Executive summary

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More than two-thirds of world trade occurs through global value chains (GVCs), in which production crosses at least one border, and typically many borders, before final assembly. The phenomenal growth in GVC-related trade has translated into significant economic growth in many countries across the globe over the last two decades, fueled by reductions in transportation and communication costs and declining trade barriers. But, at the same time, it has contributed to distributional effects that mean that the benefits of trade have not always accrued to all, which has, at least in part, been a driver in the backlash against globalization and the rise of protectionism and threats to global and regional trade agreements. In addition, new technological developments such as robotics, big data, and the Internet of Things (IoT) are beginning to reshape and further transform GVCs. This second GVC development report takes stock of the recent evolution of GVC trade in light of these developments.

Update on trends in GVCs

The growth of global value chains has slowed since the global financial crisis. A country's GDP (value added) can be decomposed into purely domestic, traditional trade, in which a product is made in one country and consumed in another, simple value chain trade, in which a good made in one country crosses one border and is used in production in the partner country before consumption there, and complex value chain trade, in which production crosses multiple borders. From 2000-2007, GVCs, especially complex ones, were expanding at a faster rate than other components of GDP. During the global financial crisis there was naturally some retrenchment of GVCs, followed by quick recovery (2010-2011) but since then, with the exception of 2017, growth has, in the main, slowed. In 2017 expansion of complex GVCs was faster than GDP growth, but it is too early to say if this is a new trend or just a one-year blip.

Concerning which sectors are particularly amenable to GVCs, over a long period we found that, the higher the technology (knowledge) intensity of a sector, the more significant the increase of complex GVC activities. Thus, GVC linkages are especially important for high-tech sectors and it is in these areas that we see highly complex value chains involving many countries.

We also distinguish between intra-regional GVC activities and inter-regional ones. Activities within North American economies would be an example of the former, whereas China's growing contribution to value chains centered on the U.S. or Germany would be examples of the latter. Between 2000 and 2017, the weight of intra-regional GVC activities in "Factory Asia" came to exceed that of "Factory North America". In contrast, the share of intra-regional GVC activities declined relatively in both Europe and North America and their share of inter-regional production sharing activities increased, especially their GVC linkages with "Factory Asia", reflecting in large part increased inter-connectedness with China. China is increasingly playing an important role as both a supply and demand hub in traditional trade and simple GVC networks, although the U.S. and Germany are still the most important hubs in complex GVC networks.

GVC analysis also provides some insight into bilateral trade balances and how they should be interpreted. In a world in which most trade consists of parts and components, bilateral trade

balances are significantly affected by the supply and demand of third countries; and, net imports are no longer a proper measure of the impact of an international trade shock on the domestic economy in the age of GVCs, compared to the time when final goods trade dominated. China happens to be at the end of many Asian value chains, taking sophisticated components from Japan, the Republic of Korea, and Chinese Taipei and assembling these into final products. Two-thirds of all intermediate imports of information and communication technology (ICT) products, coming from other countries in Factory Asia, but also with significant contributions from Europe and North America, are used as inputs into Chinese exports. Indeed, the Chinese domestic value content of their exports of ICT products accounts for only around half of the total export value. As such, trade balances look very different in value-added terms. For example, the U.S. trade deficit in ICT products with China is roughly cut in half if the calculation is made in value added terms.

Labor market effects of GVCs in developed countries

One of the main controversies of globalization is its effect on labor markets in both developed and developing economies. Across advanced economies, the real median wage has grown slowly over the past two decades and manufacturing employment has been on the decline, while incomes of highly skilled workers and owners of capital have soared. There are of course many factors at work here, and not all are related to globalization, especially countries' own domestic tax and transfer policies, but one additional factor has been big developing countries, especially China and Eastern European economies, opening up and joining the global economy.

A number of studies have concluded that, in particular, the impact of Chinese import competition on the U.S. labor market, especially after China joined the WTO, was a significant factor behind U.S. manufacturing employment dropping sharply after 2000. But these analyses have typically only provided a partial view of the overall impact on employment, by and large ignoring the reality of value chains. A full view requires that we account for the fact that the development of value chains results in churning across economies, as firms and countries specialize and create certain types of jobs while eliminating others. General equilibrium analyses of the so-called "China shock" that take account of GVCs find that, for the U.S., trade was not a main contributor to the loss of manufacturing jobs and has only minor aggregate employment effects. One important reason for this more nuanced effect is that while some industries contracted because of increased competition, others expanded thanks to the cost savings that GVC linkages provided, counterbalancing jobs lost in contracting industries. This is consistent with economic theory, which suggests that trade should not have a large net effect on employment.

