—and exports that are high in domestic manufacturing content

have the strongest associations with per capita GDP growth. Meanwhile, trade in unprocessed agricultural goods and commodities has no systematic and statistically significant relationship with growth in per capita GDP.

Countries such as Bangladesh, Cambodia, and Vietnam leveraged GVCs to move out of commodities into basic manufacturing activities and experienced large growth spurts during this transition. Firms in GVCs contribute to their country's economic transformation

### Box 3.2 Mining GVCs: New opportunities and old obstacles for local suppliers from developing countries

Mining activities are no longer always organized as huge, vertically integrated (multinational) corporations. The shift toward focusing on core activities while outsourcing and subcontracting many others is surfacing in this sector and allowing for the emergence of relational GVCs. Lead companies in mining GVCs must contain costs, and so their activities have become more knowledge-intensive. They are increasingly searching for *local* innovative solutions from *local* firms to problems such as falling ore grades, falling productivity, rising production costs, exposure to local labor and environmental disputes, and the challenges of extreme geographical conditions such as in Bolivia, Chile, and Peru, where mines are operated at high altitudes, in narrow veins, and in very dry climates.

Mining companies are relying on local suppliers not only for simple intermediate products, but also increasingly for knowledge-intensive ones. According to recent research, scientific advances and new forms of innovation have opened new technological opportunities for the mining industry in developing countries.<sup>a</sup> These include revolutionary advances in information and communication technologies, computer vision systems, satellites and other remote sensing applications, advances in molecular and synthetic biology for bioleaching (extracting heavy metals from minerals with living organisms), and bioremediation of pollutants for copper and gold. It is precisely these and similar advances that open opportunities for new suppliers to access and add value to mining value chains.<sup>b</sup>

That said, the organization and governance of the value chain do not appear to favor learning and innovation by mining suppliers, as sometimes happens in other sectors.

The hierarchical form of governance typically prevailing in the mining sector has often proved to be a true obstacle.<sup>c</sup> Information is highly asymmetric; power between the lead mining companies or buyers and their (local) suppliers is unbalanced; and many other market imperfections and failures affect transactions along the value chain. As a result, the demand for locally and sometimes even internationally provided suppliers is not easily fulfilled.

Can public policies help? The World Class Supplier Program in Chile attempts to do so by matching demand and supply with an open innovation approach, but it has had mixed results thus far.<sup>d</sup> Public intervention can help address other obstacles, particularly when these require a long-term commitment or do not happen because of coordination failures. An example of a long-term commitment is developing the skills required by the mining industry, while an example of the coordination required is bringing together the many different stakeholders. In the mining industry, the latter is an important obstacle because many actors beyond the mining industry must concur to create the enabling environment needed for firms to thrive. These actors range from local communities in the mining regions to water and energy interests, education and training institutions, and regulatory institutions—notably, those dealing with the environment.<sup>e</sup> Most important, time is of the essence for this sector. Technology is hardly modifiable once in use, and the opportunities for local firms to meet mining firms' demands and become suppliers can be generated only in the early stages of extraction process design and implementation. Once exploitation is under way, opportunities for developing country producers may shrink.

Source: Prepared by Carlo Pietrobelli, Roma Tre University and UNU-MERIT, drawing on Pietrobelli and Olivari (2018).

a. Pietrobelli, Marin, and Olivari (2018).

b. For example, in Chile the company Micomo has developed highly innovative monitoring technologies that assist the extraction process through fiber optics. Power Train has entered the market with new remote-control systems for trucks operating at high temperatures and with wireless monitoring systems that predict where crucial equipment will wear and have to be replaced, thereby preventing stoppages. In Brazil, Geoambiente has developed sophisticated geological maps, sensors, and radar images that help in the exploration phases, predicting the contents of minerals or areas prone to erosion in order to monitor environmental impacts. This company is now Google's largest partner in Brazil. The use of new materials is also revolutionizing the industry. For example, Verti in Brazil has developed dust suppressors that run on excess glycerin from biodiesel plants. Meanwhile, Innovaxxon in Chile has applied new approaches to mechanical, robotic, and electrical engineering to substantially reduce the waste generated in copper mining.

c. Pietrobelli, Marin, and Olivari (2018).

d. Navarro (2018).

e. Katz and Pietrobelli (2018).

by becoming suppliers of materials and components to a global buyer. Previously only marginally and intermittently involved in exporting or importing, these firms now source foreign goods and services to process and reexport as part of a global buyer's value chain. During this initial phase of manufacturing engagement, domestic per capita income grows steeply, reflecting firms' learning of new processes and capabilities, access to large-scale international demand, and inflow of know-how and technology from GVC partners.<sup>28</sup>

Productive firms drive the transition from limited to advanced GVC participation in manufacturing and services by growing in sophistication and size. They adopt a more complex production structure and improve managerial practices. They hire more workers in nonproduction functions, including in supply chain management, product development, ICT, and professional services. They become more capital- and data-intensive, and also tend to expand middle-management functions to handle the bigger scale of operations and the growing complexity. In this enhanced phase, relation-specific feedback loops with GVC partners become more relevant. Success requires not only continued access to markets, capital, and opportunities, but also learning more cutting-edge technologies and skills.<sup>29</sup>

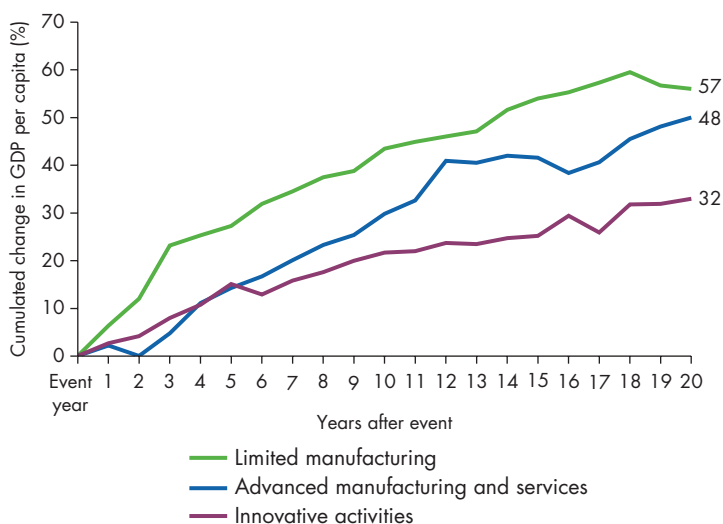
Consistent with these observations, regression results reveal that from 1990 to 2015 cumulative per

capita GDP growth was largest for countries as they moved away from being commodity or agriculture suppliers and relatively closed to foreign inputs and began to build international linkages in simple manufacturing GVC tasks—that is, “limited” manufacturing GVCs (figure 3.5 and box 3.3). In the first year after entering limited manufacturing GVCs, countries' GDP per capita is 6 percent higher than in the year of entry. In the first year after entering advanced manufacturing and services GVCs their GDP per capita is 2 percent higher. And in the first year after entering innovative tasks of GVCs, they are 3 percent higher. However, there are diminishing—and even negative—returns in staying indefinitely in this phase of development. Higher rates of growth can be sustained by transitioning into advanced manufacturing and services, and then into innovative activities. The Czech Republic, which upgraded from limited to advanced manufacturing and services in 2000 and then to innovation in 2012 (see chapter 2) is now the most productive economy in Eastern Europe and the OECD country with the lowest share of population having a disposable income below the poverty line (measured as 60 percent of median household income). The economy is thriving. Growth is balanced. Internal demand and household consumption are strong, supported by both per capita income growth and private investment. Finally, the unemployment rate has steadily declined since the country's accession into the European Union (EU) in 2004, and it is now below 3 percent, one of the lowest rates in the OECD.

What does this all mean for countries' industrialization options? It is well understood that GVCs can facilitate industrialization by reducing the range of “capabilities” required to produce and export industrial goods. For example, in the auto industry countries can participate through GVCs even when they do not have any domestic car makers or any domestic provider of car engines.

But more sophisticated tasks in value chains require skills and capabilities that many developing countries lack. As a general rule, learning to handle simple products and production processes is likely to be easier than acquiring the capabilities to transition from simple production tasks to specializing in intangible capital and breaking into new industries. The wrong skill mix could end up providing few opportunities to innovate, upgrade, and diversify after new GVC ties with international partners are created. Suppliers may find it difficult to upgrade beyond a certain task complexity because doing so may require an ability to handle growing firm size and more sophisticated management, sourcing, and learning strategies.<sup>30</sup>

**Figure 3.5 GDP per capita grows most rapidly when countries break into limited manufacturing GVCs**



Sources: WDR 2020 team, using data from the World Bank's WDI database and the GVC taxonomy for 1990–2015 based on Eora26 database.

Note: The event study quantifies the cumulated change in real GDP per capita in the 20 years following a switch from a lower to a higher stage of GVC engagement. See box 3.3 for the methodology.

### Box 3.3 Assessing outcomes of GVC participation using event studies

Event studies are used in this chapter and in chapter 5 to quantify the changes in outcomes in the 20 years following a switch from a lower to a higher stage of GVC engagement. Based on data for 146 countries over the period 1990–2015, four types of GVC engagement were identified: (1) commodities, (2) limited manufacturing, (3) advanced manufacturing and services, and (4) innovative activities (see box 1.3 in chapter 1 for a detailed description).

The event study involves computing average within-country deviations in a given outcome in each year following the year of a transition for all countries that stay at least four years in a particular GVC engagement stage, had one transition toward a more advanced GVC engagement stage, and had no transitions back to a lower stage.

The econometric specification is expressed as

$$\ln(\text{outcome variable}_{it}) = \alpha_0 + \sum_{n=1}^{20} (\delta_{t+n}^{\text{switch}}) + \delta_t + \delta_i + e_{it}$$

where the outcome variables are real income per capita (in logarithms); employment, aggregated and by skill level

(in logarithms); inequality as measured by the Gini coefficient; \$5.50 per day poverty share; and CO<sub>2</sub> emissions (kilograms of CO<sub>2</sub> per \$1 of GDP at 2011 values, purchasing power parity-adjusted).

The explanatory variable,  $\delta_{t+n}^{\text{switch}}$ , is a vector of dummy variables taking a value of 1 in the  $n$ th year after a transition to a more advanced GVC engagement stage and 0 otherwise;  $\delta_t$  and  $\delta_i$  are time and country fixed effects to control for conditions in different calendar years and in different countries, respectively; and  $e_{it}$  is the error term. The analysis quantifies the effect of transitions into limited manufacturing GVC participation (“limited”), into advanced manufacturing and services GVC participation (“advanced”), and into innovation GVC participation (“innovation”). The estimated coefficients on each dummy variable are multiplied by 100 to give the percent change in the outcome variable relative to the outcome level at the time of the transition. Figures 3.5, 3.9, and 3.13 and figure 5.2 in chapter 5 plot those coefficients.

As discussed earlier, in some cases the organization and governance of the value chain, the nature of technology, and large bargaining power imbalances may trap suppliers from developing countries in dead-end tasks instead of favoring the processes of learning and innovation typical of relational GVCs.

The rise of GVCs may thus lead countries engaged in highly hierarchical or captive GVCs, or those that lag behind in skills and human capital, connectivity, and institutional quality (chapter 2), to become locked in in relatively low value-added segments of production with little scope for upgrading. Bangladesh’s and Cambodia’s experiences in the apparel sector are examples of the difficulties developing country firms face in upgrading from basic assembly functions to more sophisticated segments of the value chain, which require a very different skill set (box 3.4). They may, then, find it simpler to “industrialize” in the age of GVCs, but the returns to doing so by replicating the strategies of earlier developers may not be as high as they were in the past. Moreover, the gradual increase in automation may compound these effects (chapter 6).

China’s experience suggests, however, that industrialization may still be possible, but it requires new approaches to development. Chinese firms that upgraded in the smartphone market used two

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, Whitaker et al. (2010) suggest that the viable growth path for developing countries is now “compressed development”—that is, leveraging globally engaged production systems rather than nationally integrated production systems. GVCs introduce international interdependencies that are unlike those faced by earlier developers (chapter 4). Accordingly, the efficacy of industrialization and development strategies depends on how well policy makers understand these new conditions and learn, seize opportunities, adapt, and develop innovative solutions in concert with a wide range of actors, domestic and foreign. These issues are discussed further in the chapters on policies.

### Box 3.4 Skills and upgrading in Cambodia's apparel value chain

The foreign direct investment that Cambodia's apparel sector has attracted over the past two decades has been important for jobs and growth. Foreign investors set up manufacturing locations in Cambodia 20 years ago to take advantage of lower production costs stemming from a mix of lower minimum wages and trade preferences. These multinational manufacturing firms have head offices in Hong Kong SAR, China; Taiwan, China; or the Republic of Korea. They also have manufacturing facilities in other Asian countries. Despite the presence of these firms, Cambodia has not moved up the apparel GVC and is still performing many of the same assembly activities largely carried out by the same original foreign investors. More than 95 percent of its apparel exporters are branch plants of foreign-owned firms.

