

The middle-income trap and upgrading along global value chains

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After acting as the primary drivers of global growth in the years immediately following the 2007–08 global financial crisis, emerging and developing economies experienced a substantial decline. Having exceeded 4% a year from 2010 to 2014, their growth declined to 3.4% in 2015 and to an expected 3.5% in 2016, with commodity producers projected to grow only 0.4% in 2016 (figure 5.1; World Bank 2016a). The end of the commodity boom and concerns about financial stability in many emerging economies led Haldane (2015, p. 13) to argue that after the Anglo-Saxon crisis of 2008/09 and the euro-area crisis of 2011/12, “we may now be entering the early stages of Part Three of the [crisis] trilogy, the ‘Emerging Market’ crisis of 2015 onwards.” Many emerging economies face high corporate debt and excess capacity, leaving them vulnerable to unexpected domestic or global events (IMF 2016). And many of the world’s largest middle-income countries—including Argentina, Brazil, China, Indonesia, Nigeria, and the Russian Federation—have seen substantial slowdowns.¹ In this economic climate, gaining better understanding of different growth trajectories and the obstacles middle-income countries face in sustaining rapid growth becomes all the more relevant.

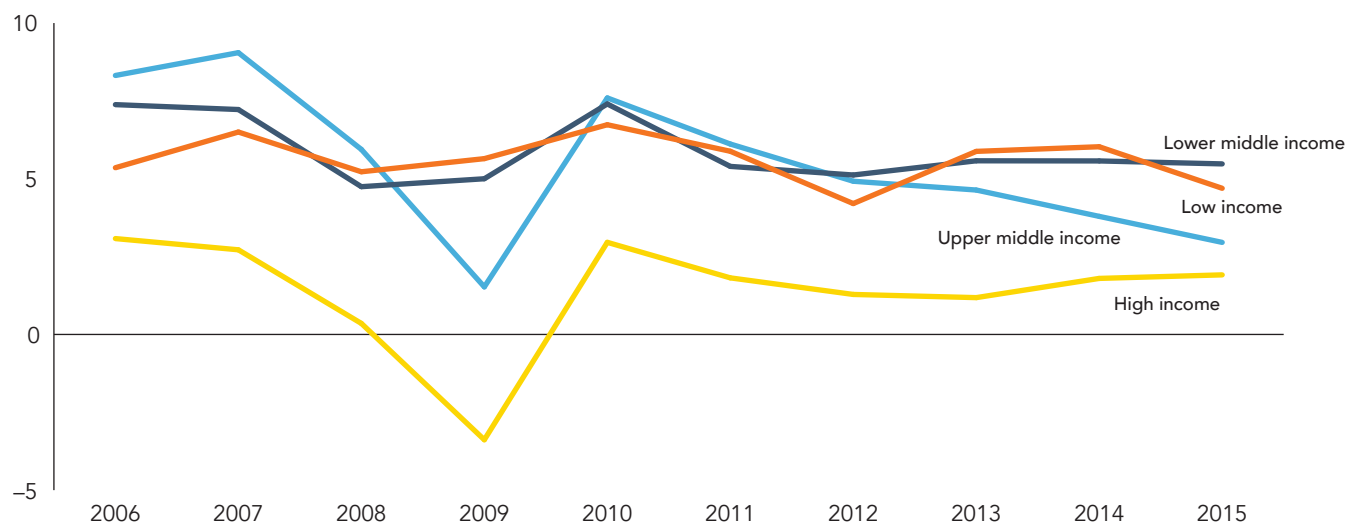
This chapter examines in greater depth the middle-income trap—in which high sustained growth becomes increasingly difficult once a country reaches GDP per capita of around \$10,000. The term, coined by Gill and Kharas (2007) in relation to growth prospects in Asia, remains ambiguous and is interpreted in various ways, producing different empirical findings and policy recommendations. Indeed, a trap specific to middle-income countries is disputed (see Pritchett and Summers 2014; Im and Rosenblatt 2013; Roy and others 2016), and the data tend to

show substantial upward mobility between 2000 and 2015, particularly for middle-income countries, with 79 of 133 countries that were low or middle income in 2000 improving their income status and none declining (table 5.1).

After addressing some of the definitional issues, the chapter reviews recent cross-country and case-study literature on the middle-income trap—its causes and its possible solutions.

It then links the middle-income trap to the emergence and growing significance of trade through global value chains (GVCs). The role of GVCs in trade and investment flows dominates academic and policy debates on trade and industrial development (see Gereffi 2014; Taglioni and Winkler 2016). One characteristic of GVC trade is the denationalizing of comparative advantage, which could allow countries to industrialize by joining GVCs rather than by building their own (Baldwin and Lopez-Gonzalez 2015). So integration into GVCs has been widely viewed as a strategic pillar for developing countries to become more competitive, to develop the skills and human capital of their labor force, and to acquire technology to industrialize and move into higher value-added production. Whether such economic upgrading is happening—and if so, where and how—remains subject to much debate and speculation.

This chapter surveys these two debates—on the middle-income trap phenomenon and on countries’ ability to grow and develop through GVC participation—and asks whether integration into GVCs can help countries avoid a middle-income trap and, if so, why and under what circumstances. The primary focus is examining how the factors that are hypothesized to contribute to growth slowdowns at middle income may also impede economic upgrading through GVCs. The literature is limited on

FIGURE 5.1 GDP per capita growth, by income group, 2006–15

Source: World Development Indicators database.

TABLE 5.1 Share of all countries in a given income group in 2000 and 2015

Percent

		Income group in 2015			
		Low income	Lower middle income	Upper middle income	High income
Income group in 2000	Low income	47.6	47.6	4.8	0.0
	Lower middle income	0.0	37.7	58.5	3.8
	Upper middle income	0.0	0.0	51.4	48.6
	High income	0.0	0.0	0.0	100.0
	Total	14.6	24.4	25.8	35.1

Source: World Bank Country and Lending Group Classification (see <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups>).

the relationship between the two debates, but empirical analyses have found some evidence that GVC participation supports escape from the dynamics hypothesized in the middle-income trap literature, albeit with substantial variation (Kummritz and others 2016; Boffa and others 2016). However, this chapter does not assign causality; it instead asserts that while GVC integration can support sustained high growth rates for middle-income countries, a certain level of development and industrial complexity also tends to be a prerequisite for participation in more sophisticated, higher value-added GVCs.

The chapter makes four central claims:

- The two debates have existed mostly independent of each other, but they should be bridged. The factors that constrain GVC participation and upgrading provide a more granular perspective of tasks, products, and industries—and a more

coherent and applicable set of policy recommendations to address the causes of growth slowdowns and structural stagnation.

- The need for developing countries to adapt to trade through globally integrated value chains in goods, services, and information presents a partial but important conceptual paradigm and policy framework to identify levers for middle-income countries to converge with richer countries. The economic complexity and institutional sophistication required to upgrade into higher value-added tasks and products over time—in the context of the emergence of globally integrated lead firms—are lacking in many middle-income countries.
- The institutional, macroeconomic, trade, and industrial policies required for successful GVC participation can also address economic stagnation among trapped middle-income countries.

- Emerging technological changes are likely to further complicate the ability to develop by integrating into and upgrading within GVCs unless countries explicitly address the links between production and distribution and between economic and social change. This informs a broad set of policy recommendations that—while requiring more nuanced targeting and adaptation specific to each country and sector—provide a promising framework for overcoming difficulties specific to middle-income countries in the age of automation and digitization.

The chapter first goes into greater depth on the debates surrounding the middle-income trap and clarifies the main terms. It then provides a framework for viewing transitions from low- to middle-income status and from middle- to high-income status through a GVC lens—and the GVC-related factors that mediate these transitions. It then examines emerging technological and economic factors and trends that are likely to make efforts to escape the middle-income trap through participation in GVCs more complex in the medium term and offers some potential policy solutions.

Definitions and implications of the middle-income trap

The term “middle-income trap” was coined almost a decade ago by Gill and Kharas (2007), who discussed three transformations that modern growth theory predicted middle-income countries in East Asia would experience. First was the slowing and reversal of diversification as countries became more specialized in production and employment. Second was the declining importance of investment and the acceleration of innovation. And third was the shift in education systems to equip workers with the skills not just to adjust to new technologies, but also to shape new products and processes. They noted that many Southeast Asian countries stagnated and failed to make the transition to productivity-driven growth. While the term middle-income trap was novel, the concept was not—drawing on earlier work on low-level equilibrium traps (Nelson 1956), poverty traps (Leibenstein 1962; Aazariadis and Drazen 1990; Kraay and Raddatz 2007), and globalization’s missing middle (Garrett 2004).

What is the middle-income trap, does it exist, and how can it be measured?

A large and growing body of literature focuses on whether the term is useful for examining the problems facing industrializing countries. As Gill and Kharas (2015) noted, after 10 years and more than 300 articles the term remains poorly defined and backed by almost no formal modeling, with very few exceptions (Agénor and Canuto 2015; Dabús and others 2016). However, two dominant definitions of the middle-income trap have emerged. At its most basic, the trap is seen as sustained economic stagnation. Egawa (2013, p. 2) argues that it is “a situation in which an MIC [middle-income country] falls into economic stagnation and becomes unable to advance its economy to a high-income level for certain reasons specific to MICs” related to “a delay or failure

to change the economic structure from an input-driven growth model into a productivity-driven growth model.”