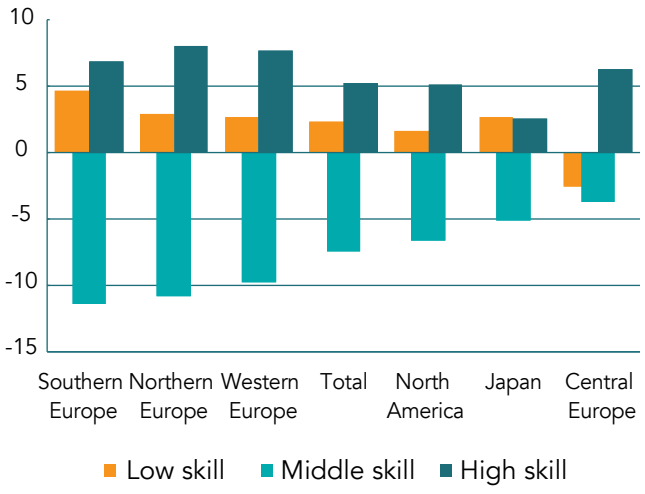
That being said, the effects vary considerably across regions and individuals with different skill levels. Moving from the nationwide and sectoral level to regional and individual outcomes reveals substantial heterogeneity in how aggregate effects map out. For instance, when local labor markets within countries are not sufficiently diversified, trade can widen regional disparities. Regions specialized in import-competing and upstream industries can fall behind, while areas with industries that export or benefit from cost savings due to cheaper imported inputs pull away.

Similarly, trade may work in the same direction as other drivers in contributing to labor market polarization. In particular, automation has impacted jobs in the middle of the skills distribution, with remaining jobs concentrated at the high and low ends. Between 1999 and 2007, the years when China was reducing barriers and entering the WTO, nearly all advanced economies had increases in employment shares for high- and low-skilled jobs, and declines for middle-skill work (see Figure 1).

While trade and automation are making a country as a whole richer, there is a need for adjustment policies to ensure a more even distribution of these gains. This is especially the case as value chains magnify trade-induced changes in skill requirements and thereby raise the demand for worker flexibility and the need for training support. With regard to the optimal design of such policies, value chains make targeted or specific labor market interventions increasingly difficult. As input-output linkages cause trade shocks to spread more widely within economies, import competition is less and less limited in terms of industries, regions, or skill levels. As a result, it can become more difficult to identify the exact reason for individual displacement. Therefore, adjustment policies should not differentiate between the various reasons for worker displacement, such as automation or trade, and be less dependent on affected workers fulfilling certain

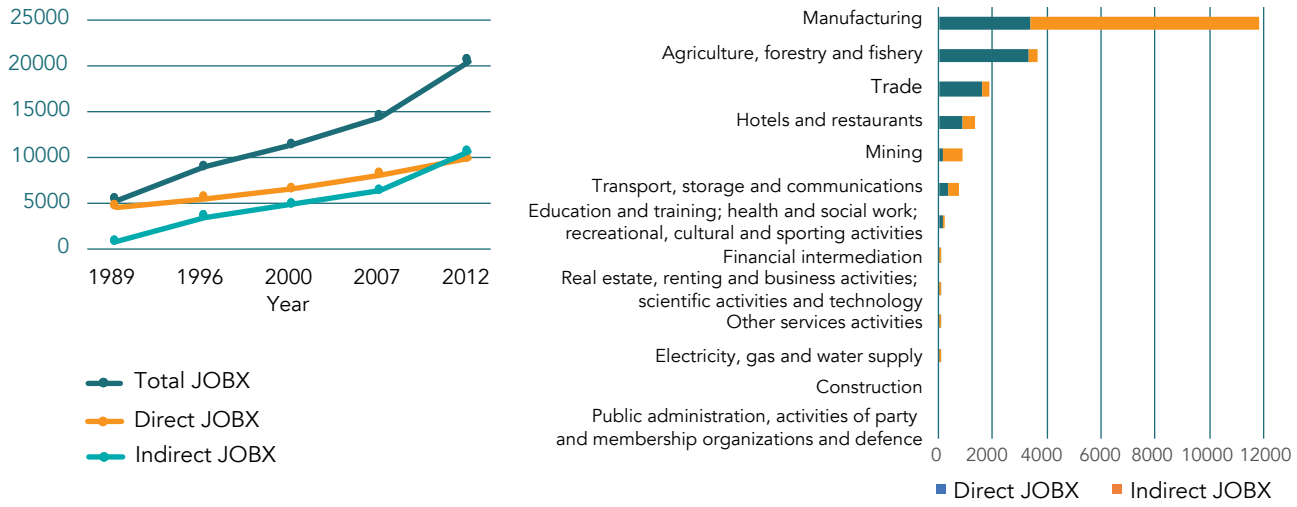
FIGURE 1 Percentage point changes in employment shares by skill level between 1995-2015