All the activities associated with functional upgrading take place at the headquarters location, leaving little or no room for branch manufacturing sites to take on more activities. These activities include textile sourcing and sales/buyer acquisition and technical product development.

This experience is not unique to Cambodia. It is, in fact, difficult for countries to upgrade in this industry because of relationships between global lead firms, multinational

apparel manufacturers, and their foreign branch plant locations.

Opportunities for functional upgrading of these multinational corporations (MNCs) is also limited because the apparel industry is buyer-driven. The company or brand responsible for setting the final price and selling the product is not the same company that owns manufacturing facilities. Apparel manufacturers (whether at the headquarters or branch locations) do not control retail, marketing, branding, or creative new product development, which are the most lucrative and knowledge-intensive activities in the sector. Thus branch plants of foreign operations therefore have little opportunity for functional upgrading.

And yet there are still opportunities for upgrading in three areas. The first is in the preproduction and production stages currently performed in Cambodia by foreigners. The second is in the sourcing of inputs and arranging the logistics of shipments, currently carried out abroad at the headquarters of foreign MNCs with manufacturing locations in Cambodia, but that could be transferred to Cambodia. The third is in creative design and branding, which could be done by private domestic firms that are locally headquartered.

*Source:* Based on Frederick (2018).

Finally, integration in agricultural GVCs can also support economic transformation in the sector wherever lead firms are able to encourage the upgrading of farmers through long-term relationships. Formal or informal contractual arrangements that regulate the provision of production inputs, such as fertilizer, technology, extension services, and market information, have positively affected the upgrading of farmers in Ghana, Kenya, and Zambia who are growing maize, cassava, or sorghum. Having a contract with a buyer is significantly and positively associated with upgrading to higher-value intermediate processes and moving to higher-value-added products. Farmers under contract seem to have better access to inputs and technologies through the out-grower company or other external sources. In a random sample of 1,200 farmers in Ghana, Kenya, and Zambia, over 50 percent of surveyed contract farmers attributed their use of fertilizer to their contractual arrangement. Extension services, seeds and pesticides, and tractors were other cited forms of support. Moreover, the majority of the farmers under contract said the scheme had a positive to very positive impact on their production

and income. For example, many farmers reported that their income and output increased by half or more as a result of contractual arrangements.<sup>31</sup>

### Employment

Apart from higher overall productivity, firms in developing countries that participate in GVCs tend to be more capital-intensive. Machines can be equipped to deliver the precision needed for the compatibility of parts. They can also deliver the higher-quality output demanded by foreign consumers and help firms achieve higher productivity and greater scale. It may therefore make sense for firms to adopt more capital-intensive methods, even those in poor countries with relatively large labor forces. The costs of accessing capital may also be lower for GVC firms because of the relational dimension of participation—they have easier access to finance, foreign machinery, and training for their operations. In Vietnam, firms that both import and export use more capital inputs per worker than firms that export only or firms that sell exclusively to the domestic market.<sup>32</sup> Firms in Ethiopia that

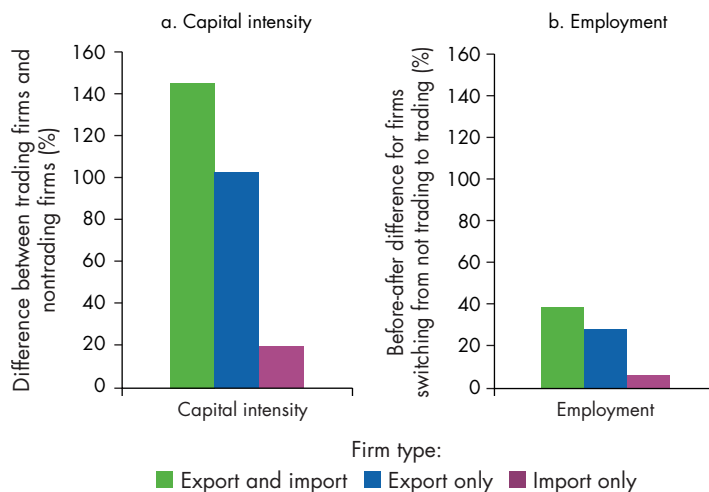
export and import are also more capital-intensive than one-way traders or nontraders. This observation holds across a sample of developing countries.<sup>33</sup>

Can GVCs deliver higher productivity and greater capital intensity, as well as more and better-paying jobs? Or is economic growth through GVCs at the expense of job growth? GVCs are becoming more important for exports (chapter 1), but at the same time exports are becoming less job-intensive.<sup>34</sup> In some countries, exports are contributing a smaller share of total jobs,<sup>35</sup> leading some observers to conclude that the employment consequences of GVCs have been disappointing.<sup>36</sup> According to these observers, rather than contributing to more and better-paying jobs in developing countries, capital-intensive production by GVC firms may lead to stagnant or lower overall employment, and the path to development by moving workers from agriculture to manufacturing may be suppressed.

Because GVCs boost exports, their overall effects on employment in developing countries have been positive. Even though production is becoming more capital-intensive and less job-intensive, the positive productivity effects at the firm level are (unexpectedly) good for scale and employment. Through scale effects, higher productivity is expanding aggregate output and employment. GVC firms tend to employ more workers than other firms.<sup>37</sup> When the higher productivity of these firms leads to sufficient scale—through more competition and market restructuring, demonstration effects, demand effects, technology spillovers, and investment in infrastructure—the overall effect on jobs is positive. In Ethiopia, firms that both export and import are more capital-intensive *and* increased their labor force faster than other firms between 2000 and 2014 (figure 3.6). These firms utilized 145 percent more capital per worker than nontrading firms between 2000 and 2014, compared with a 102 percent difference for export-only firms and a 19 percent difference for import-only firms.<sup>38</sup> Ethiopian firms that became two-way traders saw their labor force grow by 39 percent (relative to when they were nontraders), while the growth for firms becoming exporters was 29 percent and for firms becoming importers was 6 percent. Employment in manufacturing expanded from 2000 to 2014, and GVC firms accounted for an increasing share of manufacturing employment.<sup>39</sup> In Mozambique, despite adopting more mechanical technologies in the cashew value chain, as discussed earlier, employment also increased alongside output in the sector.<sup>40</sup>

Vietnam is another powerful example. Between 2004 and 2014, total jobs in firms that both import and export expanded faster than in firms that import only or export only.<sup>41</sup> As a result, GVC firms increased their

**Figure 3.6** In Ethiopia, GVC firms are relatively more capital-intensive but their employment is increasing fastest



Sources: Choi, Fukase, and Zeufack (2019), using data from Ethiopia 2000–2014 manufacturing census (firms with 10 or more employees).

Note: For the period 2000–2014 panel a reports the percentage difference in capital intensity between nontrading firms and trading firms. The results are obtained by regressing firm capital intensity (log capital per worker) on dummy variables if a firm exports and imports (GVC firm), exports only, or imports only, controlling for whether the firm is state-owned, as well as sector, year, and region fixed effects. Panel b reports the percentage difference in employment before and after the switch for firms that switched from nontrading to trading status. The results are obtained by regressing firm employment (log number of workers) on dummy variables if a firm exports and imports (GVC firm), exports only, or imports only, controlling for whether the firm is state owned, as well as year and firm fixed effects. All coefficient estimates are statistically significant. For the capital intensity and employment regressions, the coefficients for export-only and GVC firms are not statistically different. The percent differences reported in the graphs are obtained as 100 multiplied by the exponential of the coefficient estimates minus 1.

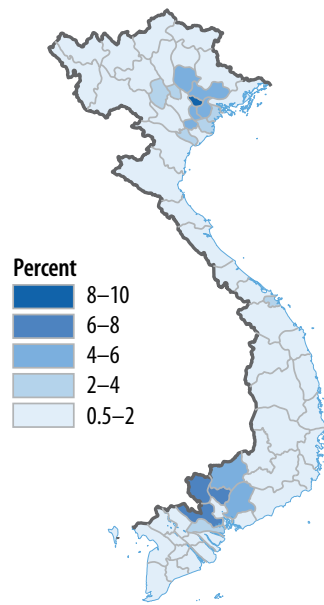
share in total employment, albeit slightly.<sup>42</sup> In fact, the provinces that became more GVC-intensive also experienced faster growth in the employment share of the population (map 3.1). No province experienced net job losses. Net job creation nationally exceeded 12 million, and the share of employment in the population (ages 15 and over) increased from 70 percent to 76 percent.<sup>43</sup> It is likely these experiences would extend to other low-income countries that have been able to integrate into basic manufacturing, such as textiles or agribusiness.

In Mexico, employment expansion is more strongly linked to GVCs than one-way trade (figure 3.7). Between 1993 and 2013, municipalities in Mexico with a larger share of employees in manufacturing firms that both export and import experienced stronger growth in their total employment and increased their share in the country's total employment.

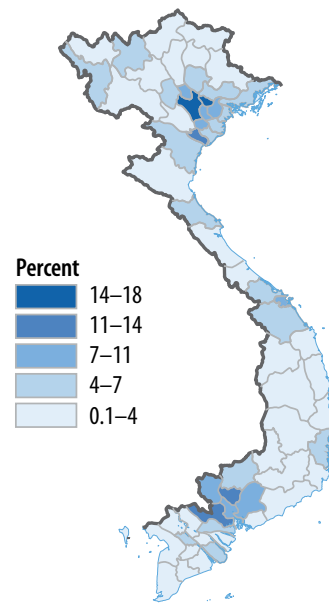
The new activities that GVCs bring to countries can also induce shifts in type of employment. In Vietnam, the number of self-employed, wage, and salaried workers, as well as employers, all increased between 2004 and 2014. But wage and salaried jobs nearly doubled, outpacing other employment types, and the

**Map 3.1** In Vietnam, employment expansion was linked to GVC firms

a. Change in employment in GVC firms per capita, 2004–14



b. Change in employment-to-population ratio, 2004–14

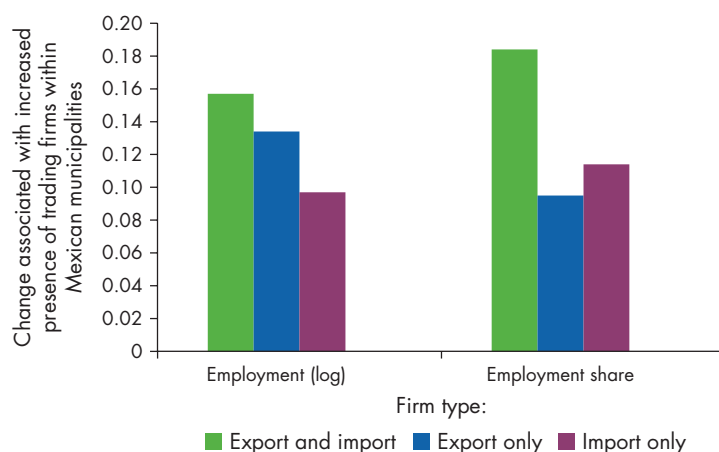


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Sources: WDR 2020 team, using data from GSO (2012) and General Statistics Office of Vietnam's Enterprise Surveys.

Note: GVC firms are firms that both export and import. Employment is measured as the total number of employees reported by registered firms, summed across firms with more than five employees within each province. The employment-to-population ratio is measured as employment relative to population in the province.

**Figure 3.7** In Mexico, employment expansion is more strongly linked to GVC expansion than non-GVC trade



Sources: WDR 2020 team, based on INEGI (2014) and CONEVAL and World Bank (2013).

Note: Standardized coefficient estimates are reported for the period 1993–2013 from a regression of log of municipality employment or municipality employment share in total employment on the number of employees per capita in manufacturing firms that export and import, export only, and import only, controlling for total population of the municipality, distance of the municipality to the U.S. border, and state and year fixed effects. All coefficient estimates are statistically significant. Standardized coefficients refer to how many standard deviations the dependent variable will change per standard deviation increase in the explanatory variable.