Three approaches to assessing when a country is stuck in a middle-income trap have emerged: one on absolute convergence to high-income countries, one on relative convergence, and one on structural change, going beyond income-related measures of development. The approaches are not mutually exclusive, and even studies focused on assessing convergence dynamics—and in many cases not finding any unique middle-income country trap—generally acknowledge that specific structural changes are required for middle-income countries to increase their income.

Absolute convergence. Drawing on Hausmann and others’ (2005) definition of growth slowdowns, Eichengreen and others (2013) stipulated three conditions for a growth slowdown to be classified as a middle-income trap: a seven-year average growth rate of GDP per capita of at least 3.5% prior to the slowdown, a decline in the seven-year average growth rate of GDP per capita of at least 2 percentage points, and GDP per capita greater than \$10,000 in 2005 international purchasing power parity prices. They find a bimodal middle-income trap at GDP per capita of \$10,000–\$11,000 and \$15,000–\$16,000, suggesting that growth in middle-income countries slows in two main stages.

Relative convergence. Felipe and others (2012) focused on how long it took countries to cross income thresholds and defined a lower-middle-income trap as a country failing to attain average growth of income per capita of at least 4.7% a year and an upper-middle income trap as a country failing to attain average growth of income per capita of at least 3.5% a year. The relative approach is exemplified by Aiyar and others (2013), who regressed growth in GDP per capita on lagged income and measures of physical and human capital to come up with a predicted growth rate. The residuals of this regression are defined as actual growth minus estimated growth, and a slowdown takes place when a substantial deviation in actual versus expected growth is sustained over 10 years. Robertson and Ye (2013) likewise used the growth rate of income relative to the United States as their dependent variable. Similarly, Huang (2016) defined this process of stagnation as an economy’s ability to continue to grow more rapidly than the United States after reaching middle-income status. Furthermore, not even the World Bank and International Monetary Fund definition of a middle-income country is considered a helpful benchmark by all researchers: Aiyar and others (2013) and Roy and others (2016) assigned a country middle-income status if its GDP range was 15–50% of U.S. income, depending on the specification.

Structural change. A third approach, while not contradicting the relative and absolute convergence approaches, focuses less on quantitative measures of growth slowdowns and more on the structure of the country’s economy and on processes of transformation. Dingemans (2016, p. 644) defined Chile’s middle-income trap as the country’s “inability to (incrementally) diversify and enhance its export trade.” Ohno (2009, p. 1) argued that the

defining characteristic of the middle-income trap is a country's failure "to build a national mindset and institutions that encourage constant upgrading of its human capital." Ohno divided the catching-up industrialization process into four stages and identified a middle-income trap as a glass ceiling in manufacturing between stages two and three (figure 5.2). In stages one through three foreign direct investment is critical to promote and sustain growth. Ohno found that Viet Nam's growth in the past two decades was driven largely by liberalization and large inflows of external purchasing power. Rigg and others (2014) took a more sociological approach in their analysis of Thailand and argued that a middle-income trap can be assessed by how individuals and households negotiate—or do not—the skills/employment transition.

Useful? While most researchers find at least some value in the concept, Pritchett and Summers (2014) demonstrated empirically that there has been little continuity in growth performance historically and found that growth declines are more likely to be sudden and large than gradual and small. Thus, what others may perceive as the middle-income trap is more likely to be a regression to the mean. Im and Rosenblatt (2013, p. 25) rejected the middle-income trap concept arguing that "MICs [middle-income countries] do not really look that different in terms of transitions across the inter-country distribution of income" and display

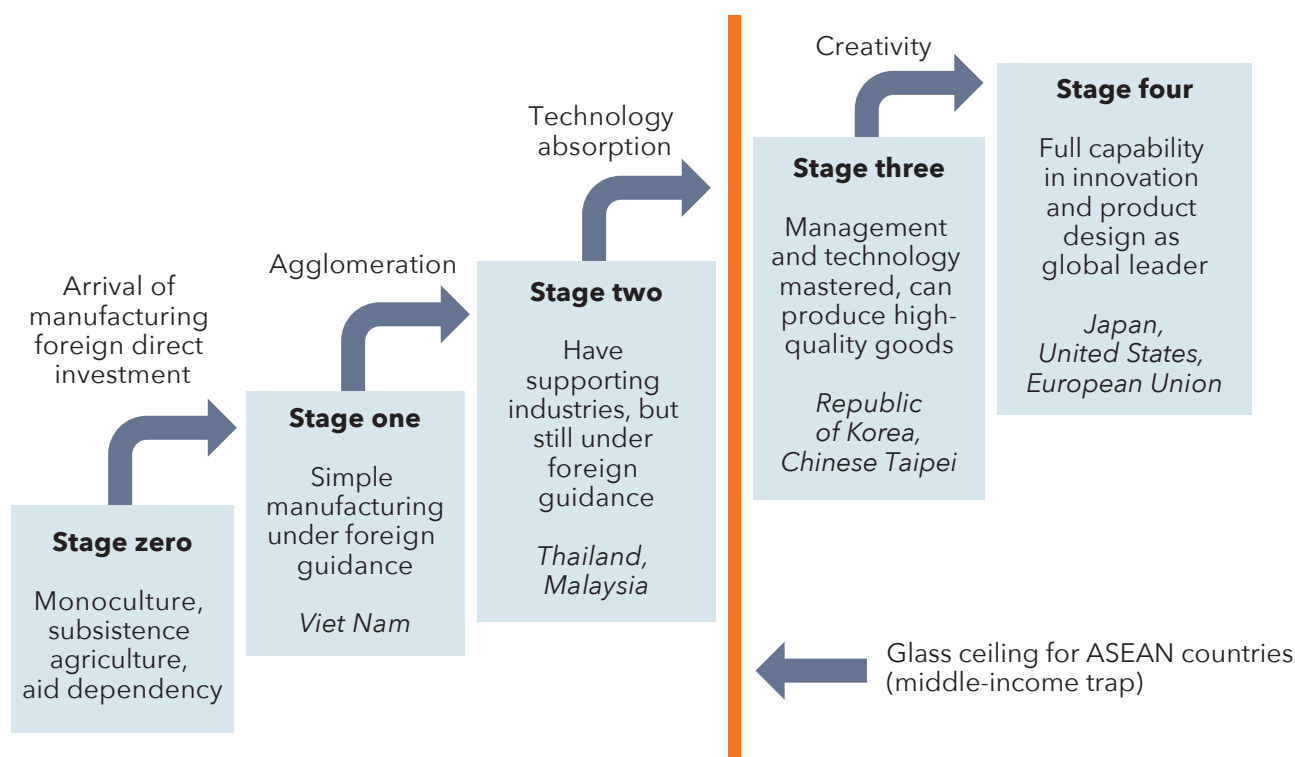
growth trajectories that "do not conform to one clear pattern that can be easily characterized as a 'trap.'"

More recently, Roy and others (2016) found little value in the middle-income trap as an empirical phenomenon. Using various measures of convergence based on catching up with rich countries either as a group or with the United States and based on both the country and individuals as the unit of measurement (accounting for and assuming away distributional changes within countries), they found that while economic divergence was a dominating global phenomenon before the 1980s, there is strong evidence for economic convergence globally since. They then tested whether middle-income countries were negative outliers within an unconditional convergence framework that included all countries and only middle- and high-income countries²—and found no evidence for either form of middle-income trap.

What are the main identified causes of middle-income traps, and which countries are affected?

The substantial definitional issues and differing empirical results complicate the notion of a clearly demarcated middle-income trap. Can something unique about industrialization processes for present-day middle-income countries be generalized? Here there is greater convergence, even among the skeptics. The literature assessing the causes of the trap differentiate between structural causes and policy-related and institutional causes.

FIGURE 5.2 Ohno's stages of catch-up industrialization



Moreover, some researchers distinguish between factors that cause the trap and those that perpetuate it (see, for example, Toh 2013). However, there is a general consensus that the trap reflects a country's inability to shift its growth strategy and economic structure toward sustained high growth rates.

In reviewing the previous decade of debate, Gill and Kharas (2015) argued that the middle-income trap occurs when rapidly growing countries with rising wages have tried to sustain an economy based on labor-intensive manufacturing and export-led growth. But as their competitive advantages decline, they have been unable to find alternative sources of demand to replace exports. This has been exacerbated by the declining elasticity of trade to growth in recent years—as well as by rising global competition, increasing currency and balance-sheet risk due to the heightened international financial flows, and for some countries, a lack of the requisite infrastructure while prematurely attempting to become knowledge economies.

Differentiating between structural change and convergence (whether relative or absolute) has implications from a policy perspective. As Paus (2014) noted, even within an income convergence framework there can still be no capability convergence. Jankowska and others (2012) explicitly framed this as an issue of structural transformation, with Latin America unable to compensate for the decreasing labor share in agriculture through its manufacturing sector, but with the Asian newly industrializing countries developing modern sectors in which productivity is both higher than in the traditional sector and sufficiently labor-intensive to transmit the gains to a sizable share of the labor force.

Glawe and Wagner (2016) pointed to two primary theoretical arguments to explain the trap. The first draws on Arthur Lewis's dual-sector model of the economy and sees the trap as reflecting a country's inability to continue boosting productivity by shifting workers from agriculture to industry. The latter argument, derived mostly from more recent developments in growth theory, focuses on a country's ability (or lack thereof) to imitate foreign technologies and develop comparative advantages in new export products. Agénor and Canuto (2015), in broad strokes, attempted to model and extend this line of thinking, arguing that knowledge network effects to developing advanced skills and infrastructure allow countries to evade a lower-growth equilibrium that they see as equivalent to the middle-income trap.