Percent



Source: OECD (2017). See chapter 2 for details.

FIGURE 2 Many jobs in Viet Nam are tied to exports, directly and indirectly



Source: Hollweg (2017). See chapter 3 for details.

conditions. In addition, mobility and place-based policies could usefully complement general labor market policies to address regional divergence.

Labor market effects of GVCs in developing countries

The emergence of global value chains has offered developing countries new opportunities to integrate into the global economy. This has fundamental impacts on where jobs go, who gets them, and what type of jobs they are. Significant parts of the developing world are deeply involved in GVCs. Their input has been initially concentrated in labor-intensive activities, which may have had important impacts on poverty in developing countries. For example, the boom in exports to the United States following the US–Vietnam Bilateral Trade Agreement of 2001 was particularly beneficial to wages of unskilled workers, reduced the skill premium, and was a key driver of poverty reduction in Viet Nam because it was concentrated in unskilled, labor-intensive GVC sectors, most notably textiles.

There is a positive association between output growth and employment growth within GVC sectors, which increased overall welfare as workers moved out of agriculture or the informal sector toward better paying, higher value-added jobs. Women who previously had difficulty accessing this type of wage work have filled many of these jobs. Employment and wage impacts can happen both directly within exporting firms as well as indirectly through these firms' demand for goods and services from the domestic economy. The extent to which GVCs interact with domestic labor thus depends on the linkages of exporting firms to domestic, input-supplying firms. The firms that export directly account for only a small part of GVC jobs. In Viet Nam, most of the job creation results from backward linkages – that is, in indirect exporting firms that supply inputs to the direct exporters (see Figure 2).

The relationship between GVC integration and level of employment though is not necessarily positive in all contexts. Imports of goods and services (backward GVC participation) matter as much as exports of intermediates (forward GVC participation) to be successful in GVCs, where opening up to imports is often a pre-condition to successfully export. However, there may be import-competing effects in labor markets.

Evidence as well as intuition suggests that GVC participation will have other distributional implications. Greater participation of developing countries in global trade is expected to integrate not only markets for products, services, finance and technology, but also, directly and indirectly, markets for labor. The hallmark of globalization is big developing countries opening up and joining global trade. In general, such economies are abundant in unskilled labor and scarce in skilled labor and capital relative to global averages. The factor-endowment theory of trade predicts that trade will reduce returns to unskilled labor in advanced economies while raising returns to capital and skilled labor. This trend has generally been observed. But the opposite trend should occur in developing countries that open up: wages of unskilled workers, clearly the most abundant factor in many developing countries, should rise faster than other factor rewards. This has not happened in most developing countries; rather, employment creation and wage gains have been biased towards more skilled workers. GVC expansion in developing countries is associated with higher relative demand for skilled workers. Characteristics of GVCs themselves, by supporting more complex industrial organization, as well as services inputs that are complementary to value chains, can be skill-biased.

Automation may be threatening GVC jobs in developing countries in the long term, where the routine tasks more susceptible to automation are increasingly performed. Technological

advancements that largely get diffused through global value chains are affecting how GVCs support jobs in developing countries. Evidence suggests that changes in efficiency in GVCs has negative impacts on employment linked to countries' participation in the global production of products, all else equal. Technological innovation has also lowered the demand for low-skilled workers relatively more than compared to high-skilled workers. Nevertheless, the adverse effects of changing production technologies and efficiencies on employment have been offset by increased consumer demand, whereby the domestic consumption expenditures in large emerging economies such as China and India will generate new demand for labor for the global economy

These distributional consequences of trade and other forces are a principal concern to policymakers. Policies also play an important role in mediating the relationship between GVCs and employment in developing countries. These include policies that support (i) participation of developing countries in GVCs, (ii) fostering positive spillovers from GVC participation, (iii) upgrading to higher value-added tasks within GVCs, and (iv) mediating negative effects from winners, such as inequality.