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>44</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>45</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 in apparel output (a proxy for apparel exports), there was a 0.3–0.4 percent increase in employment. This rise in employment increased overall welfare as workers moved out of agriculture or the informal sector

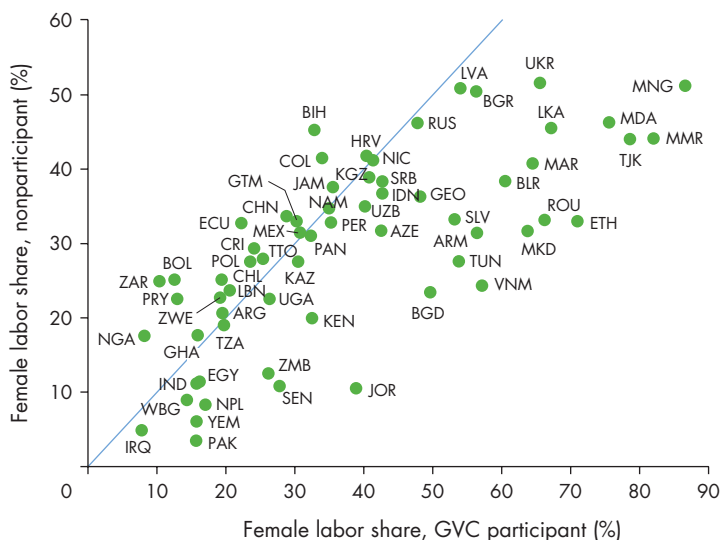
toward better-paying, higher-value-added jobs.<sup>46</sup> Similarly, Lesotho's integration in the global apparel sector accounted for 10 percent of the country's workforce and half of manufacturing employment in 2009, helping to transform an agrarian economy.<sup>47</sup> In Haiti, the apparel sector employed 37,000 workers in 2014.<sup>48</sup>

GVCs support employment of not just men, but also women. Female employment grew faster than male employment in Vietnamese provinces where GVC participation expanded the most.<sup>49</sup> Notably in the apparel and electronics sectors, where assembly of many small parts must be done manually, firms report preferences for female employees because of the high levels of dexterity required. In Ethiopia, women constitute 75 percent of the workforce in the apparel sector,<sup>50</sup> 65 percent in Haiti,<sup>51</sup> and 77 percent in Sri Lanka.<sup>52</sup>

Across the world, firms that both export and import tend to employ more women than firms that do not participate in GVCs (figure 3.8). Foreign-owned firms as well as firms that export *or* import also have higher female labor shares on average than firms that do not, but the relationship is stronger for GVC participants. These jobs have positive effects on other aspects of women's livelihoods. In Bangladesh, for example, young women in villages exposed to the garment sector delay marriage and childbirth, and young girls gain an additional 1.5 years of schooling (box 3.5).<sup>53</sup> The gender dimension of GVCs though is not without challenges.

Not only do GVC firms employ more people, but they also pay better. In Ethiopia, manufacturing firms that both import and export paid significantly higher

**Figure 3.8 Worldwide, GVC firms hire more women than non-GVC firms**



Source: Rocha and Winkler (2019), using data from World Bank's Enterprise Surveys.

Note: Each dot represents a country-year observation. The x-axis plots the employment-weighted share of female workers of total workers in firms that both export and import (GVC participant). The y-axis plots the employment-weighted share of female workers of total workers in firms that do not export and import (nonparticipant). For country abbreviations, see International Organization for Standardization (ISO), <https://www.iso.org/obp/ui/#search>.

wages in 2000–2014 than did those that exported only or imported only, controlling for sector, location, and year effects. In Mexico, wages are also significantly higher in firms that both import and export than in firms that do not. Firms that have relationships with buyers or suppliers also pay higher wages than

### Box 3.5 GVC participation can lead to indirect welfare improvements for women

How does getting a job change one's life beyond the income itself? Bangladesh is an interesting case study because the country's ready-made garment industry employs 3.6 million people, 53 percent of whom are women.<sup>a</sup> Meanwhile, the country has seen remarkable progress in health and education. How might these factors be related? One study used an innovative approach, looking at 1,395 households in 60 villages to identify how the arrival of ready-made garment jobs may have affected various welfare-related indicators.<sup>b</sup> Exposure to the sector was associated with a drop in both marriages and childbirths for girls ages 12 to 18—an important finding because of the long-term

negative effects of early marriage and childbirth. Girls in villages close to garment factories had on average significantly higher educational attainment—they appeared more likely to stay in school than those with no factory nearby. This effect was particularly strong for younger girls ages 5–9. The most plausible explanation appears to be that the chances of getting a job increase the returns to staying in school and improving literacy and numeracy. In addition, parents, through higher income from these jobs, can better afford to send their children to school.

The study compared these demand-led welfare effects with a more supply-side intervention in the form of a

(Box continues next page)

### Box 3.5 GVC participation can lead to indirect welfare improvements for women (*continued*)

large-scale conditional cash transfer program to encourage girls' school enrollment. The demand-led welfare effects were much larger than the effects of conditional cash transfers. In other words, expanding light manufacturing provides not only benefits in the form of jobs but also, more indirectly, benefits for education, health, and workers' children. That said, there was a small negative effect on school enrollment of girls ages 17–18. For them, the opportunity cost of getting a garment factory job may outweigh the returns to staying in school. As discussed in box 3.6, the relationship between human capital formation and participation in GVCs is heterogeneous across countries' contexts.

Together, these results suggest that the type of job matters, and that as countries move into more value-added and skill-intensive activities, the returns to education for girls will improve, and dropout rates are likely to fall. Evidence from India seems to confirm this point. An investigation of the more skill-intensive business processing outsourcing (BPO) industry in the country showed that women in villages linked to the industry had higher aspirations and invested more in computer or English courses than did

those in other villages. There were also indirect positive effects from BPO employment on girls' school enrollment, nutrition, health, delayed marriage, and childbirth.<sup>c</sup>

Evidence of improved welfare for women working in GVCs can be found elsewhere as well. One study looked at the subjective well-being of women employed in Senegal's export-oriented horticulture industry.<sup>d</sup> Employment improved subjective well-being for the poorest women, generally through improved living standards, but not as much for women whose incomes were well above the poverty threshold. For low-income women employed in Ethiopia's cut flower industry, savings in relation to their incomes are higher than for those employed in other sectors, and the subjective valuation of their jobs is also higher.<sup>e</sup>

Finally, by analyzing workers' experiences in the Kenyan cut flower industry through interviews, the authors of one article found a clear link between employment and women's empowerment—such as in greater independence, new opportunities, and decision making within the household.<sup>f</sup> The strength of the effect, however, depends on the quality of the job.

a. Moazzem and Radia (2018).

b. Heath and Mobarak (2015).

c. Jensen (2012).

d. Van den Broeck and Maertens (2017).

e. Suzuki, Mano, and Abebe (2018).

f. Said-Allsopp and Tallontire (2015).

firms without relationships in Mexico.<sup>54</sup> In China, GVC engagement improved firms' wages (more so in capital-intensive and foreign-invested firms) both by improving productivity within firms and by reallocating labor to more productive firms.<sup>55</sup> Again, across a sample of developing countries, firms that both export and import pay higher wages than import-only and export-only firms and nontraders.<sup>56</sup>

How countries participate in GVCs also matters for wage growth. From 1990 to 2015, wage growth was the largest for countries that broke out of commodities or agriculture into basic manufacturing ("limited manufacturing" in figure 3.9).

### Poverty and shared prosperity

By supporting employment and income growth, GVCs also support poverty reduction and shared prosperity. The classical trade literature suggests that 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. Second, productivity growth can boost final demand. And, third, such growth may lead to compositional shifts in the structure of the economy and could support jobs by spurring the growth of sectors with high labor shares.

In a cross section of countries, growth in GVC participation is indeed associated with a decline in the number of people living on less than \$5.50 a day (in 2011 international prices)—see figure 3.10. Openness affects poverty primarily through growth, the

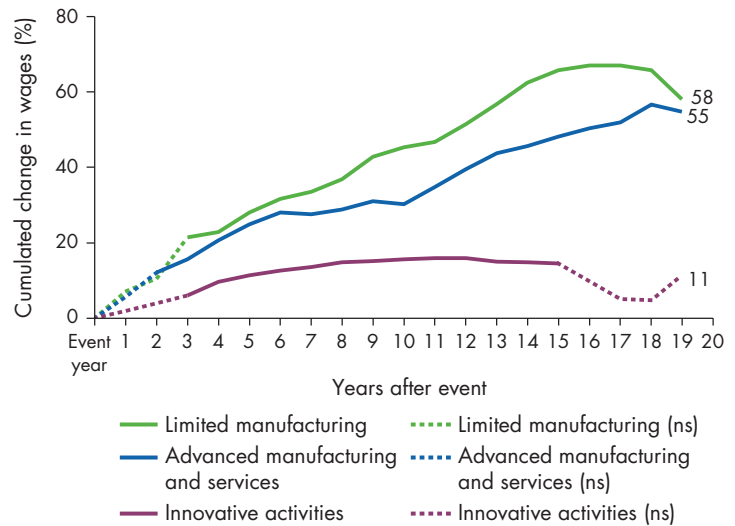
main driver of the remarkable reduction in global poverty since 1990.<sup>57</sup> Where economic growth from GVCs is larger than from conventional trade, poverty reduction from GVCs will also likely be larger.

In Mexico, municipalities with a larger share of employees in internationalized firms experienced a greater reduction in poverty between 1993 and 2013 for the poorest as well as vulnerable households. A greater presence of import and export firms is positively associated with the poorest households' ability to obtain a basic food basket. Municipalities with greater GVC participation also experienced a lower incidence of capabilities poverty and asset poverty—that is, their access to enough financial resources to provide for other needs, including health, education, and transport, improved.<sup>58</sup> They also experienced a decline in the marginalization index, which captures deprivation and inaccessibility to basic goods and services for welfare. The relationship among poverty, marginalization, and international integration is generally stronger for firms that both export and import than for those that export only or import only (figure 3.11). All this said, even though GVCs can create opportunities for poor households, they have also been found to create risks for the accumulation of human capital throughout the life cycle, such as in Mexico (box 3.6).

In Vietnam, provinces with more internationalized firms also experienced greater reductions in poverty between 2004 and 2014 (figure 3.12). This decline likely worked through the employment and ultimately the income channels, as just discussed. Provinces with more internationalized firms similarly experienced higher growth in the incomes of the bottom 40 percent of the population between 2004 and 2014. The impacts were not restricted to those provinces with more GVC participation, and poverty also fell in neighboring provinces in Vietnam.<sup>59</sup>

The positive effects of GVC participation on income growth are likely to extend to everyone in society—if the welfare state works. GVC integration in certain regions of a country can give people the incentive to migrate within their country, which can be a powerful mechanism for reducing poverty. Higher incomes will also generate more demand for a greater number and diversity of goods and services, imported and domestic. This demand will lead to diversification of the economy, which will increase opportunities for a broader and more diverse set of agents. GVCs are also likely to make a larger variety of goods more affordable, such as cell phones, thereby allowing the poor to participate more widely in society.

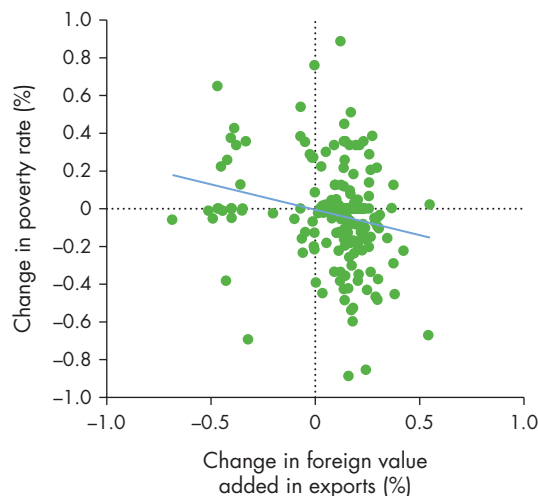
**Figure 3.9** The boost to wages is largest in countries after they first enter limited manufacturing GVCs



Sources: WDR 2020 team, using data from the World Bank's WDI database and the GVC taxonomy for 1990–2015 based on Eora26 database.

Note: The event study quantifies the cumulated change in wages in the 20 years following a switch from a lower to a higher stage of GVC engagement. Dotted lines indicate statistically nonsignificant (ns) coefficients. See box 3.3 for the methodology.

**Figure 3.10** GVC participation is associated with poverty reduction

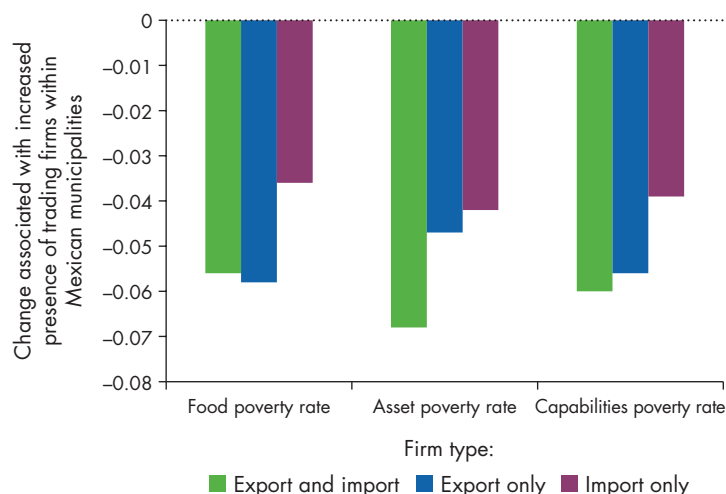


Sources: WDR 2020 team, using data from Eora and World Bank's WDI database.

Note: Each dot is a country-year observation. The x-axis is the average annual growth in foreign value added in exports between 1990 and 2015. The y-axis is the average annual growth in the poverty rate between 1990 and 2015. The poverty rate is measured as a percentage of the population living on less than \$5.50 a day (in 2011 international prices).