Several studies using absolute and relative convergence definitions have determined the impact of variables that either are correlated with or causally contribute to the trap:

- Eichengreen and others (2013) used a sample of present-day developed countries and found that correlates and determinants of growth slowdowns were more likely in economies with high old-age dependency ratios, high investment rates, and undervalued real exchange rates.
- Aiyar and others (2013) examined 42 variables in seven categories using a weighted average least-squares approach and found the following to be significant determinants of falling into the trap: rule of law, size of government, the regulatory

environment, dependency and sex ratios, the share of gross capital inflows, investment public debt in GDP, output diversification, agriculture and service shares, a country's GDP-weighted distance, its degree of output diversification, whether it is involved in a war or civil conflict, and whether it has a tropical climate.

- Bulman and others (2014) used pooled regressions on middle-income countries and found that escapees from the trap had higher growth at all relative incomes, higher total factor productivity growth, faster transformations toward industry, better macroeconomic management, and consistently more export orientation. Furthermore, countries with high secondary and tertiary education and with a larger share of high-tech products in exports are less likely to fall into the trap.

The results, while methodologically distinctive and using differing control variables, provide some consistency in their focus on demography, equity, the macroeconomic framework, and—most prominently—the export structure. In other words there is some consensus that factors seen as important for long-run economic development are important for middle-income countries to sustain GDP growth. This is a useful contribution, but as Paus (2014, p. 25) noted, “it is not clear what these findings mean for policymaking.”

Trade and export diversification is central to numerous recent analyses. Felipe and others (2012) compared the export structure of countries in the trap across variables related to their ability to structurally transform and found that escapees had more sophisticated and diversified export baskets than did nonescapees. This is also supported by country case studies. Dingemans (2016) found that the lack of diversification in Chile was caused in large part by the country's inability to promote innovation and develop more complex export products. Paus (2014) likewise saw the main challenge for Latin America as addressing the disjuncture between global competitive pressures and the slow process for firms to learn and countries to implement capability-enhancing policies. Rigg and others (2014) identified the primary failure of inadequate structural transformation at three distinct levels in Thailand: government's inability to develop the population's human capital, firms' failure to develop human capital or exploit what already exists, and individuals' unwillingness to develop human capital and embrace opportunities away from their home villages. The trap is “as much personal as it is structural and institutional” (p. 196).

Several researches have focused on social and demographic factors. Egawa (2013) saw the worsening income distribution as a primary engine of stagnation, while Ozturk (2016) emphasized the presence and size of the middle class. Panther and Flechtner (2015) took the relevance of inequality a step further by examining domestic and international inequality as political economy drivers of the trap, using a large sample of comparative qualitative case analyses. For national inequality multiple intersecting inequalities (income, ownership of assets, access to power) result in low institutional quality, which in turn prevents the adoption of policies that may be opposed by vested interests and would allow the country to transition to a more

productive economy. For international inequality the ability of countries to benefit from globalization and the proliferation of multinational corporations and GVCs are influenced by distributions of power and income at the global level. Ito (2016) made this focus on institutions as the mediating factor for countries either escaping or stuck in the trap more explicit by arguing that countries sort themselves into three equilibria (low income, middle-income trap, and middle-income convergence toward high income), depending on their willingness to carry out fundamental economic and structural reforms. Much recent work deals either explicitly (Woo 2012; Huang 2016) or implicitly with China (World Bank 2013; Pritchett and Summers 2014). In most of these China-focused analyses governance and institutions are particularly relevant.

Both the definitions and the causes inform the classification of countries in the middle-income trap. Some researchers focus on individual countries—Egawa (2013) on Malaysia, China, and Thailand, Dingemans (2016) on Chile, and Ohno (2009) on Malaysia and Thailand. Other researchers take a multicountry approach and come to different conclusions. For example, Felipe and others (2012) considered 35 of 52 countries to be stuck in the trap. Aiyar and others (2013) used a “trap map” based on the seven factors and 42 variables to determine countries most at risk. Panther and Flechtner (2015) examined which countries have achieved convergence with the United States over discreet eight- to nine-year time periods.

Annex 5.1 illustrates the results of the three cross-country studies that address different points in time. Aiyar and others (2013) examined whether countries risk falling into the middle-income trap in the future. Felipe and others (2012) analyzed countries now in the trap. Panther and Flechtner (2015) assessed whether countries that were middle-income countries at some point in the past 40 years have managed to converge toward the average GDP per capita in high-income countries over discreet

nine-year periods. So definitively stating which countries are now in the middle-income trap is an imprecise science.

How can countries escape from the trap?

The broad array of causes for countries entering and becoming stuck in an alleged middle-income trap include macroeconomic and microeconomic factors related to industrial structure, trade profile, demographics, income distribution, macroeconomic management, and the quality of institutions. So how have countries in the past escaped from middle-income status? And what lessons might this hold for countries today? In absolute terms many if not all of today’s high-income countries were arguably stuck in some sort of middle-income trap in the 20th century (table 5.2; Im and Rosenblatt 2013).

It is clear by the objective criteria for escaping the middle-income trap (graduating from middle-income country status) that numerous countries, particularly in East Asia and Central and Eastern Europe, have escaped whatever trap dynamics middle-income status might entail. Bulman and others (2014) described this process as part of a momentum hypothesis, where past escapees achieved strong growth in one period, followed by strong growth in the subsequent period. But Im and Rosenblatt (2013, p. 25) are cautious about this inevitability approach, arguing that attempts to grow at rates higher than 7% could lead to “unsustainable policies that eventually create the ‘trap’-like pattern of dismal growth that MICs [middle-income countries] are trying to avoid in the first place.” So gradualism that focuses on overcoming the institutional factors inhibiting growth might be more promising. Roy and others’ (2016) analysis of the structural break in the 1980s when convergence started attributed this to the sharper focus on macroeconomic stability in the 1990s and on the transformational changes that the spread of information and communication technologies engendered in developed economies.

TABLE 5.2 Countries that have escaped the middle-income trap

Reference	Definition of escape from middle-income trap	Countries that have escaped
Agénor and Canuto (2015)	Middle-income countries in the 1960s that became high-income countries by 2008	Equatorial Guinea; Greece; Hong Kong, China; Ireland; Israel; Japan; Republic of Korea; Mauritius; Portugal; Puerto Rico; Singapore; Spain; and Chinese Taipei
Bulman and others (2014)	Middle-income countries in 1960 that became high-income countries by 2009	Greece; Hong Kong, China; Ireland; Japan; Republic of Korea; Puerto Rico; Seychelles; Singapore; Spain; and Chinese Taipei. Cyprus and Portugal, still classified as middle income in 2009, are considered on the verge of escaping
Felipe and others (2012)	Crossing from lower-middle-income status in at most 28 years and from upper-middle-income status in at most 14 years.	No clear list of past escapees, but at their current pace China, Bulgaria, Poland, and Thailand should be able to escape the upper-middle-income trap if they sustain their income per capita growth
Im and Rosenblatt (2013)	Middle-income countries in 1950 that have since become high-income countries (though the authors reject the concept of a middle-income trap)	Austria; Estonia; Finland; Germany; Greece; Hong Kong, China; Ireland; Israel; Italy; Japan; Republic of Korea; Singapore; Slovenia; Spain; and Chinese Taipei
Jankowska and others (2012)	Countries that have attained income convergence with high-income countries	Hong Kong, China; Republic of Korea; Singapore; and Chinese Taipei

The experiences of these countries center policy recommendations primarily on structural, industrial, and trade policies as well as social policy:

- Macroprudential policies limit the buildup of excessive capital inflows to cushion impacts of potential sudden stops. However, Aiyar and others (2013) see an important role for measures to enhance regional integration, infrastructure investments, and deregulation in areas where private sector activity is excessively stifled. Their threat map aims to provide an analytical tool to assess where these issues may be at play (see table A5.1.1 in annex 5.1).
- Developing knowledge network externalities could link individuals' skill attainment and access to public infrastructure (Agénor and Canuto 2015).
- Skilled workers are needed to move up the value chain from low value-added industries to develop higher value-added activities (Eichengreen and others 2013).
- To avoid the middle-income trap, China, like past escapees, will need to upgrade its industrial structure through new industries with higher levels of technology (Huang 2016). This will require differentiating between state-owned enterprises and non-state-owned enterprises and between product and factor markets.