Technological progress, diffusion, and opportunities for developing countries

The nature of technology used in products plays a major role in determining the governance structure of value chains and the benefits of participation for developing countries. Standardization through breaking production into modules with a high degree of functional autonomy (limited mutual interference between modules) can dramatically reduce the amount of R&D, learning by doing, and the number of complementary skills needed to produce a good. This greatly increases opportunities for developing country firms to participate in formerly capital-intensive industries through reducing entry costs into global value chains.

However, widespread access to standardized products with little ability to modify technical features can lead to an excessive supply of homogeneous products in a local market, resulting in intense price competition and limited technology transfer. By contrast, technology that facilitates scope for product modification and greater interaction with lead manufacturers can help boost technology transfer and product upgrading by developing country firms. Chapter 4 illustrates this interaction between changes in technology and opportunities for developing countries through developments in the automotive and cell phone industries in China.

The chapter argues that policies for helping domestically owned firms to become technologically standalone – what some might refer to as "techno-nationalism" – do not necessarily deliver the expected results in terms of upgrading. The world's most powerful technology companies, both from emerging and advanced countries, work with global suppliers and even with competitors in "open innovation" environments. Hence, the advice to policymakers seeking to upgrade toward the global technology frontier is to prioritize measures that encourage firms to be full partners in global technology ecosystems and to pursue open source innovation solutions.

The question that now remains is whether firms from other countries, especially in less/least-developed regions, can replicate the positive experience of leveraging platforms by Chinese firms as demonstrated in this chapter. And does automation of production even prevent initial entry based on low wages?

Robotics, 3D printing, the IoT, Big Data, and cloud computing, among others, are transforming entire industries. The evidence suggests that automation reduces some of the incentives for GVCs to relocate to lower-wage countries. However, it is also seen that automation does not necessarily dampen the attractiveness of low-wage destinations, especially for labor-intensive tasks that require human dexterity. In the apparel industry, for example, soft materials like fabrics are difficult to handle through automation compared to solid materials such as metal or wooden objects, and sewing/stitching can still be out of the reach of "robots' hands".

In this sense, automation is likely to have only a limited impact on developing countries' opportunities to participate in value chains through the offshoring of production by high-income countries, at least in the short term. Foreign direct investment flows (greenfield investment) from high-income countries to low- and middle-income countries has declined since 2010. Nevertheless, there are important differences across industries and between production and assembly tasks within industries. The pattern across countries also suggests that some FDI may have migrated from China to low-income and middle-income countries in Asia and Africa and from higher- to lower-income countries in the Europe and Central Asia region.

While automation does not pose immediate risks to shut the door to labor-intensive exports from developing countries, governments need to develop a comprehensive digital strategy. Our economies are increasingly sitting on a digital foundation, one that is generating high-speed growth and disruptive change. The employment and investment of tomorrow will be data intensive, and value in a knowledge economy is increasingly created by innovative ideas and data.

Not only is embracing digital technologies good for the economy, but it is also good for society. The digitally powered, knowledge-intensive GVCs that are emerging and are likely to dominate in the coming years have a strong potential for inclusion. As Nobel Prize winner Mike Spence points out, they have low marginal costs of production and are non-rival. Moreover, they can expand markets for small businesses beyond traditional geographies. They can also expand financial inclusion, as data on e-commerce can be used as collateral, and smartphones link up poorer countries to these opportunities.

GVCs and digital technology

"Supply Chain 4.0" is the re-organization of supply chains – design and planning, production, distribution, consumption, and reverse logistics – using technologies that are known as

"Industry 4.0". These technologies emerged in the 21st century and are largely implemented by firms that are at the frontier of supply chain management in high-income countries. The most frequently mentioned supply management techniques are the IoT, big data analytics, 3D printing, advanced (autonomous) robotics, smart sensors, augmented reality, artificial intelligence, and cloud computing. Through these advanced techniques, a continuous flow of information between the retailer and supplier keeps the shelves stocked and there is no longer a "back room" in stores where inventory is kept.