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

**Figure 3.11** In municipalities in Mexico, the expanded presence of GVC firms is more strongly associated with poverty reduction than the presence of firms that export only or import only



Sources: WDR 2020 team, using data from INEGI (2014) and CONEVAL and World Bank (2013).

Note: Standardized coefficient estimates are reported for the period 1993–2013 from a regression of food poverty, asset poverty, and capabilities poverty rates at the municipal level on the number of employees per capita in manufacturing firms that export and import, export only, and import only, controlling for total population of the municipality, distance of the municipality to the U.S. border, and state and year fixed effects. Ratios are defined as the number of food, asset, or capabilities poor over total population in the municipality. All coefficient estimates are statistically significant. Standardized coefficients refer to how many standard deviations the dependent variable will change per standard deviation increase in the explanatory variable. For definitions of food poverty, asset poverty, and capabilities poverty, see note 55 at the end of this chapter.

exports and the modernization of export supply chains of green beans and tomatoes had important positive welfare effects. Most notable were higher incomes for these farmers, particularly those in the lower quartile of the income distribution. The result was a reduction in the absolute poverty levels.<sup>60</sup>

There is no apparent relationship between GVC participation and growth in income inequality in Vietnam or Mexico, as measured by the Gini coefficient using household data at the provincial or municipal level.<sup>61</sup> Despite this finding, there can be important distributional implications of GVC participation across and within countries.

The lack of a systematic relationship between GVC participation and growth in income inequality for developing countries is at first sight confirmed by the cross-country event study described in this chapter (see box 3.3). Greater income inequality within countries, as measured by the Gini coefficient, is observed only in the group of countries that switch to the innovation stage of GVC engagement, and it becomes statistically significant only after about a decade (figure 3.13).

## Distribution of gains

Paralleling the gains that GVCs have delivered for countries, a large majority of people in both high- and lower-income countries view two elements of GVCs

### Box 3.6 Does GVC participation lead to human capital accumulation?

By boosting productivity and enabling structural transformation, participation in GVCs has been associated with rising incomes and less poverty. But the extent to which countries reap long-term development gains from GVC participation hinges critically on its consequences for the human capital of workers and their children.

Many developing countries are giving priority to raising human capital formation while deepening GVC participation and pursuing export-led industrialization. The experience of East Asia—such as Korea in the 1980s and 1990s and more recently China and Vietnam—suggests that these two goals are compatible and may reinforce one other. GVC participation fosters industrialization and urbanization, boosting parental income and productivity. It also raises tax collection and creates room for larger private and public investments in education. Human capital formation further supports GVC participation and industrial development.

But the rates of human capital formation differ significantly among countries that increased their participation in GVCs. Although Mexico experienced an increase in openness after the launch of the North American Free Trade Agreement (NAFTA), income growth and human capital formation remained disappointing, despite rising public spending on education.

What explains these different experiences? Recent empirical evidence suggests that the skill intensity of newly created manufacturing jobs may play a critical role. Subnational evidence from Mexico reveals that the school dropout rate rose with the local expansion of export manufacturing industries: for every 25 jobs created, one student dropped out of school at grade 9 instead of continuing through grade 12.<sup>a</sup> These effects are driven by the export-manufacturing jobs that require fewer skills and therefore raised the opportunity cost of schooling for

(Box continues next page)

### Box 3.6 Does GVC participation lead to human capital accumulation? (continued)

students at the margin. Subnational evidence from China reveals that high-skill export shocks raise both high school and college enrollments, whereas low-skill export shocks depress both.<sup>b</sup> The amplified differences in skill abundance across regions reinforce the initial patterns of industry specialization. Broader cross-country evidence for 102 countries over 45 years points in the same direction: growth in less skill-intensive exports depresses average educational attainment, whereas growth in skill-intensive exports raises schooling.<sup>c</sup> At the same time, in China rising imports of

capital goods raised the demand for skills and led to greater educational attainment.<sup>d</sup>

These findings point to a mutually reinforcing relationship between the skill intensity of tasks and skill acquisition. On balance, participation in GVCs may still support human capital formation via income growth and the weaker financial constraints facing parents and governments. But these positive effects may be offset by reduced skill formation in areas in which participation in GVCs leads to an expansion of low-skill-intensive sectors and tedious tasks.

a. Atkin (2006).

b. Li (2018).

c. Blanchard and Olney (2017).

d. Li (2019).

positively: free trade and international business ties. However, the number of skeptics in all countries grew between 2002 and 2014 (figure 3.14). Although the discontent is greater in high-income countries, the number of those perceiving themselves to be losers from global integration is also nonnegligible in developing countries.

GVCs may have fueled some of this public discontent. Rather than being distributed equally across and within countries, the gains have been concentrated, accruing to specific firms, workers, and locations. People can feel left out, even if they are not worse off.

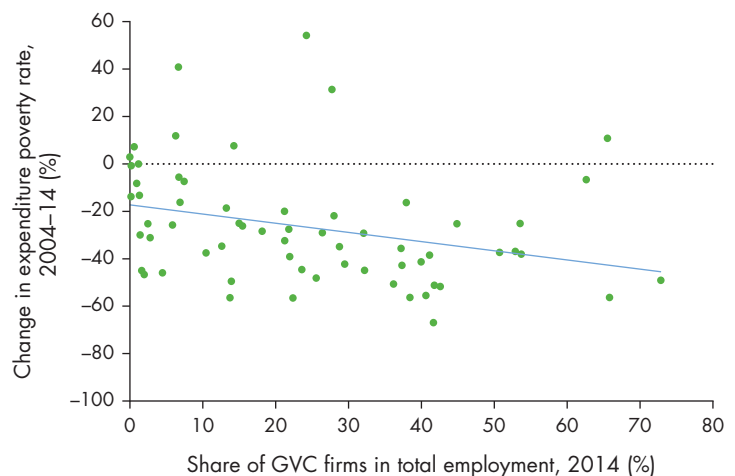
#### Markups and firms

The public sentiment on trade and international business ties captures the fact that since the 1980s there has been a widespread rise in firms' profits. In 134 countries, the average global markup increased by 46 percent between 1980 and 2016, with the largest increases accruing to the largest firms in Europe and North America and across a broad range of economic sectors.<sup>62</sup>

The growth of GVC activity appears to be a contributor to the rise in markups for several reasons. First, GVCs lower the costs of inputs for companies, through importing, and increase their productivity, through the scale of expansion afforded by exporting.

Second, in the presence of economies of scale GVCs disproportionately favor large firms that can afford the fixed costs of exporting and importing,

**Figure 3.12** In Vietnam, poverty reduction was greater in locations with a higher presence of GVC firms

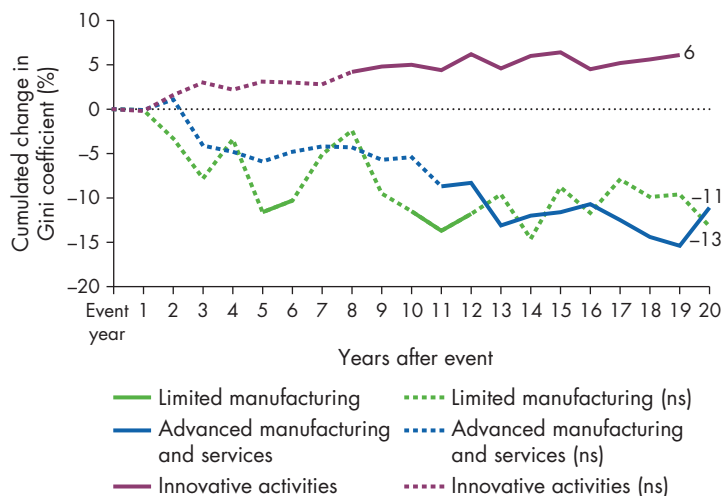


Sources: WDR 2020 team, using data from GSO (2012) and General Statistics Office of Vietnam's Enterprise Surveys.

Note: GVC firms are firms that both export and import. Employment is measured as the total number of employees reported by registered firms, summed across firms with more than five employees within each province. The expenditure poverty rate is measured as the poverty headcount. The presence of firms that export only had no additional relationship with poverty reduction.

Firms that import and export are not constrained by domestic inputs and domestic demand, which helps them grow and realize economies of scale. This factor is especially important in the mass production manufacturing that dominates the limited manufacturing GVC group. The size distribution of firms is likely to

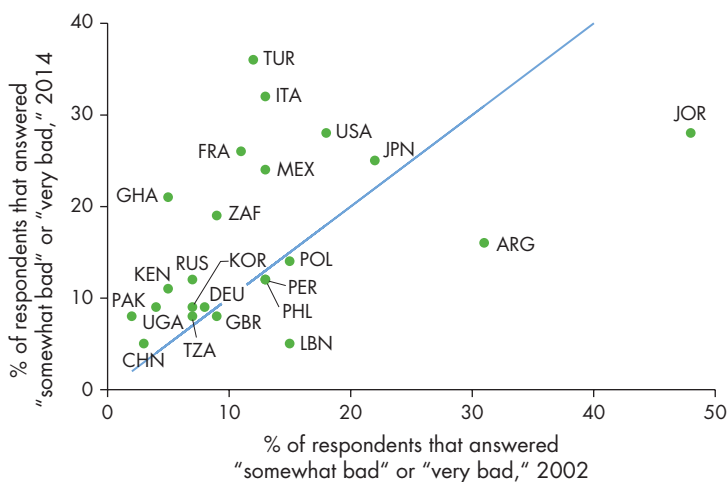
**Figure 3.13** Rising income inequality is a greater problem for countries breaking into the innovation stages of GVC engagement



Sources: WDR 2020 team, using data from the World Bank's WDI database and the GVC taxonomy for 1990–2015 based on Eora26 database.

Note: The event study quantifies the cumulative change in the Gini coefficient in the 20 years following a switch from a lower to a higher stage of GVC engagement. Dotted lines indicate statistically nonsignificant (ns) coefficients. See box 3.3 for the methodology.

**Figure 3.14** A majority worldwide views trade and international business ties positively, but skepticism grew from 2002 to 2014



Source: Pew Research Center 2014.

Note: Each dot is a country-year observation. The figure shows the share of respondents that answered in 2002 and in 2014 "somewhat bad" or "very bad" to the question "What do you think about the growing trade and business ties between [survey country] and other countries—do you think it is a very good thing, somewhat good, somewhat bad, or a very bad thing for our country?" For country abbreviations, see International Organization for Standardization (ISO), <https://www.iso.org/obp/ui/#search>.

be significantly more skewed in a world of GVCs than in a world without them, which is consistent with evidence that firms participating in GVCs tend to be larger than other firms.

Third, markups increase only if these cost reductions are not fully passed on to consumers through lower prices.<sup>63</sup> Participating in GVCs justifies some markup increase to cover the greater fixed costs of more complex sourcing or exporting. But the markup growth in GVC-intensive sectors is also likely to have increased the profit rate of these companies. It is well established empirically that large firms pass through a smaller share of a price shock to consumers. Consistent with this, these large firms are also likely to only partly pass on lower costs due to offshoring to consumers. The California company Everlane, which is committed to transparent pricing, reports the cost breakdown of all its products as well as the average price of its items in the market. According to the company's website, a pair of jeans that customarily sells for \$170 is produced for \$34, which includes cost, insurance, and freight.

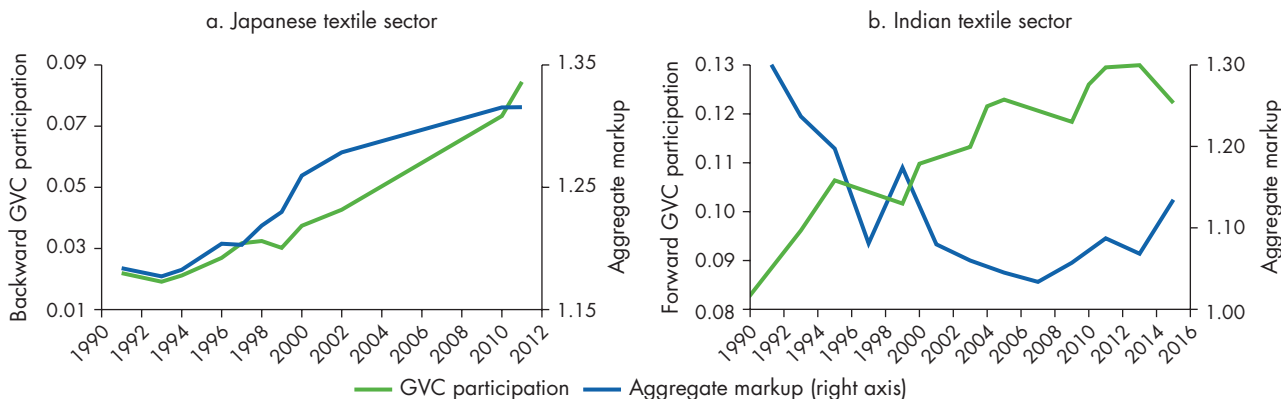
Indeed, U.S. industries are increasingly concentrated, with a small number of productive firms accounting for large shares of the market and large profits.<sup>64</sup> This rise of "superstar" firms in the United States and other advanced economies may be associated in part with the rise of GVCs and in part with technological change and innovations. In other words, GVCs have boosted superstar firms that earn superstar profits and may dominate the market. In Ethiopia, for example, measures of markups are also highly correlated with industry concentration in manufacturing.<sup>65</sup>

There is evidence that firms in developed countries that outsource parts and tasks to suppliers in developing countries have seen higher profits. In the textile sector, for example, markups of Japanese firms have increased since 1990 in line with backward GVC participation (figure 3.15, panel a). This positive association holds for other developed countries and other sectors that have also transferred large parts of their production to developing countries.<sup>66</sup>

Within developing countries, there is also evidence of incomplete pass-throughs of cost reductions to consumers through lower prices, resulting in higher profits. After India's trade liberalization in the 1990s, when input tariffs on intermediate inputs fell, both costs and prices dropped, but markups went up by about 13 percent when the economy opened to trade.<sup>67</sup> Consumers still benefited through lower prices (as well as higher quality and greater variety), but they were worse off than if firms had fully passed on those cost reductions.