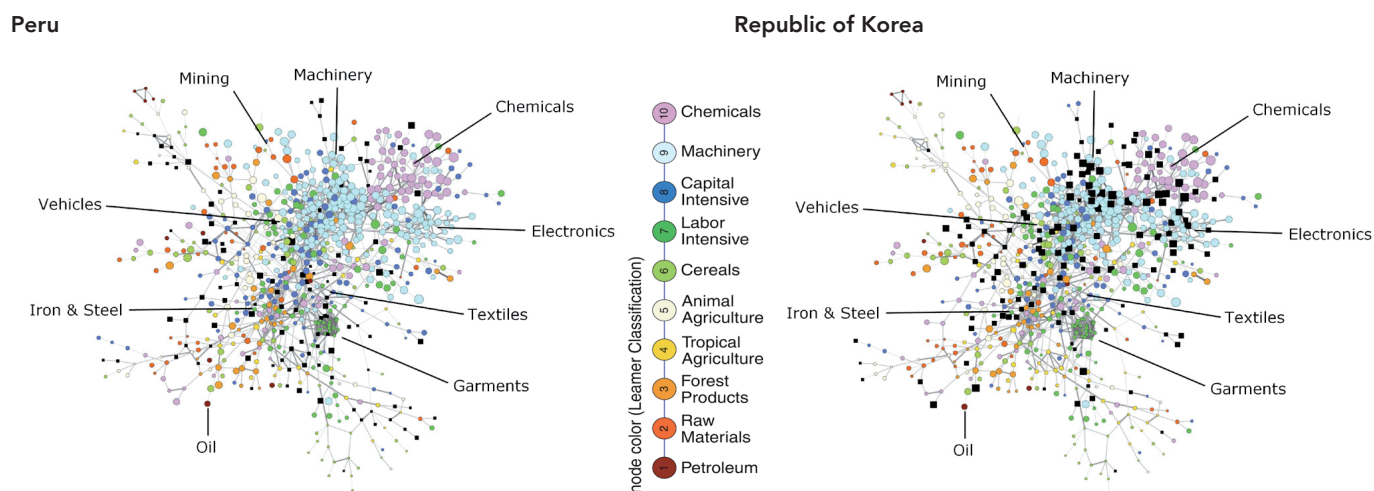
Jankowska and others (2012) compared the experience of Latin American countries with the Asian newly industrialized countries using a product-space methodology and suggested that diversifying to new products is central to emulating the experience of the newly industrialized countries (figure 5.3). In these countries new production was sequentially developed in industries such as iron, steel, machinery, and electronics through workers with skills

and capabilities transferable from existing industries. A central lesson from these past industrialization processes is learning how to produce and export more complex products—a finding that also emerges from the complex systems analysis literature.³

Ohno (2009) proposed that Viet Nam develop a proactive industrial policy to internalize skills and technology, develop effective public–private partnerships, and deepen industrial knowledge. Focusing primarily on structural characteristics related to trade, industry, and labor market transformations, Felipe and others (2012) argued that the most direct strategy for a middle-income country to become a high-income country is to acquire a revealed comparative advantage in sophisticated and well-connected products. The focus on linking education to (primarily horizontal) industrial development objectives is a logical corollary for numerous researchers. Pantner and Flechtner (2015) pointed to mobilizing talent through education and providing this talent with the right incentives to assimilate best-practice technologies and organizational routines to adapt and apply them to cutting-edge technologies. Rigg and others (2014) linked this more explicitly to countries moving up the value chain through re-training and re-skilling and sustained investments in upper secondary and tertiary education.

Researchers that focus on the role of inequality in driving trap-like dynamics for middle-income countries see addressing disparities as the central component. Egawa (2013) argued that policies need to address urban–rural disparities, providing benefits for low-income individuals, fiscal redistributive reforms, transfers, as well as equalizing education opportunities. Kahras and Kohli (2011) see social programs and a change in the policymaking mindset that targets the middle class as essential to avoiding the

FIGURE 5.3 Product space maps of Peru and the Republic of Korea in 2009



Source: Jankowska and others 2012.

Note: The product space methodology provides a map of all traded goods displaying relative proximity or similarity between products. The colors on the map represent the Leamer classification, which categorizes products according to labor, capital, and other resource intensiveness. The black squares indicate products in which the country has a revealed comparative advantage.

middle-income trap. All this helps countries mediate three critical transitions—from diversification to specialization in production, from physical accumulation of factors to productivity-led growth, and from centralized to decentralized economic management.

This in turn leads to a focus on institutions. Panther and Flechter (2015) used a two-level model of the relationship between inequality and the middle-income trap to argue that at the international level ensuring a certain level of domestic equality mediates the benefits of global integration for growth. At the domestic level a focus on economic (over political) equality is central to catch-up policies. At the global level having some independence in policy-setting from dominant external powers is essential for convergence when paired with export diversification. Dingemans (2016) saw the bidirectional relationship between structural change and economic development as driven by institutional change. Chang (2011) argued that increased wealth intensifies the demand for and provision of higher quality institutions and new political actors who demand and shape them. In that sense, moving from a more state-centered approach to export development, not just export promotion, is essential.

Gill and Kharas's (2015) assessment of 10 years of literature on the middle-income trap focused on the need for policymakers to manage a transition to more mature institutions so that capital investments remain efficient even after growth moves from productivity growth stemming from intersectoral resource reallocations to intrasectoral catch-up technological growth.

A new World Bank study (2016b, forthcoming) on Poland's recent high and stable growth sees this as being due in part to the country's institutions transforming in parallel with firms increasing in sophistication and complexity—including providing better foundations for resolving conflict, enforcing contracts, and implementing antitrust and competition laws. This has been bolstered by rapid integration into the EU bloc, boosting productivity through increased trade openness, investment and talent, increased domestic competition and regulatory harmonization, and more certainty through commitments to EU institutions. In comparing new high-income countries (Chile, the Czech Republic, Hungary, the Republic of Korea, Poland, and the Slovak Republic) with trapped middle-income countries (Brazil, Mexico, Romania, and Turkey), the study found that while in the late 1990s these countries were fairly similar in many aspects, by 2015 barriers to entrepreneurship, trade, and investment were much lower in the new high-income countries, which also had lower perceived economic and political risk.

The relevance of global value chain trade for understanding the middle-income trap

While the role of trade through GVCs remains more implicit than explicit in discussions of the middle-income trap, the significance of producing and trading higher value-added goods is a central lesson from the literature. Establishing this link is the focus here. This section first addresses three questions. What is meant by GVC participation and upgrading? How is it measured,

and what factors condition countries' ability to upgrade in GVCs? And what is the empirical relationship between GVC participation and the middle-income trap? It then provides a conceptual framework for viewing income transitions through a firm-level GVC lens.

An overview of global value chain participation and economic upgrading

Driven by lower transport, information, and communication costs, technological improvements, and lower barriers to the movement of goods and capital, global patterns of trade and production have changed dramatically over the past decades. Trade is now characterized by the growth and increasing dominance of vertically integrated multinational firms with fragmented value chains stretching across borders. The internationalization (and particularly regionalization) of global production and the development of value-chain trade in both goods and services have changed the prospects for countries to benefit from trade. In this context, understanding a country's current participation in value chains is central to ensuring that its industrial and trade policies can facilitate sustainable productivity gains and increased quality employment in higher value-added sectors. For developing countries this creates opportunities to upgrade into new higher productivity tasks and activities and to integrate into global production networks. But according to some researchers, this is often less an issue of catching up than of fitting into existing GVCs (Whittaker and others forthcoming).

The value chain concept in the industrial organization literature (Porter 1985) has become ever more central to understanding and analyzing the interfirm and intrafirm dynamics and governance of value-chain trade (Gereffi and others 2005). And in trade economics it has increasingly become the dominant framework to understanding the second unbundling of globalization (Baldwin 2006; see Antràs and Rossi-Hansberg 2009 and Ahmad 2013 for overviews of this literature). Viewing trade through a GVC framework involves four paradigm shifts for trade policy (Catteneo and others 2013):

- It implies a move toward a global (or at least regional) view of policy.
- It requires a shift from entire industries to narrower tasks and business functions.
- It requires assessing a country's competitiveness not as endowments and stocks but as flows in which GVCs are the primary channel enabling transfers.
- It implies a change from focusing on tariffs as the most relevant obstacles to trade to focusing on behind-the-border barriers and regulatory measures.⁴

Viewing trade this way requires a revised approach to measuring and analyzing cross-border and cross-industry flows, with value-added trade becoming a more relevant measure of trade flows within GVCs. For individual countries becoming competitive in specific components and tasks to participate in globalized production networks and in turn generate more value domestically over time becomes increasingly important (Taglioni and Winkler 2016). So using multiregion input-output tables allows for tracking

use at the sectoral level and for differentiating between transactions in intermediate and final goods. This has informed a growing literature on the development of value added in trade (see Hummels and others 2001, Koopman and others 2014, and Johnson and Noguera 2012) and a growing number of indicators and indices (Fally 2012, Antras and Chor 2013, and Wang and others 2016).

Measuring value-added trade through multiregion input-output databases has clear benefits (Ahmad 2013):

- It makes it possible to understand a country's actual industrial structure and international links among sectors in order to formulate targeted policies and strategies.
- It provides evidence of how nontariff measures or regulatory changes affect upstream and downstream producers.
- It offers better analytical tools to anticipate the impact of potential shocks.
- It enables calculations of the trade's job content and impact on ecosystem services, thanks to satellite accounts of employment and environmental indicators.

However, multiregion input-output tables have some limitations. They cannot measure the links among service sectors very accurately. And they are subject to two simplifying assumptions: the proportionality assumption, that all products (for export and domestic use) have the same import content, and the homogeneity assumption, that the use of inputs is uniform among all firms in a sector.

The new data make it possible to quantify economic upgrading through GVC participation. Drawing on earlier work by Humphrey (2004), Taglioni and Winkler (2016) differentiated four types of economic upgrading based on skills, capabilities, and comparative advantage. Process upgrading is based on efficiency gains and productivity improvements. Product upgrading entails moving into more sophisticated products in an existing value chain. Functional upgrading involves increasing the value-added share by moving toward more sophisticated tasks. And intersectoral upgrading involves moving into new value chains with higher value-added shares (figure 5.4).