"Supply Chain 4.0" is about transforming the model of supply chain management from a linear model in which instructions flow from supplier to producer to distributor to consumer, and back, to a more integrated model in which information flows in multiple directions. While lead firms are increasingly analyzing this information through "supply chain control towers," the end effect of this development is making the goods economy more responsive to consumer demand. According to a recent PwC (2016a) study on the rise of Industry 4.0, a third of the more than 2,000 respondents say their companies have started to digitize their supply chains, and fully 72% expect to have done so five years from now.

In "Supply Chain 4.0", the internet makes the warehouse visible to the customer and within the warehouse, some technologies such as autonomous logistics and robotic transport can be employed to substantially improve pick-and-pack performance. Business-to-business (B2B) e-commerce consists of links in supply chains – whether transactions between parts suppliers and assemblers, between distribution centers and retailers, or online purchases of services which in many cases support the supply chain. B2B commerce can be implemented either through websites, much like business-to-consumer (B2C) e-commerce, or through electronic data interchange (EDI) which is a mature technology through which the computer systems of the buyer and seller are directly connected using a common record format.

To rapidly assess and respond to changes in customer demand, tracking and tracing throughout the supply chain is enabled through sensing technologies underlying the IoT, including radio frequency identification (RFID), Bluetooth, and global system for mobile communication (GSM). Applications of IoT are increasingly used to facilitate the management strategies of "customer-managed inventory" (CMI) or "vendor-managed inventory" (VMI) in which information is initially provided by a customer and then transmitted up the supply chain to the warehouse. Technologies such as RFID tags then transmit information to the distribution center so that orders can be fulfilled. An EDI system causes an order created electronically by the customer to be instantly duplicated without error in the vendor's computer system, and the invoice to be similarly electronically duplicated in the customer's computer system. Some of these processes are being implemented through blockchain, a distributed ledger technology that allows multiple parties to maintain copies of the same information in various locations, either in an open manner or requiring individual entities' permission to access the network. Its special feature is that historical entries cannot be altered.

New technologies gather prodigious amounts of data. Big data analytics is about using data to drive useful business intelligence, answering the questions, "What just happened?", "Why did it happen?", and "What are we going to do next?" The ability to collect and analyze data gathered in the whole supply chain makes it possible to "run scenarios within the platform", where the platform is conceived of as an overarching software solution within the supply chain control center. Besides saving time and labor, and reducing errors, EDI enables a large amount of data capture about customer behavior which can be the basis for supply chain analytics using either "big data" or "small data" techniques.

The use of modern technology and human labor in warehouses are often complements, rather than substitutes, especially in conditions where e-commerce is substantially increasing demand for certain goods and services. E-commerce is a mechanism for translating unpaid household shopping time into paid market time. Instead of consumers spending time shopping, workers in warehouses and on delivery trucks are picking goods off warehouse shelves and bringing them to the consumer's front door. Most of the jobs being created involve moving goods around either in warehouses or delivery vehicles and have many of the characteristics of factory work. A study using U.S. data gathered in the Occupational Employment Statistics of the Bureau of Labor Statistics, shows that employment in the most dynamic parts of the supply chain has grown at a rate substantially exceeding that of the overall economy since 2011. These sectors include warehousing and storage, couriers and messengers (i.e. express delivery), and non-store retailers (i.e. e-commerce companies).

Digital technologies and the internet are becoming the foundation of entire economies. There are huge benefits in terms of inclusive patterns of growth, innovation and entrepreneurial opportunities, but the downside risks are much larger than was initially understood. Trade and investment will be vulnerable in the near complete absence of international agreements on the uses and prohibited abuses of the internet and data.

The digital economy and SMEs

Small and medium-sized enterprises in general have low direct participation in international trade, compared to large enterprises. This result makes economic sense as long as there are fixed costs in exporting, such as learning about foreign markets or rules and minimum scales for shipping. In theory, the spread of GVCs should reduce these effects and make it easier for SMEs to participate in trade as the break-up of the production process makes it feasible for a specialized firm to find niche markets. Yet, SMEs are underrepresented in GVCs.

This may be changing, however, as access to information and communication technology (ICT) continues to grow. For example, there is evidence that the internet reduces search costs, facilitating more exchange and increasing firm productivity. Cross-border e-commerce platforms are also providing new opportunities for SMEs and even micro firms.