GVC activity—and the relational nature of GVCs in particular—similarly appear to be a likely contributor to the international dispersion of the markups that

**Figure 3.15** Increasing GVC participation is associated with rising markups in developed countries but falling markups in developing countries



Sources: WDR 2020 team, using data from Eora and Worldscope.

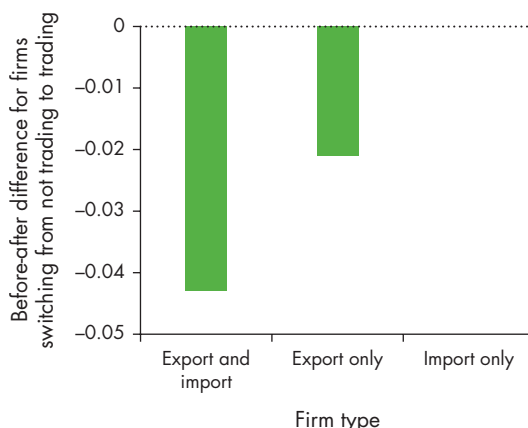
Note: Graphs plot data between 1991 and 2011 for panel a and between 1990 and 2015 for panel b. The left y-axis in panel a measures the share of foreign value added in gross exports of the Japanese textile sector (backward GVC participation). The left y-axis in panel b measures the share of domestic value added in India embodied in importing countries' exports to third countries (forward GVC participation). The right y-axis in both panels measures the share-weighted average markup of listed companies in the textile sector. Markups are calculated following De Loecker and Eeckhout (2018). Similar results hold across countries and sectors.

GVCs generate.<sup>68</sup> The implications of GVCs for the emergence of superstar firms huge in scale, high in market power, and large in profit rates are exacerbated by the disproportionate bargaining power that these large lead firms may have over their suppliers.

Although buyer firms in developed countries are seeing higher profits, supplier firms in developing countries are getting squeezed. Across 10 developing countries, the relationship between markups and forward participation is negative for developing countries in the textile and apparel sector (see figure 3.15, panel b, for India).<sup>69</sup> Some developing countries, including China, enjoy a positive correlation. This finding is consistent with a growing number of firms from emerging economies graduating from supplier to lead firms in GVCs.

Other country-level evidence suggests markups have increased mostly in advanced economies but not in emerging markets.<sup>70</sup> In Ethiopia, firms that buy inputs abroad to sell in the external market have lower markups than other types of firms (one-way traders or nontraders).<sup>71</sup> And the more intensely a firm is integrated into a GVC (measured as the share of the export value added and imported inputs in total sales), the lower is its markup. As Ethiopian firms become integrated into GVCs, they also experience reductions in their markups, which are strongest for two-way traders (figure 3.16). In Poland, increased GVC participation—including the use of imported components in production as well as the rising presence of domestic firms in foreign markets—is associated with the observed decline in markups between 2002 and 2016.<sup>72</sup>

**Figure 3.16** In Ethiopia, firms entering GVCs experience greater declines in markups, 2000–2014



Sources: Choi, Fukase, and Zeufack (2019), using data from Ethiopia: 2000–2014 manufacturing census (firms with 10 or more employees).

Note: Standardized coefficient estimates are reported for the period 2000–2014 from a regression of the log of markup at the firm level on dummy variables for firm type (export only, import only, export and import), controlling for state ownership, labor (log), capital (log), firm fixed effects, and year fixed effects. No data shown for "Import only" because only statistically significant coefficient estimates are reported. Standardized coefficients refer to how many standard deviations the dependent variable will change per standard deviation increase in the explanatory variable.

In South Africa, markups charged by manufacturing exporters are on average significantly lower than those charged by nonexporters. Firms with a relatively small proportion of exports (up to 10 percent) charge markups that are about 1.2 percent lower than

nonexporters, while firms with a medium (11–25 percent) and large (more than 25 percent) share of exports charge markups that are 1.8 percent and 2.3 percent lower than those of nonexporters, respectively.<sup>73</sup> The risk that firms from developing countries experience limited profits after becoming suppliers for global firms mirrors the rise in profits in developed countries.

In short, GVCs primarily reward large international firms by reducing their production costs. However, these gains are only partly passed on to consumers or shared with suppliers. Because suppliers are predominantly in developing countries, the gains may be distributed unequally, even across countries in the value chain.

### Markups and labor's share of profits

The rise in the market power of firms is contributing to the changing distribution of capital and labor in countries. The share of income accruing to workers—or how much of a country's GDP accrues to labor through wages as opposed to physical capital and profits—is the other side of the markup phenomenon: profits are rising, but labor's share of income is falling (figure 3.17, panel a).

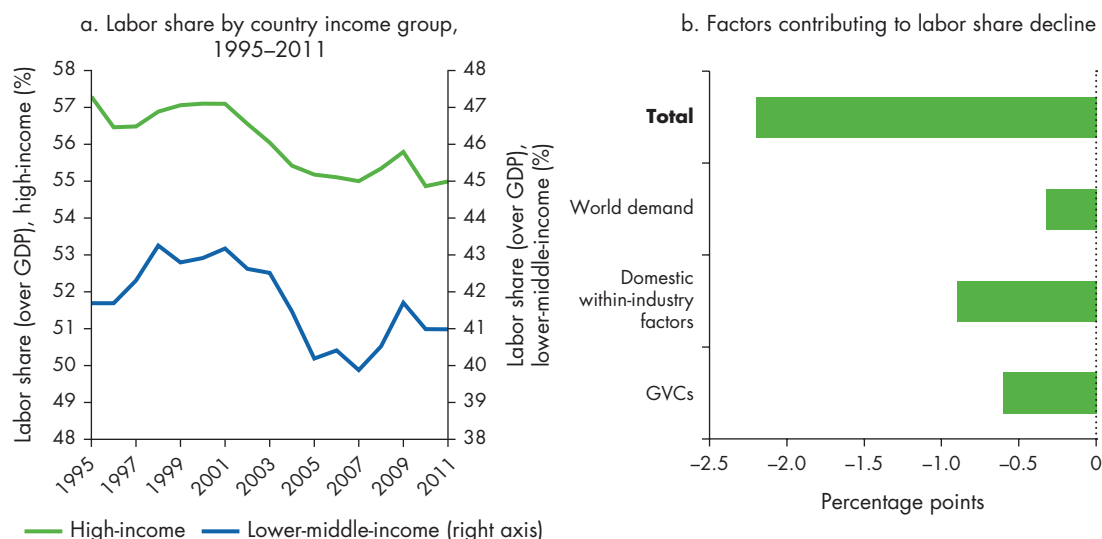
There are, of course, many possible explanations for the observed global decline in the so-called labor

share,<sup>74</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>75</sup> It may be that producers are not passing on their cost savings to both workers and consumers.

Similarly, the movement of relatively labor-intensive tasks from developed to developing countries could explain why the composition of production becomes more capital-intensive with GVC participation in developed countries. In developing countries, this could also reduce the labor share insofar as it accompanies production that has become relatively more capital-intensive than before.<sup>76</sup>

In 63 developed and developing economies, GVC integration as well as other domestic within-industry forces, such as technology or markups, contributed significantly to the reallocation of value added from labor to capital within countries between 1995 and 2011. The labor share declined by 2.2 percentage points, with GVCs contributing 0.6 percentage point (figure 3.17, panel b). Similarly, global integration, particularly

**Figure 3.17** GVCs have contributed to the declining labor share within countries



Source: WDR 2020 team, using data from OECD's TiVA database.

*Note:* In panel a, the green line plots the labor share in 29 advanced economies, and the blue line plots the labor share in 34 developing economies. In panel b, the decomposition explores the contribution of world demand, domestic within-industry factors, and GVCs to the total percentage point decline in the average labor share of 63 developed and developing economies between 1995 and 2011. V is the diagonal matrix of the share of value added in gross output; B is the Leontief inverse; and Y is the diagonal matrix of final goods and services produced in a country and sold worldwide. The results are obtained from three counterfactual exercises to decompose the relative contribution of each component by asking what the contribution to the observed overall changes in labor share would be if only domestic within-industry factors (V), GVCs (B), or world demand (Y) are allowed to change over time. The decomposition follows the methodology of Reshef and Santoni (2019).

the expansion of GVCs, has been identified as the primary trigger of the rise of overall capital intensity in production in emerging markets and developing economies.<sup>77</sup> Alongside globalization, explanations have also focused on economies of scale, innovation, and new technologies.<sup>78</sup>

### **Skills and wage inequality**

Inequality can also arise within the labor market, with a growing wage premium for the skilled. The Stolper-Samuelson theorem, one of the key tenets of traditional international trade, indicates that rising trade integration is likely to increase wage inequality (skilled versus unskilled workers) in relatively advanced countries with abundant skilled labor. But rising integration would be expected to reduce wage inequality in lower-income countries in which skilled labor is scarce. In a world of fragmentation, however, the theorem's validity is undermined. And, indeed, it is widely accepted both theoretically and empirically that greater fragmentation of production increases wage inequality in countries at all income levels for at least three reasons.<sup>79</sup> First, when production is moved across countries, the workers in those economies find themselves employed in new production processes and tasks. In higher-income countries, these processes and tasks may be considered low-skilled and labor-intensive, but in lower-income countries they are considered skilled labor-intensive when compared with the outside opportunities of workers.<sup>80</sup> Thus offshoring increases the demand for skilled workers in low- and middle-income economies and puts upward pressure on wage inequality.

A second reason for increased wage inequality in low- and middle-income economies is that GVCs are often more skill-sensitive than traditional trade flows, in part because they often produce goods destined for quality-sensitive consumers in rich countries,<sup>81</sup> and in part because of the high complementarities among the various stages of production carried out in different countries.<sup>82</sup>

The disproportionate importance of the matching between buyers and sellers in GVCs may also drive up wage inequality. Because the identity of these producers matters, especially when sensitivity to quality is high, relational GVCs may set off “a war for talent,” with the price of particularly attractive producers or the wage of particularly skilled individuals bid up disproportionately relative to that in a world without relational GVCs.