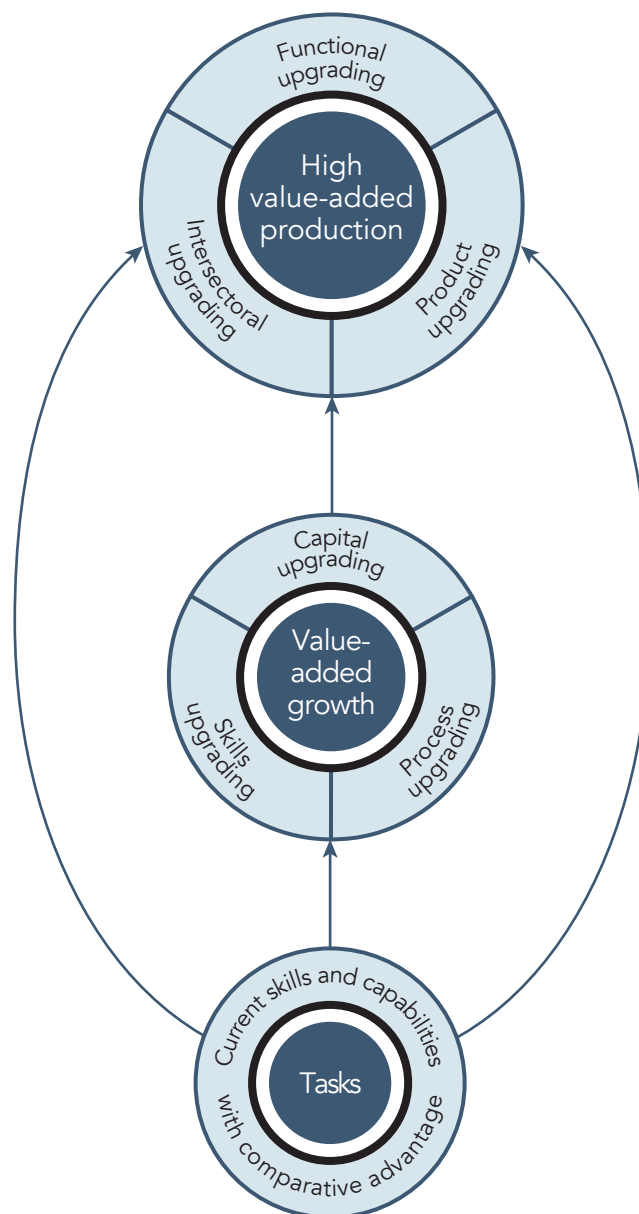
The ability of firms to upgrade is determined by improving workers' skills, improving firms' absorptive capacity and technology, and increasing productivity in existing tasks. Lead firms set detailed specifications and requirements that exceed local norms and create opportunities for improving capabilities, technologies, and assets. But this is not always the case: the complexity of GVCs and the power dynamics within their governance structures can lead to stagnation or downgrading (Rossi 2013; Blažek 2015).

The empirical relationship between global value chain integration and the middle-income trap

A broad literature on the factors likely to influence a country's ability to upgrade in GVCs is based primarily on case studies, with few econometric analyses (until recently). But open economies tend to grow faster and have higher incomes than do closed economies (Wacziarg and Welch 2008; Gill and Kharas 2015).

GVC participation can lead to higher output, productivity, and value added through five main transmission channels: backward and forward links, pro-competitive market restructuring,

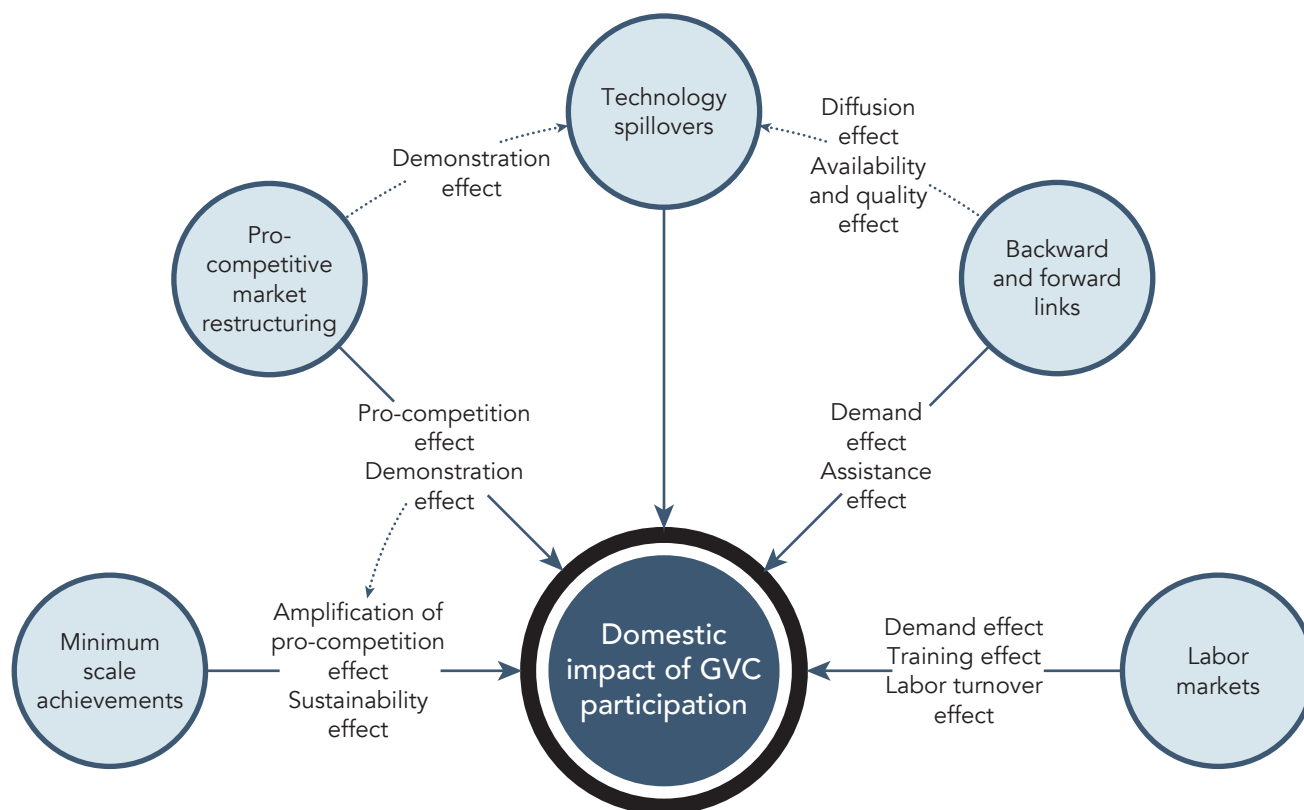
FIGURE 5.4 Achieving functional, product, and intersectoral upgrading through skills, capital, and process upgrading



Source: Taglioni and Winkler 2016.

technology spillovers, minimum scale achievements that amplify pro-competitive effects, and labor market effects, including the demand for skilled workers and their training as well as turnover when trained workers move to local firms (figure 5.5).⁵ The individual channels have complex and frequent intermediating effects on each other.

Three main factors link value-chain integration to productivity: foreign direct investment, exporting, and importing inputs

FIGURE 5.5 Transmission channels from global value chain participation to the domestic economy

Source: Taglioni and Winkler 2016.

(Kummritz and others 2016). For foreign direct investment the impact of spillovers on productivity is not conclusive (Görg and Greenaway 2004, Paus and Gallagher 2008). For the link between exporting and economic upgrading, Bernard and Jensen (1999) demonstrated that exporters outperform nonexporters in the same sector and country in productivity, skills, and wages. Is this self-selection or learning by exporting? For self-selection the assumption is that only more productive firms are able to absorb additional trade costs. The learning by exporting literature argues that exporting improves the productivity of firms over time, with the most robust findings for developing countries and nascent industries. Recent research questions the robustness of these early learning by exporting studies (Clerides and others 1998), but Lileeva and Treffler (2007) found learning by exporting effects for Canada, and Fernandes and Isgut (2005) found them for Colombia.

Research on the link between importing inputs and productivity focuses on developed countries. Importing can improve key aspects of competitiveness through three main feedback loops: productivity, innovation, and skills. Easier access to imports tends to improve firm productivity. Grossman and Rossi-Hansberg (2006) showed that offshoring can entail productivity gains similar to technological progress for offshoring countries through lower input costs. Amiti and Konings (2007) showed that

a 10% drop in input tariffs leads to a 12% improvement in productivity for importing firms. Bas (2012) showed that for a sample of Argentinian firms, input tariffs facilitate entry into export markets. MacGarvie (2006), drawing on French trade and citation data, and Bøler and others (2015), using a sample of Norwegian firms, found importers to be more innovative and profitable. Skills are relevant for importing and complementary to it. Koren and Csillag (2011) showed that importing more sophisticated machines requires higher skills to operate them and increases the returns to skills.