Using firm-level data from the World Bank's Enterprise Surveys, new research finds that whether a firm has a website on the internet facilitates the participation of manufacturing SMEs in GVCs and trade. In particular, such SMEs are more likely to use foreign inputs for production and export their output. Further, ICT connectivity is found to be more important for small firms than for large ones when considering whether or not a firm participates in trade.

Evidence underlines the importance of ICT access for SMEs to join GVCs in the digital economy, however, access to new technology varies not only between firm size, but also regionally by level of development. Infrastructure constraints faced by developing countries in e-commerce range from the most basic, such as access to a steady supply of electricity, to the more complex, such as not having access to electronic payment systems or a lack of high-speed internet cables. This is a particular problem, not only because information communication technology (ICT) is necessary for e-commerce, but also because ICT is now considered a pre-requisite for joining most GVCs. No matter the internet's functionality, regardless of lacking features such as broadband connection and e-commerce platforms, e-commerce can only develop if the internet is present. This is in line with empirical studies showing that access to the internet improves export performance in developing countries across manufacturing and services sectors through reduced search costs and decreased distance barriers. Furthermore, the internet has also been shown to increase firm productivity, especially of smaller and less innovative firms.

However, SMEs face a number of additional challenges integrating into GVCs with the digital economy. On top of lagging behind large firms in terms of overall digital technology use and capability, small businesses may also find it difficult to access e-commerce platforms and payment systems. National policy may also be inadvertently preventing successful internationalization of SMEs via GVCs. Complex customs procedures, regulatory uncertainty and barriers to services trade all adversely affect SMEs and pose challenges to SME participation in GVCs, despite the opportunities provided by e-commerce.

These findings underscore the continuing need to improve the ICT environment/infrastructure and to expand services such as e-payment and e-commerce, all of which benefit SMEs disproportionally, but they also highlight the lack of information regarding SMEs. In theory the digital economy holds potential for SME participation in GVCs, but for effective policies to be developed, better data will need to be collected.

Should high domestic value added in exports be an objective of policy?

Global value chains make it easier for developing countries to move away from export reliance on unprocessed primary products to become exporters of manufactures and services. Before the development of GVCs, a country had to master the production of a whole product in order to export it. GVCs allow countries to specialize in a particular activity and join a global production network. As a developing country moves from export of primary products to export of manufactures and services via GVCs, the ratio of domestic value added to gross export value tends to fall. Developing countries often start out at the end of value chains, with labor-intensive assembly of parts produced elsewhere. For some individual products, the ratio of domestic value added to gross export value can be very small, maybe only a few percentage points. The gross exports from the country can be very large, but this is an artifact of the position in the value chain. The country's value added contribution to the export is much smaller. Many developing countries worry about this phenomenon and aspire to increase their value added contribution to exports. There are a number of reasons why this objective should be approached cautiously. It may seem like simple math that a higher domestic value added share means more total value added exported and hence more GDP. But that simple idea ignores the reality that imported goods and services are a key support to a country's competitiveness. If a country artificially replaces key inputs with inferior domestic versions, the end result is likely to be fewer gross exports and less, not more, total value added exports.

History provides a number of interesting lessons about this issue. First, in almost all countries, developed and developing alike, the share of domestic value added in exports has tended to trend downwards over time. This reflects the expansion of global value chains. Even the countries best known for final products in key sectors such as autos, machinery, and electronics rely heavily on imported inputs, both manufactures and services. Many of the iconic products in the world, such as BMW cars and iPhones, have large amounts of imported inputs that go into final assembly. Developing countries have learned part of this lesson and are generally quite open to imports of parts and components. However, imported services are also a key input into manufactures, and developing countries tend to be more protectionist vis-à-vis services. Both trade in services and investment in services (often needed in order to trade the services) tend to be more restricted in developing countries, than policies towards manufactures. Developing countries that have more imported service content in their exports tend to be more persistent and successful exporters of manufactures.

A second point about the ratio of domestic content to gross value of exports is that the early East Asian industrializers show a highly non-linear trend in this variable. In the case of Japan, this ratio fell in the early post-war period as the country opened up and began to use imported inputs. In the 1980s, however, the ratio increased as Japan became a capable producer of a wide range of manufactured intermediates and parts. Since 1990 there has again been a sharp trend downwards in domestic content as complex value chains developed throughout Asia. Japan is an industrial powerhouse with many successful brands, and it is revealing that the domestic content ratio in the most recent year is the lowest ever recorded. Being an industrial powerhouse does not mean that all activities take place within the border. Japanese firms use imported goods and services in a highly

efficient manner. The Republic of Korea's and Chinese Taipei's experiences are very similar to Japan's, but with a lag.