A third reason for the increase in wage inequality in countries in which skilled labor is scarce is that

firms in GVCs tend to adopt more capital-intensive techniques than comparable domestic firms.<sup>83</sup> Physical capital deepening and upgrading contribute to the increase in the relative demand for skilled workers because of the capital-skill complementarity—physical capital (and especially capital equipment) is less substitutable with skilled labor than with unskilled labor.<sup>84</sup> Consistent with this finding, in countries participating in GVCs and in the more capital-intensive parts of the value chain firms demand more-skilled workers.<sup>85</sup> The result is that as workers tend to move toward less routine and more interactive tasks, GVCs produce more jobs for skilled workers.<sup>86</sup>

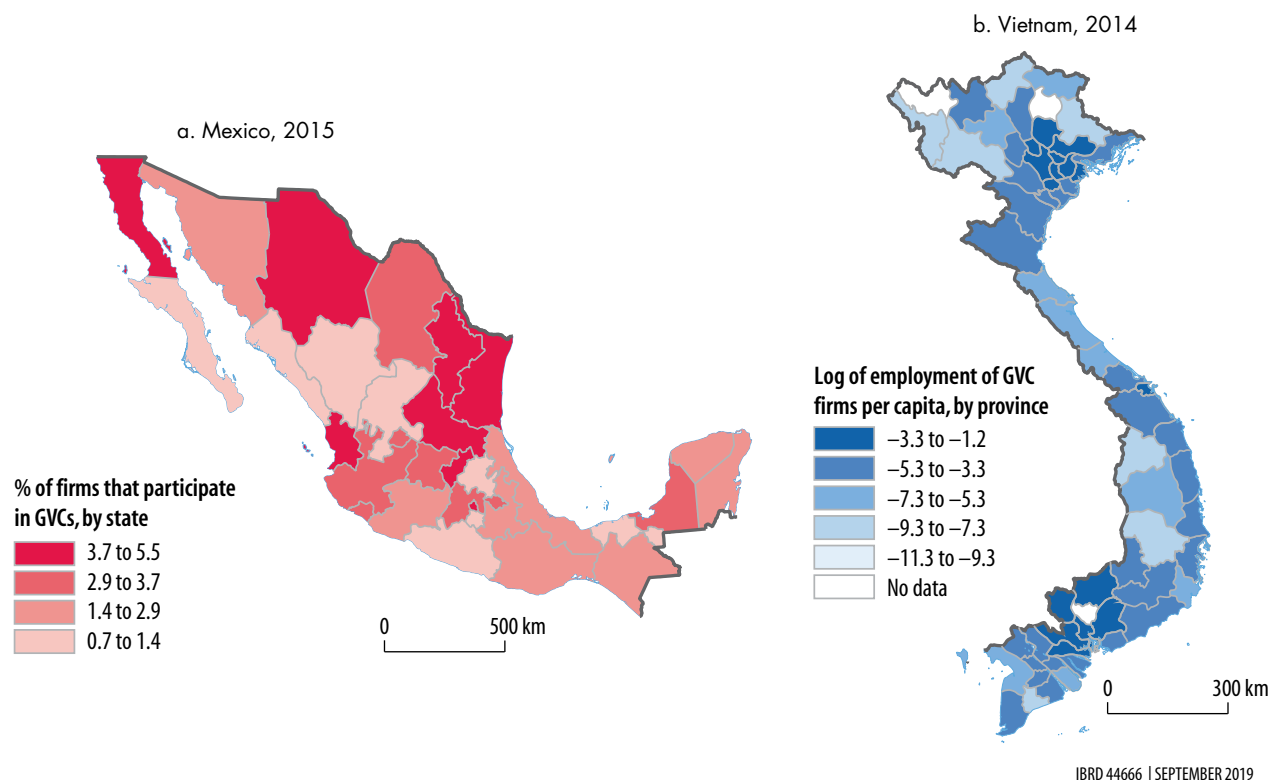
Firm-level analysis confirms a positive and significant relationship between GVCs and skilled employment—that is, between the number of skilled workers and firms with international links that export or are foreign-owned.<sup>87</sup> In 27 transition economies, importing inputs increases the demand for skilled labor.<sup>88</sup> In fact, global sourcing explains more than a quarter of the unconditional difference between importers and nonimporters in the employment share of high-skilled workers. In Madagascar, upgrading by diaspora- and Mauritian-owned firms in the apparel sector corresponded with in-firm training and skills upgrading.<sup>89</sup> In Africa more broadly, with Chinese import penetration firms increase their share of skilled workers by almost 4 percent, which is associated with a shift in production from low-skill to high-skill-intensive products.<sup>90</sup>

### **Geographical disparities**

Inequality arising from GVCs also has a geographical dimension. GVC integration is strongly associated with greater concentration in cities,<sup>91</sup> as well as border regions for countries neighboring GVC partners. This finding is consistent with evidence from Mexico and Vietnam showing that economic integration across national borders is associated with greater spatial concentration within national borders (map 3.2).

Because some regions grow faster than others, regional inequalities in developing countries can increase when labor is not perfectly mobile. In Vietnam, the only areas with double-digit job growth were concentrated around Hanoi and Ho Chi Minh City. By contrast, in developed countries some regions are being hollowed out by GVCs. In the United States, the outsourcing of manufacturing tasks and the exposure of industries to foreign competition have led to the emergence of a “rust belt.”<sup>92</sup> Such a phenomenon can result in localized and persistent income losses for years for people in negatively affected regions or

**Map 3.2** In Mexico and Vietnam, GVCs are spatially concentrated



Sources: Mexico: WDR 2020 team, using data from ENAPROCE 2015. Vietnam: WDR 2020 team, using data from GSO (2012) and General Statistics Office of Vietnam's Enterprise Surveys.

Note: In Mexico, state-level GVC participation is measured as the percent of firms that participate in GVCs. In Vietnam, province-level GVC participation is measured as log of employment of GVC firms per capita.

sectors when people cannot move easily.<sup>93</sup> Both experiences highlight the need for internal mobility of labor to distribute the gains from trade. Place-based policies that could reduce the negative consequences of the economic forces that disproportionately benefit some areas are discussed in the final chapters of this Report.

### Unequal work conditions

Small-scale farmers and home-based workers form the base of some value chains, often on unequal terms. A review of 49 studies related to the commodities and horticulture value chains concluded that “informality is the norm rather than the exception: informal workers make up the majority of the workforce, even in formal enterprises.”<sup>94</sup> In a random sample of 1,200 farmers in Ghana, Kenya, and Zambia growing maize, cassava, or sorghum, between 82 percent of farmers in Zambia and 97 percent in Kenya had no contract. For those with a contract, informal contracts dominated the landscape. In Kenya, 86 percent of contracts were informal.<sup>95</sup>

Subcontracted home-based workers (so-called homeworkers) make up significant shares of employment in other supply chains. Among other things, they weave textiles, package products, process rice, and make food products. An estimated 5 million homeworkers are part of India's garment and textile supply chains alone. Most homeworkers are informally employed without employer contributions to their social protection, and the vast majority are women. Their average earnings are not only lower than those of factory workers but also erratic, and subcontracted homeworkers also pay for many of the nonwage costs of production, such as workplace, equipment, utilities, and transport. Integrating homeworkers into supply chains on fairer terms will require better regulation from above and better integration from below (box 3.7).

GVC participation can increase casual employment. A case study in Ghana and Côte d'Ivoire on participation in the pineapple and cocoa value chains found that, although participation benefits successful farmers through improved growing processes, higher yields, and higher incomes, it is also associated

### Box 3.7 Home-based work in GVCs

By organizing in collectives, homeworkers can link to global supply chains in efficient ways and on fair terms. To do this, collective enterprises of homeworkers—cooperatives or other collective forms—would have to seek the following types of support:

- Management and business training, including how to forecast market demand and how to manage businesses
- Professional managers and knowledge of how to recruit and retain managers
- Professional advice and assistance on how to link to global supply chains, how to upgrade products and production systems, and how to reduce dependence on intermediaries

- Capital—physical and social networks
- More appropriate and enabling laws and regulations regarding cooperatives and commercial transactions because the existing laws in most countries are not appropriate for cooperatives and the commercial transactions of those at the base of the economic pyramid.

Additional spillovers from forming collective enterprises include greater bargaining power in market transactions and an enhanced ability to challenge the social norms that constrain women's time, mobility, and access to resources (such as the social norms governing inheritance and property rights) and the economic policies that ignore or under-value their economic activities and contributions.

with an increase in casual labor hiring, as well as displacement of farmers from land because of their low bargaining positions and lack of knowledge on their rights to land ownership.<sup>96</sup> Earlier research has documented the growing use of casual and seasonal contract labor both on farms and in packhouses in South Africa (fruit exports) and Kenya (fresh vegetable exports).<sup>97</sup>

GVCs may also be associated with poor worker conditions. Work practices often fall short of international standards in supplier countries, ranging from violations of core labor standards to unsafe working conditions, low wages, excessive working hours, and precarious contracts.<sup>98</sup> This problem is particularly associated with labor-intensive GVCs, where outsourcing to developing country locations is often motivated by low-wage labor.<sup>99</sup> This situation has led many observers to question the social value of the GVC business model, pointing to incidents at contract manufacturers such as the 2013 collapse of the Rana Plaza garment factory in Bangladesh. In the copper-cobalt belt of the Democratic Republic of Congo, for example, children often work in the mining sector.<sup>100</sup> And yet putting a halt to sourcing from these artisanal mines as a way to counter child labor could have unintended negative effects for household income, where poverty and then social norms are the main reasons for children working in mining.

There are signs that GVCs can transmit sensitivities about working conditions in host countries and induce remedial actions. In Indonesia, for example,

anti-sweatshop campaigns in the 1990s brought attention to poor working conditions in the textile, footwear, and apparel (TFA) sector.<sup>101</sup> As a result of activist pressure, multinational enterprises (MNEs) signed codes of conduct pledging to raise wages and improve working conditions in factories producing their products. The result was large real wage increases in the targeted enterprises, by as much as 30 percent in large foreign-owned and exporting TFA plants relative to other TFA plants. In fact, wages were no worse in MNEs than in domestic plants to begin with. Within the TFA sector, real annual wages in domestic plants were lower than those in foreign-owned or exporting plants.

Relationships within value chains can also catalyze improved working conditions. CocoaAction, promoted by nine main global producers of chocolate and cocoa, was set up to regenerate the cocoa plantations in West Africa. It also sought to help smallholder cocoa farmers who often subsist on incomes below the poverty line and who face deficits in literacy, low school attendance rates, child labor, and gender inequality. In launching CocoaAction, the leading chocolate and cocoa companies recognized that their individual commitments could not solve the complex and systemic challenges and that more sustainable production of cocoa would also be good for their profits. Similar efforts were made in Ethiopia, Mexico, and Vietnam.

However, this may not be enough. While private firms can play an important role, there is also a clear role for policy action supported by international

cooperation to determine the appropriate standards and ensure their enforcement. These policies are addressed in the final chapters of this Report.

## The gender gap

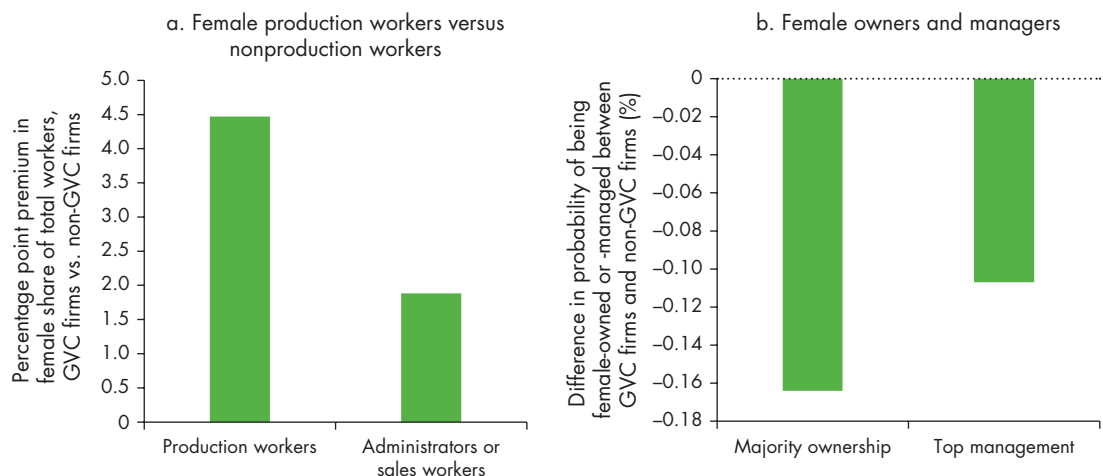
Although firms in GVCs tend to employ more women than other firms, women are generally in lower-value-added segments of the value chain, mostly in labor-intensive production jobs and in occupations that require lower skills and pay less.<sup>102</sup> The positive relationship between GVC participation and the female labor share is much higher for production workers than for administrators or sales workers in manufacturing firms (figure 3.18, panel a). Many countries have few women-owned or women-run GVC firms. Firms that import and export are significantly less likely to be majority female-owned than other firms and are significantly less likely to have a top female manager. Thus GVCs do not appear to be breaking the glass ceiling (figure 3.18, panel b).

The asymmetry between production, on the one hand, and management and ownership, on the other, is particularly visible in agriculture, but it is on view in other sectors as well (table 3.1). In southern Africa's fish-aquaculture sector, women contribute mostly to primary production and make up 90 percent of the

processing workforce, but they are poorly represented in enterprise management. The trends are similar in aquaculture in Nigeria and Vietnam,<sup>103</sup> cocoa and coffee in Papua New Guinea,<sup>104</sup> and horticulture in Azerbaijan<sup>105</sup> and Afghanistan.<sup>106</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>107</sup> In call centers in the Arab Republic of Egypt, women make up the majority of call agents, whereas men dominate jobs in higher-value segments and management.<sup>108</sup> In Kenya, women are overrepresented in the accommodation and excursion segments of tourism, but they tend to work as low- to mid-skilled employees, unless engaged as entrepreneurs.<sup>109</sup>

Why are so few GVC firms owned or run by women? Women's placement in value chains stems in part from the same reasons that hold back women in the non-GVC economy. These include disadvantages in endowments, such as assets, education, skills, experience, networks, and social capital, as well as gender-biased regulations or discriminatory social norms. According to the World Bank's Women, Business, and the Law database, 20 countries have yet to grant men and married women equal ownership

**Figure 3.18** Women are more likely to be production workers and less likely to own or manage GVC firms



Source: Rocha and Winkler (2019), using data from the World Bank's Enterprise Surveys.