To test whether GVC participation has enabled countries to upgrade economically, Kummritz and others (2016) used foreign value added in exports and domestic value added re-exported by third countries as respective measures of backward and forward GVC integration and domestic value added generated by a specific sector as the measure of economic upgrading. They tested the impact of national characteristics that may be associated with economic upgrading via GVC participation: infrastructure, connectivity, investment and trade policy, business climate and institutions, financial and labor markets, skills and education, innovation and product standards, as well as labor, social, and environmental standards. They found that overall GVC integration increases a country's domestic value added. Splitting the sample into income groups did not substantially change results,

though GVC integration as a buyer (through foreign value added) is more significant at lower incomes and selling into GVCs has more impact at higher incomes. For countries buying from GVCs air freight infrastructure and road network quality are particularly important. Connectivity, education and skills, and standards compliance are most important for countries selling into GVCs. The researchers concluded that the policy areas thought to be significant for economic upgrading in GVCs largely have the expected impact.

The correlation between GVC integration and GDP per capita depends on income status and the type of integration (figure 5.6; Boffa and others 2016). GVC integration increases GDP per capita, but the gains diminish as income increases. Similarly, growth in output per capita is highest for lower income groups. Some channels for GVC integration depend on industry similarity, with links assumed to be easier when trade is intraindustry. Manufacturing leads to higher GDP gains for buyers, but for

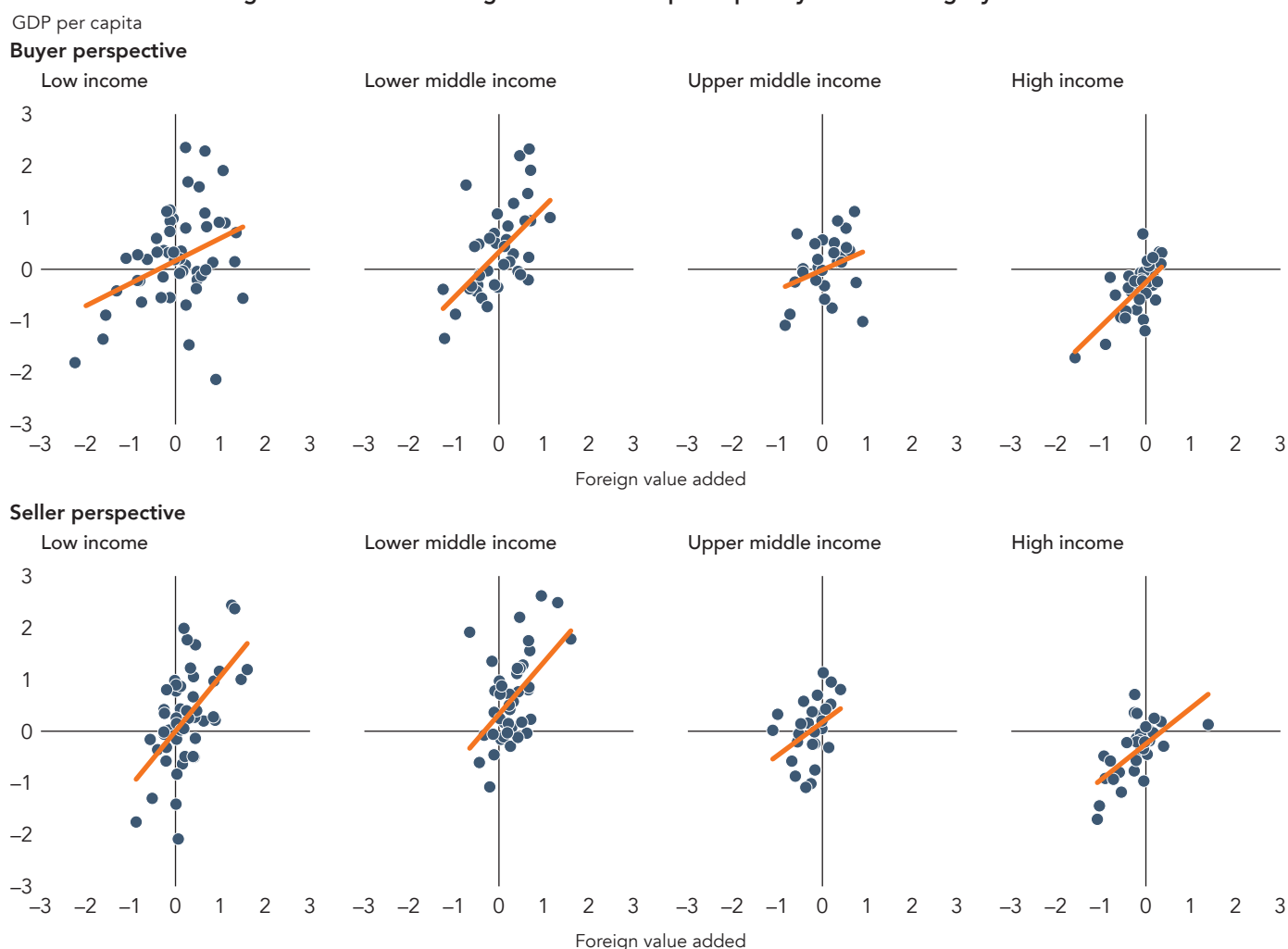
services both types of integration—forward and backward—lead to similar GDP increases.

These studies suffer from two main limitations. First, because of the lack of value-added trade data prior to 1990, they permit analysis for only the last 20 years, while much of the middle-income-trap literature goes back 50 years or more. Second, they do not specify the conditions for specific types of institutions and policies to produce greater gains from GVC participation. The next section addresses both limitations in part from a theoretical perspective.

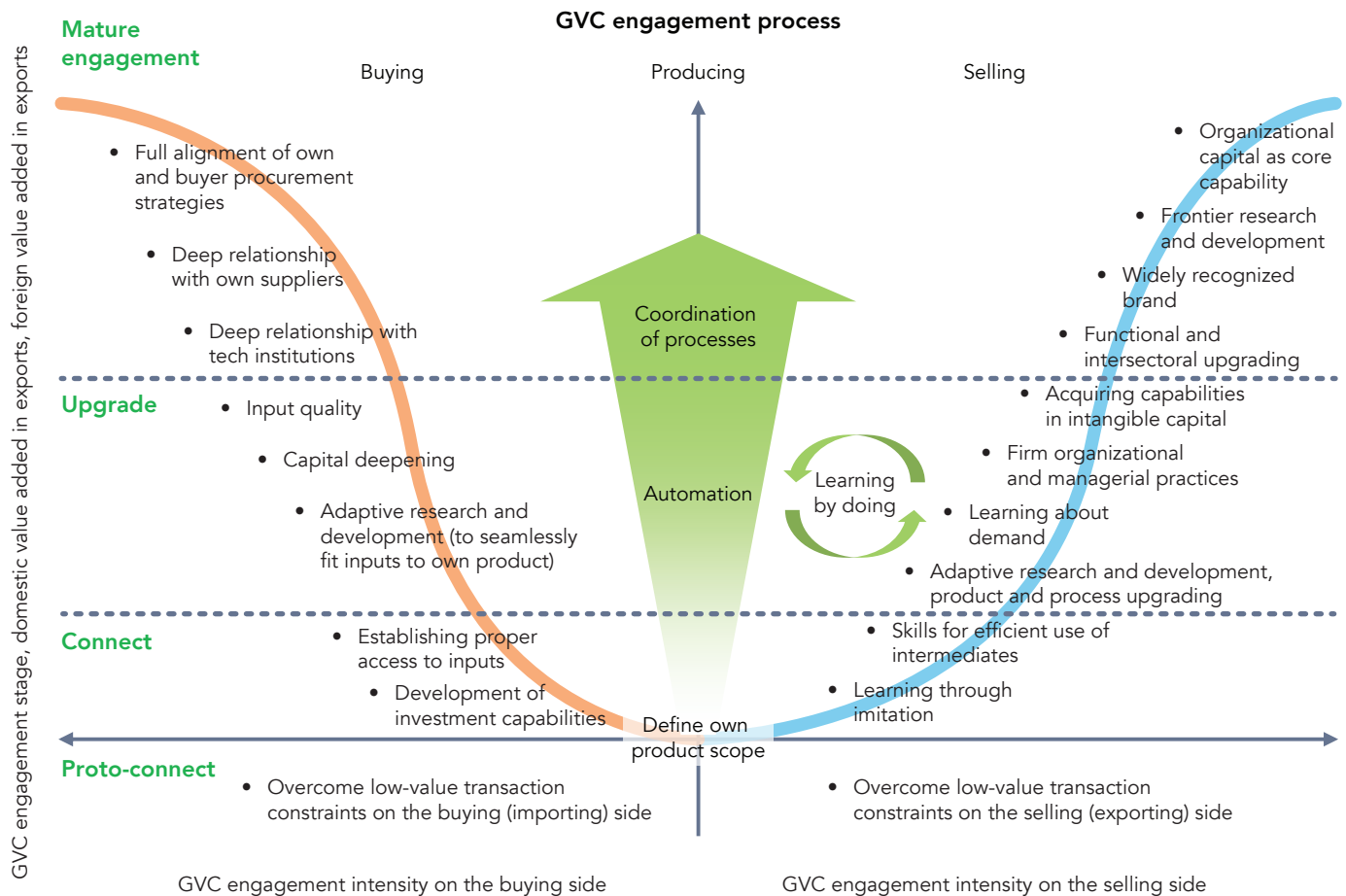
Viewing income transitions through a global value chain lens: bringing in the firm perspective

The previous section showed that while integrating into GVCs is associated with sustained growth and development, doing so may become more difficult and complex at higher incomes. This section explicitly adopts a GVC firm-level lens to the income

FIGURE 5.6 Growth of global value chain integration and GDP per capita by income category



Source: Boffa and others 2016.