China's recent experience is an important counter-example. At the beginning of economic reform there was a sharp drop in the domestic value added ratio as the country moved from exporting primary products to assembling apparel and electronics using parts produced in other countries. However, over the past decade the ratio has been rising, catching the attention of other developing countries. Our research indicates that this trend is primarily the result of technological advance in China, not the result of restrictive trade policy. What is happening to China now is analogous to what happened to Japan in the 1980s and the Republic of Korea in the 1990s, as their technological capability advanced. If China's experience continues to be similar to the earlier industrializers, then the ratio can be expected to peak and later decline as labor-intensive activities are off-shored to lower wage locations and more imported components and parts are used in production to keep Chinese firms competitive in international markets. China's development is likely to be influenced by its "Made in China 2025" industrial policy. This policy aims to make China a technology leader in ten advanced manufacturing sectors. China has set indicative targets for domestic value added in these sectors. In semiconductors, for example, China currently imports 90% of usage, but plans to produce 70% of usage by 2025, which would be an extraordinary shift. What remains unclear is what policy tools China will use. If it restricts imports or direct investment in these sectors, it will make its firms less competitive, not to mention inflaming global trade tensions.

Issues in GVC measurement

The proliferation and development of global input-output tables in recent years has significantly transformed our ability to interpret global production. But, important though such initiatives have been, they are typically silent on the role of multinationals in this new landscape. In addition, the policy debate in recent years has increasingly focused on 'inclusive globalization', referring to the growing realization that the benefits of globalization may not have accrued to all members of society equally, even if only as a process of transition.

With traditional macroeconomic statistics, it is not immediately clear, for example, which categories of workers in which countries benefit from globalization (and how) and which may have been, even if only temporarily, left behind. Moreover, trade in value-added (TiVA) estimates, derived through the construction of a global input-output table, implicitly assume that all firms within a given sector have the same production function (input-output technical coefficients), import intensity and export intensity.

This of course has never been true. We know for example that larger firms will typically have different production functions compared to smaller firms, because of economies of scale, and also higher labor productivity. And these firms will also typically be more export and, indeed, import orientated than their smaller counterparts (reflecting in part the disproportionate costs of trade faced by smaller firms compared to larger firms). The same generalizations hold true for foreign-owned enterprises, or enterprises with affiliates abroad, compared to purely domestic firms; for example, the foreign content of exports by foreign-owned firms in the transport sector in the United States is twice that of domestically owned firms. But TiVA estimates, relying as they do on national supply-use and input-output tables, cannot reflect these heterogeneities; thus, key measures, such as the import content of exports, are downward biased.

Additional complexities can create significant interpretative challenges for users of TiVA type statistics. Because inter-country input-output tables value transactions at basic, and not market, prices, many of the related TiVA analyses reveal only some of the story. What is often not fully understood in the use of tables valued in basic prices is that they exclude the value that is added at the end of the chain by distribution sectors (in particular retail and wholesale, which often include value associated with marketing activities and brands). At the heart of the debate, and indeed confusion, is that input-output tables in basic prices are in essence a mechanism to provide a view of production, and because they remove significant distribution margins at the end of the chain, they are less well equipped to provide a perspective from the consumption point of view. This has a direct impact on smile-curve type analyses that describe where sectors are in value chains and how far they are from final demand. Moreover, although the basic price concept may provide a correct view of, for example, the domestic value-added or services content of a country's total exports, it provides an arguably distorted view of the same measure of a given good seen from a consumption, or free-on-board (FOB) perspective. This is because basic prices exclude often significant distribution margins related to transportation from the factory gate to the customs frontier, which may also reflect significant contributions from activities related to brand, R&D, design, and marketing. For example, the US domestic value-added content of its exports of textiles and clothing in FOB prices was around 20% in 2016 compared to 3% using the pure basic price approach.

The basic price approach also limits the scope to reveal additional dependencies related to globalization, for example jobs sustained in retailers through sales of imports. A complementary accounting framework is developed in "market" prices to illustrate the insights that can be gained through such an approach. In the United States, for example, the sale of imports supported 9.0 million jobs.