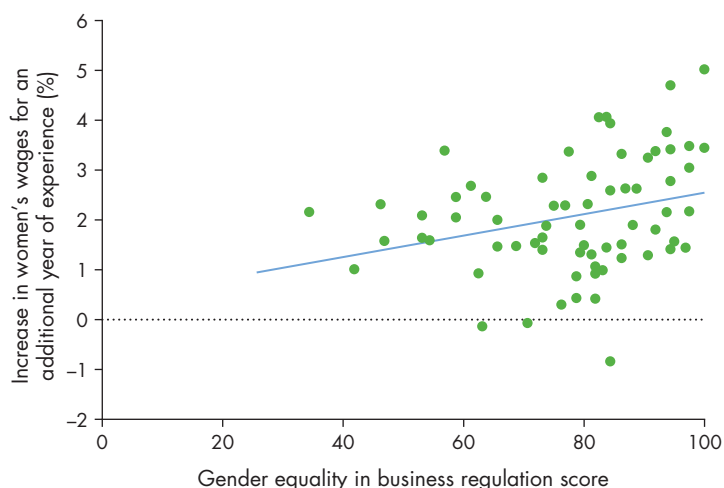
*Note:* Exporters are firms with an export share (direct or indirect) of at least 10 percent of total sales. Importers are firms with an imported input share of at least 10 percent of total inputs. GVC participants are firms classified as both exporter and importer. Panel a plots the coefficient of estimations of the female labor share (production workers and nonproduction workers) on a dummy variable if the firm is a GVC participant, controlling for capital intensity, sales, and total factor productivity (TFP), as well as country-sector, subnational region, and year fixed effects. Panel b plots the coefficient of estimations of whether a firm is majority female-owned or has a female top manager on a dummy variable if the firm is a GVC participant, controlling for country-sector, subnational region, and year fixed effects. All coefficient estimates are statistically significant.

**Table 3.1** Sample of results from case studies on gender in specific GVCs

| Author and year of publication | Sector and country(ies)                                         | Results                                                                                                                                                                                             |
|--------------------------------|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Velu et al. (2009)             | Aquaculture, Nigeria and northeast Vietnam                      | Women represent a significant share of employment, especially in processing and packaging, but they are poorly represented in enterprise management.                                                |
| World Bank and IFC (2014)      | Cocoa, coffee, and fresh produce value chains, Papua New Guinea | Women provide substantial labor in both coffee and cocoa cultivation and predominate in the fresh produce sectors, especially in tasks relevant for the quality of exports such as postharvesting.  |
| IFC (2018)                     | Horticulture, Azerbaijan                                        | A higher share of women are employed in horticulture than in other sectors. For products that depend on manual harvesting, women constitute more than 50 percent of harvesters.                     |
| World Bank (2011)              | Horticulture, Afghanistan                                       | Women provide the majority of labor in the lower levels of the value chains for horticulture—harvesting and postharvesting—although this is often unpaid household work.                            |
| Ahmed (2013)                   | Call centers, Arab Republic of Egypt                            | Women make up the majority of call agents, whereas men dominate jobs in higher-value segments and management.                                                                                       |
| Christian (2013)               | Tourism, Kenya                                                  | Women are overrepresented in the accommodation and excursion segments of the tourism sector, although they tend to work as low- to mid-skilled employees, unless they are engaged as entrepreneurs. |
| Barrientos (2014)              | Apparel, globally                                               | In 2014 on average 60–80 percent of production workers in the top 27 apparel-exporting countries were women.                                                                                        |

rights to property, and 41 countries do not grant sons and daughters equal rights to inherit assets from their parents. Even when the legal system does not discriminate against female ownership of assets, social norms inhibiting land ownership by women are a recurring theme across low- and middle-income countries. In Afghanistan's rural areas, social and cultural norms severely limit women's access to services, including credit, training, extension, inputs, and trading and marketing networks.<sup>110</sup> In Honduras, efforts by female entrepreneurs to enter value chains and upgrade into higher-value activities appear to be complicated by limited access to important inputs such as land, finance, and market information.<sup>111</sup> In call centers in Egypt, limited access to education, training, promotion, and networks made it difficult for women to take advantage of the rising demand for higher technical skills generated by product upgrading.<sup>112</sup> These gender-intensified constraints can restrict a country's ability to remain competitive and upgrade to higher-value segments of the chain—a topic discussed in a forthcoming report by the World Bank and World Trade Organization on trade and gender, "How Can 21st Century Trade Help to Close the Gender Gap?"

Removing legal restrictions that make it harder for women to start businesses and access productive

**Figure 3.19** Gender equality in business regulations ensures that women are more fairly rewarded

Source: World Bank 2019b.

Note: Each dot represents a country observation. The x-axis plots the country score for gender equality in business regulation. The y-axis plots the expected percentage increase in wages for each additional year of experience for women. The World Bank's Women, Business, and the Law database (2019) documents the gender legal disparities for 189 economies.

resources can be an effective first step. The larger the number of legal restrictions women face, the lower is the payoff from work experience (figure 3.19). Simply mandating a nondiscrimination clause in hiring

increases women's employment in formal firms by 8.6 percent.<sup>113</sup>

## Taxation

Raising tax revenue is a challenge in today's globalized and digitalized economy. GVCs have magnified the challenges facing the international tax system. The current system of international taxation relies principally on identifying the physical place where value is created by firms. The mobility of certain factors of production, combined with the fragmentation of production processes across countries, make firms even more sensitive to the differences in taxation from country to country. In GVCs that involve affiliates of the same firm, fragmentation of production also leads to greater intrafirm trade and more opportunities for tax avoidance by manipulating where value is recognized for tax purposes. Exacerbating the problems are the growth of intangibles in global business and the digital delivery of services.<sup>114</sup>

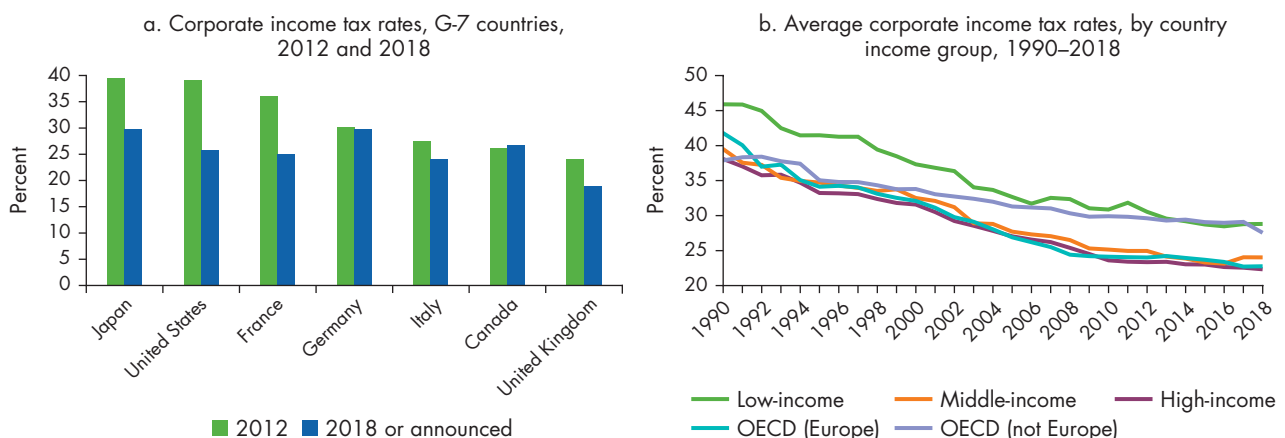
Countries are under pressure to engage in tax competition by lowering the burden of corporate income tax to retain domestic and attract foreign investment. Meanwhile, lower communication and transport costs are facilitating the relocation of firms and the fragmentation of production across countries. Indeed, firms can locate production chains and procurement across the globe, choosing countries that make the most sense from a business perspective. That includes taking advantage of differences between national tax systems to shift production to lower-tax jurisdictions. Countries compete by

lowering corporate income tax rates and granting tax incentives such as tax holidays and preferential tax zones. Such measures can help countries achieve development objectives by promoting job growth and technology transfer. But they can also be inefficient if such benefits do not outweigh the cost of lower tax revenues.<sup>115</sup> In a race to the bottom, corporate income tax rates have declined by almost half since 1990 (figure 3.20).<sup>116</sup>

Revenues from corporate income taxes are further eroded by international tax avoidance, which takes advantage of loopholes and weaknesses in the international tax architecture. In GVCs that involve affiliates of the same common corporate structure, firms can locate activities that generate high profits with relatively little input, or “substance,” in jurisdictions where those profits are taxed at low rates. Such practices are legal, but they run counter to the principle of taxing activities where value is created. Firms can also manipulate transfer prices between their affiliates to shift profits to lower-tax jurisdictions.

In principle, transactions between affiliates of a multinational corporation are “priced” according to the arm's-length principle, which means that they are in line with comparable transactions between unrelated enterprises under comparable circumstances. These rules for affiliated-party transactions are intended to ensure that profits of MNCs are registered in countries where value is created. In practice, however, the arm's-length principle is hard to apply, leaving scope for manipulating transfer prices to shift profits (but not substantial activities) to low-taxed entities without violating transfer pricing rules.<sup>117</sup>

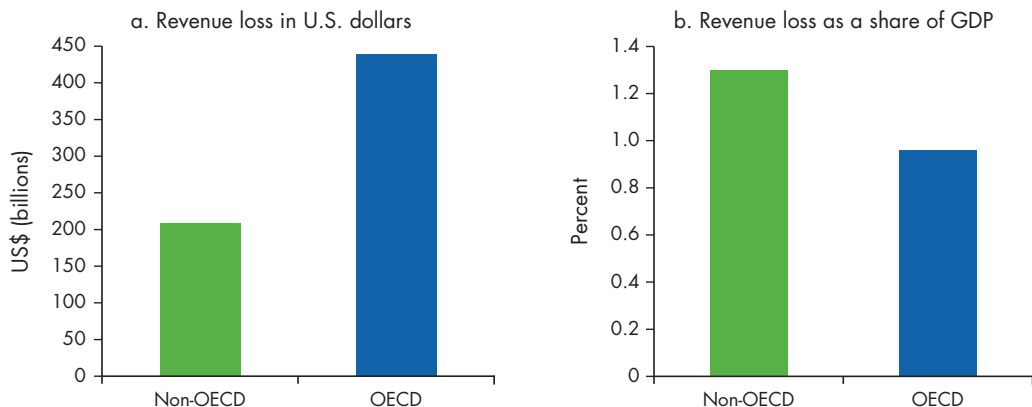
**Figure 3.20 Corporate income tax rates have declined by almost 50 percent since 1990**



Source: IMF 2019.

Note: Data include average subnational rates. OECD = Organisation for Economic Co-operation and Development.

**Figure 3.21** As a share of GDP, non-OECD countries lose the most from profit shifting



Source: Crivelli, de Mooij, and Keen 2016.

Note: OECD = Organisation for Economic Co-operation and Development.

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>118</sup>

Tax revenue losses from profit shifting are substantial: an estimated 30 percent of global cross-border corporate investment stocks are routed through off-shore hubs, and the associated tax losses for developing countries are estimated at about \$100 billion.<sup>119</sup> In 2013 non-OECD countries missed out on \$200 billion in tax revenue as a result of profit shifting, a relatively larger loss than in OECD countries (figure 3.21).<sup>120</sup>

The growth of intangibles in GVCs and the digital delivery of services pose special challenges. Intangible assets such as data, patents, and trademarks are inherently more mobile than the traditional physical factors of production. Such assets are hard to value, and their share in overall capital goods is rising in the digital economy. In the United States, the share of intangible assets in the nonresidential capital stock doubled between 1966 and 2016.<sup>121</sup> Firms can choose to move only certain parts of the production process abroad, thereby minimizing any associated risk and maximizing the potential gains.<sup>122</sup> Thus small changes in tax policy can prompt large locational shifts by GVC firms, increasing pressure on countries to compete for economic activity through their national tax systems.

## Notes

1. Harmonized System (HS) categories 61, 62, and 64, using mirror data for 2017. The HS trade statistics coding system is an internationally standardized system of names and numbers to classify traded products.

2. Moazzem and Radia (2018); Solotaroff et al. (2019).
3. World Bank, Women, Business, and the Law (database). See appendix A for a description of the databases used in this Report.
4. *Guardian* (2019).
5. International buyers have joined together to work in a coordinated way through the Fire and Building Safety Accord (mostly European companies and unions) and through the Alliance for Bangladesh Worker Safety (a group of mostly North American buyers). These groups have committed to inspecting their supplier factories and developing plans for training and remediation. In March 2013, the government, business organizations, and trade unions signed the National Action Plan on Fire Safety, which calls for action to improve legislation, expand labor inspection capacity, and implement systematic inspections of all factories. The Accord, the Alliance, and the National Action Plan have agreed to use a common standard for certification to ensure that building structural integrity and fire safety are adequate. The World Bank Group has also been working with the private sector on improving water usage through the Partnership for Clean Textiles and labor standards through ILO-IFC Better Work (ILO and IFC 2016). In April 2018, after the five-year anniversary of the Rana Plaza disaster, a crowd-sourcing effort to map all garment factories in Bangladesh and make the mapping publicly available was initiated by the private sector, with collaboration among Sourcemap, the C&A Foundation, and BRAC University.
6. Markup is a measure of market power. It is the ratio of the price to the marginal cost of production after all tangible and intangible factors of production have been remunerated.
7. (See also UNCTAD 2013.)
8. Quantitative methods that trace the internationally fragmented nature of GVCs through global input-output links typically predict larger gains from trading across borders than models without those international links (Antràs and de Gortari 2017; Caliendo and Parro 2013).