FIGURE 5.7 How global value chain determinants evolve as the engagement in global value chain changes

Source: Mariscal and Taglioni 2017.

transitions from low to middle to high through a series of diagrams laying out these transitions.

Mariscal and Taglioni (2017) proposed a framework that views firms' connection to GVCs as a dynamic process for the relevance of capabilities to evolve in a continuum (figure 5.7). The first dimension (x-axis) contains the buying, producing, and selling aspects of integration in GVCs, and the second dimension (y-axis) illustrates the degree of GVC engagement, from proto-connecting to connecting to upgrading to mature engagement. The orange lines indicate the growing intensity of engagement on the buying side, and the blue lines indicate the growing intensity of engagement on the selling side. More sophisticated issues tend to appear on the upper section of the diagram, where upgrading meets buying, producing, and selling in increasingly nuanced and complex ways. Connecting usually starts on the buying side: firms that correctly evaluate their core capabilities and have an effective sourcing strategy are more likely to successfully engage in GVCs. However, the sequence of engagement from simpler to more sophisticated, and from buying to selling capabilities, is intended to be illustrative. Rather than

tightly allocating capabilities into specific steps on the diagram, most capabilities are shared between elements. The diagram is somewhat selective in reporting the most relevant determinants, since they may vary by industry and GVC.

Engagement starts with the proto-connecting stage, when reaching a minimum scale of transactions is key in both the buying and the selling functions. Intermediaries that play a matching role can help firms move the first steps toward international engagement. The large intermediaries may themselves become companies engaging in GVCs, as traders or by gradually adding value by expanding into processing for some of the immediate upstream or downstream functions.

The pure connection stage is mostly about meeting minimum requirements—a few basic capabilities that allow the firm to connect to either a foreign market or a lead firm. Basic capabilities (such as production or managerial abilities and cheap access to key inputs of the production process) and the ability to correctly evaluate and leverage the firm's core competences are crucial in connecting to GVCs. From a buying perspective this means that the firm can streamline its processes and product scope while

complementing production with proper and effective access to input markets. From a selling perspective the key capabilities are aligning its goals to those of actual and potential buyers and modulating its processes to fit seamlessly in their production processes. At this stage engagement in GVCs is not a robust situation but is unstable and subject to market forces that may exclude the firm from continuing the connection.

Once a firm overcomes the challenges of pure connection, its learning processes and absorptive capacities become more fundamental—learning by exporting, learning from selling to global buyers, and learning to connect decisions on the product scope to the available importing possibilities. At this stage demand-side elements also acquire importance, as the firm needs to make its product known and valued. Efforts will also be made to accumulate customers, although competition will be based mostly on price rather than quality. As the process continues and deepens, process innovation and product innovation will start to matter greatly. Relatedly, firms' organization of skills will change. Middle management will start to become more important than production, and the firm will increasingly focus on its core competences and learn to spin off tasks that are not its comparative advantage.

In the final stage firms upgrade toward the most complex stages of GVC production. Firms are now in direct relation with, or themselves become, lead firms, turnkey suppliers, trading platforms, or global buyers. The relationships between buyers and sellers are seldom the result of market interactions but are geared to modular (or even captive) interaction. Firms connect to the most technologically relevant buyers with good learning

potential and virtuous feedback loops through direct and indirect exposure to new ways of managing and organizing production. Meanwhile product complexity also increases, with products both more elaborate and containing more value added.

The evolutionary process in GVCs is unlikely to take place in a vacuum. As firms transition from proto-connecting to connecting to upgrading to mature engagement, a parallel process of development takes place in the hosting economy. The domestic economy will likely have evolved to development stages where an ecosystem of firms starts building up, populating the middle size. The determinants of firm growth will also evolve, increasingly a function of firm capabilities rather than institutional idiosyncrasies.

Reflecting their comparative advantages, firms in low-income countries will tend to be engaged in GVCs in industries such as agriculture and manufacturing, where complexity is limited and price competition is more common than nonprice competition (table 5.3). In these industries buyer–seller relations tend to be either at arm's length or captive. They are captive when the lead firms are technologically very dependent on suppliers, transactions are highly codified, and supplier competence is low. Firm size is not a constraint at this stage, so small firms can easily engage. Once countries graduate to middle-income status, their firms start integrating in GVCs with functions in advanced manufacturing and modern professional services, including preproduction and postproduction high-value added services. In these GVCs buyer–seller relations tend to be more relational, captive, or hierarchical, with substantial know-how transfers. Participating

TABLE 5.3 Trajectories in global value chain engagement

Global value chain engagement stage	Low-income status	Middle-income status	High-income status
Industry complexity	Simple	Intermediate	Complex
Typical specialization	Commodity production in agriculture, light manufacturing, low value-added services	Advanced manufacturing, agri-business and services	Organization capital, coordination and research and development in complex agri-business, manufacturing and services, branding
Typical market structure and average firm size	Predominantly small firms	Some large, missing middle size in the market likely	Complex market structure with several lead firms and conglomerates and a large and dynamic fringe of small to medium-size firms that interact in complex ways
Buyer–seller relational dependence and governance in global value chains	Market relations (or captive, if supplier competence is low, transactions highly codified, and technological dependence high)	Relational or hierarchical	Highly modular and complex vertical and horizontal relationships of interdependence
Typical firm structure and pool of skills	Few organizational layers, narrow set of capabilities, workforce distribution highly skewed toward production functions	Mid-complexity organization and firm structure	Large firm or conglomerate, quantitatively important middle and higher management and research and development staff relative to production functions
Mode of competition	Price-to-quality competitiveness	Increasingly diversified, nonprice competitiveness	Based purely on brand and value added features in highly specialized areas at the technology frontier

Source: Adapted from Mariscal and Taglioni 2017.

firms tend to be medium to large, particularly in manufacturing (Cusolito and others 2016). Firm growth is driven by productivity and capabilities rather than by rent positions. And competition among firms is increasingly based on nonprice features, such as quality, customization, and responsiveness and timeliness in delivery.

Once countries reach high-income status, their firms' engagement in GVCs will likely be predominantly specialized in coordination and high-value added services, such as research and development and branding. Firms are primarily buyers of inputs and components and sellers to end markets—or engaged in modular relationships. Their comparative advantage is based on offering highly specialized products at the technology frontier.

Institutions are central to these processes. Consider three key aspects. First, coordination among different levels of governments has to ensure that policies are not done and undone at different levels or that competition among regions does not erode the fiscal base. Coordination becomes increasingly important at higher levels of development. Second, predictability in policy implementation also matters proportionally with the level of development. Uncertainty could erode good current incentives by exposing firms to unnecessary risk. For example, uncertainty in trade openness policies may freeze the formation of buyer–supplier links as firms find it optimal to wait before engaging in investments that lose all their value unless variable trade costs are actually reduced. Third, policies should be well sequenced. For example, opening to foreign direct investment without actually developing basic infrastructure and institutions is unlikely to generate much investment or many jobs. It may be beneficial to consider gradual increases in competition so that foreign firms do not eradicate all domestic firms and capture all economic rents. To put in place policies conducive to real domestic competition is a sensible requirement before opening to trade or foreign direct investment. Another, more classic example is the coordination between foreign direct investment and trade policies. Since multinational corporations are import-intensive, opening to foreign direct investment to create jobs will not work unless foreign companies can also have access to the foreign services and intermediate goods they require.

There is no one way to optimally sequence policies, since considerations are context-specific. Yet some general regularities in policies are likely to matter at different stages of GVC engagement and development (Taglioni and Winkler 2016). At the initial stages of GVC engagement, policies are best directed toward facilitating efficient use of resources and factors of production and encouraging competition through broad market access (table 5.4). As development takes place and GVC engagement deepens, the institutional setup should focus on helping firms thrive in a complex world—with both imports and exports from and to multiple countries and sourcing and selling to multinational corporations (domestic and foreign).

When a country reaches middle-income status, institutions can help leverage GVC engagement for development by fostering skill building, innovation, and efficient access to capital; by including deep provisions in agreements with key trade partners; by supporting the engagement of more local firms and workers in the GVC network; and by focusing on structural reforms that raise domestic labor productivity and skills. As countries target high-income status, building institutions that allow for contracts to be more complete and for administrative burdens to be lower. They also need to ensure high confidence in the institutions, business friendliness, and stable policies. Labor market-enhancing outcomes for workers at home and more equitable distributions of opportunities and outcomes create social support for a reform agenda aimed at strengthening a country's GVC participation. Climate-smart policy prescriptions can mitigate the challenges for firms from climatic disruptions. Frederick's (2016a, 2016b) work on the apparel GVC in China illustrates this dynamic (box 5.1).