9. Based on regression results from Constantinescu, Mattoo, and Ruta (2019).
10. Costa (2019).
11. Output per worker controlling for capital as well as foreign ownership status, sector, and regional differences. The percent differences are obtained by multiplying 100 by the exponential of the coefficient in figure 3.3 minus 1.
12. Doane (2015).
13. Amiti and Konings (2007); De Loecker et al. (2016); Goldberg et al. (2010).
14. For example, Antràs, Fort, and Tintelnot (2017) show that U.S. firms that began importing from China after that country's accession to the World Trade Organization also increased their sourcing from domestic suppliers in the United States.
15. Amiti and Konings (2007); Constantinescu, Mattoo, and Ruta (2017); Goldberg et al. (2010); Halpern, Koren, and Szeidl (2015); Taglioni and Winkler (2016).
16. Sampson (2015).
17. The benefits for producers in developing countries that relational GVCs produce are sizable. In Colombia, a program led by a multinational firm induced suppliers to upgrade their coffee farms while planting trees and incorporating more efficient and sustainable practices. About 80,000 farmers and 1,000 villages benefited from the program: the quality of coffee improved, while farmers' profits increased by 15 percent (Macchiavello and Miquel-Florensa 2019).
18. Barrientos et al. (2016).
19. Krishnan (2017).
20. Gereffi, Humphrey, and Sturgeon (2005).
21. Macchiavello and Miquel-Florensa 2017).
22. Dearden, Reed, and Van Reenen (2006).
23. Iberahim (2013).
24. Hansson (2008).
25. Alfaro-Ureña, Manelici, and Vasquez (2019).
26. Pietrobelli, Marin, and Olivari (2018).
27. Gereffi, Humphrey, and Sturgeon (2005).
28. De Loecker (2007, 2013); Iacovone and Crespi (2010).
29. Kugler and Verhoogen (2012).
30. More abundant use of capital and skills is important for upgrading (Bustos 2011). Handling greater product complexity requires reinforcing intermediate management layers relative to plant workers (Caliendo et al. 2015). Sourcing strategies are also essential for upgrading. As part of this process, the organization of procurement practices and sourcing becomes an integral part of a firm's strategy and an increasingly important part of its competitive advantage (Antràs, Fort, and Tintelnot 2017). It not only matters which international linkages a firm creates, but also which domestic supplier linkages it creates (Eslava, Fieler, and Xu 2015). Connections with demanding and refined customers supports learning (Fieler, Eslava, and Xu 2014). But these customers have high standards of quality and delivery that may be more difficult to learn than simpler tasks, even with deep relationships within the GVC. A firm's ability to quickly absorb increasing amounts of more complex technology, know-how, and an ability to produce at high quality determine outcomes (Costinot, Oldenski, and Rauch 2011).
31. Dihel et al. (2018).
32. General Statistics Office (GSO), Vietnam, Enterprise Surveys, 2014 (database).
33. World Bank, Enterprise Surveys (database). The surveys are administered to a developing country sample of 81 countries.
34. Cali et al. (2016). In a sample of 39 countries, the number of jobs supported by \$1 million in gross exports declined from 38 in 2001 to 16 in 2011. The number of manufacturing jobs supported by \$1 million in gross exports declined from 20 in 2001 to 12 in 2011. Similarly, the number of jobs per unit of domestic value added in exports declined between 2000 and 2014 in seven developing countries, where technical change in GVCs has been biased against the use of labor (Pahl and Timmer 2019).
35. Cali et al. (2016). In a sample of 39 countries with data for 2001 and 2011, 26 countries experienced a decline in export jobs' share of total jobs. On average, 28 percent of jobs were supported by exports in 2011, compared with 31 percent in 2001.
36. Rodrik (2018).
37. In Vietnam, firms that import and export employ more workers than firms that export only and firms that do not trade, controlling for sector and province fixed effects as well as state- and foreign-ownership. In Mexico, firms that have relationships with buyers, as well as firms that export and import, also see higher employment than firms that only import or only export. This holds even when considering regional, sector, and foreign ownership characteristics of firms. Across developing countries, firms that import and export employ more workers than one-way traders or nontraders.
38. The percent differences are obtained as 100 multiplied by the exponential of the coefficient in figure 3.6 minus 1.
39. Manufacturing firms with 10 or more workers. The share of GVC firms in total employment increased from 19 percent to 23 percent between 2000 and 2014.
40. Costa (2019).
41. In the nonagricultural enterprise sector. Employment in GVC firms increased by 130 percent between 2004 and 2014, compared with 115 percent for import-only and 47 percent for export-only firms (with six or more employees). Total employment in nontrading firms increased slightly faster, by 136 percent, although this difference is likely not statistically significant.
42. From 30 percent to 31 percent.
43. World Bank, World Development Indicators (database).
44. Total manufacturing employment increased from 2.7 million to 5.7 million between 2004 and 2014. Formal manufacturing jobs (covered by social security) in formal enterprises increased from 2.4 million to 4.5 million. GVC firms accounted for 14 percent of formal jobs in 2004 and 17 percent in 2014.
45. According to the General Statistics Office (GSO) of Vietnam, the number of employees age 15 and older in

manufacturing was 5,031,200 in 2005 (first year of available data) and 7,414,700 in 2014 (see annual employed population and annual employed population 15 years of age and above, with breakdown by kind of economic activity, items, and year).

46. Lopez-Acevedo and Robertson (2016).
47. Kumar (2017).
48. Faucheux et al. (2014).
49. Within provinces, a 1 percentage point increase in the share of firms that participate in GVCs is associated with a 3.2 percent increase in female employment and a 2.1 percent increase in male employment.
50. Staritz, Plank, and Morris (2016).
51. Faucheux et al. (2014).
52. World Bank (2018).
53. Heath and Mobarak (2015). There is a 28 percent decrease in the likelihood of getting married and a 29 percent decrease in the likelihood of childbirth.
54. There is no additional wage premium for relational firms over export-only or import-only firms.
55. Using firm-level and customs transaction-level data covering the period 2000–2006 with the methods of propensity score matching, difference in differences, and generalized propensity score. See Lu et al. (2019).
56. Shepherd and Stone (2012) also find that firms with the strongest international linkages—export, import, and foreign-owned—pay higher wages.
57. The poverty elasticity of growth depends on various factors, including its incidence (changes in inequality); the initial distribution of land; wealth and income; education levels among the poor; other forms of past public investment; and local institutions, including unions (Ferreira, Leite, and Ravallion 2010; Ravallion and Datt 2002). Also see Dollar and Kraay (2002) and Ferreira and Ravallion (2008).
58. *Food poverty* is defined as the inability, even if all available income is used in the home, to buy only the goods of a basic food basket. *Capabilities poverty* is defined as the insufficiency of disposable income to acquire the value of the food basket and carry out the expenses necessary in health and education, even dedicating the total income of the home to nothing more than these purposes. *Asset poverty* is defined as the insufficiency of income available to acquire the food basket, as well as to make the necessary expenses in health, clothing, housing, transportation, and education, even if the entire household income is used exclusively for the acquisition of these goods and services.
59. This is consistent with the observation that migrant workers are more likely to work in the formal sector in Vietnam (McCaig and Pavcnik 2015).
60. Maertens, Minten, and Swinnen (2012).
61. Foreign direct investment (FDI) inflows—an important determinant of GVC participation—has similarly been associated with poverty reduction, but also income inequality in Ethiopia, Vietnam, and Turkey (World Bank 2019a). In Ethiopia, the overall effects of FDI are largely positive, with large effects on poverty reduction and limited effects on income inequality. In Vietnam, FDI has significantly benefited shared prosperity, but some increases in income inequality emerged as well. In Turkey, the average worker has experienced some benefits, although many of the benefits have accrued to high-skilled workers, thereby revealing the greatest increase in income inequality.
62. De Loecker and Eeckhout (2018).
63. Markups can increase because prices are higher or because costs are lower, or it may be a combination of both when markets are not perfectly competitive, meaning that firms can affect prices. The effect of GVC participation on firms' markups depends on whether the reductions in costs, or the gains from GVC participation, are fully passed on to the consumer through lower prices.
64. Autor et al. (2017).
65. Including the Herfindahl index and the number of firms within an industry.
66. Based on regression analysis that considers country- and industry-specific characteristics. It is possible that these producers focus on tasks that have the highest value added because of demand (such as for a particular design, concept, or service—that is, where market power is the result of innovation or merit), and they outsource those tasks that have lower value added (such as producing homogeneous parts). Ideally, one would disentangle the channels and the different effects, but this is not possible with the data.
67. De Loecker et al. (2016).
68. De Loecker and Warzynski (2009).
69. Excluding China and controlling for country fixed effects. The negative correlation also holds without controlling for country fixed effects for samples that exclude and include China.
70. Diez, Fan, and Villegas-Sánchez (2019).
71. Choi, Fukase, and Zeufack (2019). Controlling for state ownership, firm size, and capital intensity.
72. Gradzewicz and Mućk (2019).
73. Dauda, Nyman, and Cassim (forthcoming).
74. Karabarbounis and Neiman (2013).
75. Barkai (2016) finds that in the United States profits have risen as a share of GDP and that the pure capital share of income (defined as the value of the capital stock times the required rate of return on capital over GDP) has fallen alongside the labor share.
76. Autor et al. (2017) also point to outsourcing as a possible explanation for the declining labor share in the United States.
77. Reshef and Santoni (2019) investigate the same phenomenon in a sample of 26 EU countries over the period 1995–2014. They suggest that the labor-reducing effect of capital intensity may be a short-run phenomenon. The authors document a recovery from 2007 onward, explained by within-industry changes, notably for skilled labor associated with the complementarities between capital intensity and skilled labor. Domestic within-industry factors also explain a recovery in the labor share from 2007 on in the larger sample of 63 developing and developed economies.
78. Oxera Consulting (2019).
79. Goldberg and Pavcnik (2007).
80. Feenstra and Hanson (1996, 1997).

81. Verhoogen (2008).
82. Antràs, Garicano, and Rossi-Hansberg (2006); Kremer and Maskin (2006).
83. Bernard, Moxnes, and Ulltveit-Moe (2018).
84. Griliches (1969); Krusell et al. (2000).
85. Becker, Eckholm, and Muendler (2013); Bloom and Van Reenen (2011); Dearden, Reed, and Van Reenen (2006); Hansson (2008).
86. Hijzen et al. (2013); Javorcik (2014); Markusen and Trofimenko (2009); te Velde and Morrissey (2003). 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.
87. Shepherd and Stone (2012).
88. Crinò (2012).
89. Morris and Staritz (2014).
90. Darko, Occhiali, and Vanino (2018).
91. World Bank staff estimates. Analysis of OECD's TiVA database for 61 countries shows that a one-unit standard deviation increase in domestic value added in exports of intermediate products is associated with a 0.1 decline in the dispersion of the urban size distribution within countries.
92. Autor, Dorn, and Hanson (2016).
93. de Vries (2017); Farole, Hollweg, and Winkler (2018).
94. Chan (2013).
95. Dihel et al. (2018).
96. Amanor (2012).
97. Dolan and Sutherland (2003); Kritzing et al. (2004).
98. ILO (2016).
99. ILO and IFC (2016).
100. Faber, Krause, and Sánchez de la Sierra (2017).
101. Harrison and Scorse (2010).
102. Staritz and Reis (2013).
103. Velu et al. (2009).
104. World Bank and IFC (2014).
105. Muñoz-Boudet (2018).
106. World Bank (2011).
107. Costa (2019).
108. Staritz and Reis (2013).
109. Christian (2013).
110. World Bank (2011).
111. Staritz and Reis (2013).
112. Ahmed (2013).
113. World Bank, Women, Business, and the Law (database).
114. This section focuses on direct taxation. However, GVCs also pose challenges for indirect taxes, such as the value added tax (VAT), although these are more tractable (see Clavey et al., forthcoming).
115. See IMF, OECD, United Nations, and World Bank (2015).
116. As corporate profits have gone up, the average revenue from corporate income tax has remained stable over the same period. But as other sources of income (such as wage income) as a share of GDP have gone down, these factors have indirectly reduced the scope for governments to secure adequate tax revenue.
117. Cooper et al. (2016).
118. For a more complete listing, see Beer, de Mooij, and Liu (2018).
119. UNCTAD (2015).
120. Crivelli, de Mooij, and Keen (2016).
121. Auerbach (2017).
122. de Mooij and Ederveen (2008).

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