Participating in global value chain trade in the context of a rapidly changing world of industrial production and work

The positive and significant relationship between GDP per capita and integration into GVCs raises questions about the gains of GVC trade for workers in countries at the middle-high income threshold. Over the past few years numerous reports and papers have investigated the impact of technological change on production, trade, and labor markets (West 2015; Oxford Martin School 2016; Chui and others 2016; WEF 2016; KPMG 2016; Autor 2015;

TABLE 5.4 The institutional dimension of global value chain engagement

	Low income	Middle income	High income
Global value chain engagement objective	Attract foreign direct investment and facilitate domestic firm entry into global value chains	Expand and strengthen participation in global value chains, including promoting economic upgrading and densification, and strengthening domestic firms' absorptive capacity	Ensure sustainability and transform global value chain participation into inclusive growth
Institutional setup	Facilitate efficient use of resources and factors of production and encourage competition through broad market access	Foster skills-building and efficient access to capital and include deep provisions in agreements with key trade partners	Target contract completeness, lowering of administrative burden, high degree of confidence in institutions, business friendliness, stable policies, labor market-enhancing outcomes, and climate-smart policies

Source: Adapted from Taglioni and Winkler 2016.

BOX 5.1

Lessons from China for apparel upgrading

China has been remarkably successful in the apparel industry, improving all key areas and growing rapidly. Fredrick (2016) argued that it was able to upgrade (process, product, end-market, function, and intersectoral) by having a distinct value proposition that entailed affordability, reliability, and the development of a good reputation; a broad range of product categories; full-package offerings; and “good-enough” compliance. She attributes this to six factors:

- Industrial policies geared toward upgrading and assessing global dynamics, including grants and loans for technological upgrading, incentives for machinery to make more advanced products while removing incentives for lower-value products; targeting of non-EU and non-U.S. markets as well as the domestic market; investments in textile capabilities and sustained technological investments and growth in key material segments; a “go-out” policy to encourage investment of low value-added segments in neighboring countries; and support for domestic brand development.
- A functional division of labor between sales and production, using agents and intermediates to promote manufacturers and link up with global buyers.

- Investments in connectivity through sourcing offices in Hong Kong, China, and near airports in mainland China that focused on having buyers both close and comfortable.
- Continuous innovation and modifications in production processes to keep costs low and keep up with emerging competitors.
- Developing long-term relationships that built on improvements in quality, speed, and price competition.
- Correctly assessing the tipping points for buyers possibly inclined to change suppliers and not exceeding them.

While China’s success cannot be directly replicated, it does have numerous lessons for other countries, including the importance of developing long-term relationships and ties with foreign firms, partnering with Chinese firms both to transfer skills and knowledge and to access the Chinese market, targeting emerging markets without highly developed buyer–supplier relationships, targeting niches within a highly diversified industry, and taking advantage of rising labor costs in China to undercut these suppliers.

Source: Frederick 2016.

Beaudry and others 2016, Eden and Gaggi 2015; Morikawa 2016; Pikos and Thomsen 2016). Researchers have focused on the rapid technological advances in automation, big data analytics, and digitization. They have also looked at manufacturing responses to climate change and other environmental- and resource-related risks, including transitions toward additive manufacturing through three-dimensional printing technologies. And they see the growth of the circular economy as likely to require manufacturers to design products for several cycles of disassembly and reuse.

GVCs are characterized by four features: customized production; sequential production decisions going from the buyer to the suppliers; high contracting costs; and global matching of goods, services, production teams, and ideas (Antràs 2015). All four point to the substantial power that multinational corporations coordinating GVCs have in selecting where to geographically locate individual production tasks. Technological improvements are likely in each of these cases to increase both the sophistication of buyer demands and the supplier capabilities to meet them. A full exploration of these issues is beyond the scope of this chapter, but given their implications for the relationship between GVC participation and declining economic growth and structural stagnation that many middle-income countries experienced, it is worth addressing two aspects of these medium-term developments.

First, the workforce skills required to manufacture even unsophisticated products is likely to increase substantially, requiring not only higher levels of education but also cross-domain

skills and tacit knowledge for using new equipment and thinking computationally and analytically and high levels of technical and engineering knowledge. For many middle-income countries this will require a fundamental upgrade of education systems, research institutions, and innovation systems. So the already diminishing advantage that labor-abundant, low-wage countries possess for low-skill manufacturing is likely to diminish further.

Second, re-shoring production to developed economies—given the need for highly skilled workers and, more important, the ability to automate many tasks—is likely to become even greater in coming years, reinforced by the rapidly growing political backlash against globalization and rising economic nationalism in many western countries. Some 70% of clients surveyed in a recent study believe that automation and developments in three-dimensional printing will encourage companies to move their manufacturing closer to home, with North America seen as having the most to gain from this trend and China the most to lose (Oxford Martin School 2016). The jobs of 77% of workers in China and 69% of workers in India are at risk because of automation (World Bank 2016c). In this context the rapidly growing importance of trade in data and information, even within production and manufacturing, is likely to further increase the modularity of work processes and to bypass all but the most sophisticated middle-income countries.

Together, these issues are likely to reinforce concerns of premature deindustrialization, with countries running out of industrialization opportunities sooner and at lower income than earlier

industrializers (Rodrik 2016). The trend may have hit Latin American middle-income countries, both economically and in risks for political stability and democratization. Only recently have firms and governments in developed and developing economies come to terms with the fact that the GVC revolution required a fundamental rethinking of trade and, more broadly, industrial development. These new disruptive technological changes will again require new policies and strategies to adapt.

This points to the challenges for ensuring that the gains from GVC trade for industrializing countries actually benefit workers and households—to the recent and emerging ever-more-complex aspects of the political economy of globalization, particularly for industrializing countries. What is needed? First is a better understanding of what automation is and what globalization is—since narratives have profound political consequences. Second is a sharper focus on the distributional impacts of GVC trade, on adjustment costs, and on displacement—renewing attention to labor market impacts and to the risks of downgrading within GVCs for certain workers even as countries upgrade overall.

Conclusions and policy implications

Can integration into GVCs help countries avoid a middle-income trap? And if so, through what channels and under what circumstances? And how do the factors hypothesized to contribute to growth slowdowns at the middle-income level also impede economic upgrading through GVCs. Inevitably, in bridging two issues for which even definitions are heavily disputed, reviewing the relevant theoretical literature and empirical analysis may have created more shadow than light.

In discussing the middle-income trap, it probably helps to move away from the deterministic framing that the concept can assume, particularly in the eyes of policymakers. The evidence is fairly robust that there is nothing overly probable, let alone

inevitable, about growth slowdowns at specific incomes. But problems related to the structural transformation of industries are quite specific to middle-income countries, and this more limited understanding of a middle-income trap is analytically more tractable. The closely linked debates on GVCs and middle-income traps both strongly point to developing countries' need to adapt to a world of global trade and investment operating through globally integrated value chains in goods, services, and information. This presents a partial but important conceptual paradigm for addressing many middle-income countries' inability to converge with Organisation for Economic Co-operation and Development economies. The macroeconomic, trade, and industrial policies required for successful GVC participation can play an important role in the factors that have contributed to economic stagnation both in the recent past and in present-day middle-income countries. There is a reason why many countries find it difficult to graduate to high-income status: capabilities, policies, investment decisions, and institutional processes become highly complex. As economic forces interact in multidimensional, unpredictable, and dynamic ways, it is often difficult for institutions to capture such complexity, adapt swiftly, and set policy priorities. Moreover, many challenges—and thus solutions—are unique to the respective country, sector, and commodity, so adopting previously successful strategies may not help. Indeed, emerging technological changes are likely to further complicate countries' ability to integrate into and upgrade within GVCs.

Even so, policy recommendations can be formulated. First, policymakers and companies in the digital era—in developed and developing countries alike—will have to focus on the key features of the 21st century economy. This includes addressing the interplay between technological (digital) innovation and globalization (increased connectivity and GVCs) and creating an environment conducive to diversification, innovation, and productivity. Second, attention to the macroeconomic, social, and environmental sustainability of a GVC-led development model is also in order.

ANNEX 5.1

Attempts to quantify the middle-income trap

TABLE A5.1.1 Country status relative to indicators associated with middle-income trap

Country	Aiyar and others (2013) "Trap Map" based on seven key factors (higher score signifies greater risk of middle-income trap)	Felipe and others (2012) LMIC trap = not crossed the lower-middle-income segment in at most 28 years UMIC trap = not crossed the upper-middle-income segment in at most 14 years	Panther and Flechtner (2015) Share of four total time periods (1976–2009) during which GDP per capita growth exceeded high-income country average (%)
Albania		LMIC trap	75
Algeria	13	LMIC trap	100
Argentina	12		100
Bolivia, Plurinational State of	12	LMIC trap	0
Botswana		LMIC trap	75
Brazil	8	LMIC trap	75
Bulgaria			100
Cambodia			100
Chile	7		100
China	2		100
Colombia	6	LMIC trap	0
Congo, Rep.		LMIC trap	75
Costa Rica	5		75
Czech Republic			100
Cyprus			75
Dominican Republic		LMIC trap	75
Ecuador	9	LMIC trap	25
Egypt	8	LMIC trap	75
El Salvador	2	LMIC trap	50
Equatorial Guinea			50
Estonia			100
Gabon		LMIC trap	25
Greece			75
Guatemala	11	LMIC trap	25
Honduras	11		50
Hong Kong, China			100
Hungary			100
India	4		100
Indonesia	1		100
Iran	4	LMIC trap	75
Ireland			75

(continued)

TABLE A5.1.1 Country status relative to indicators associated with middle-income trap (*continued*)

Country	Aiyar and others (2013) "Trap Map" based on seven key factors (higher score signifies greater risk of middle-income trap)	Felipe and others (2012) LMIC trap = not crossed the lower-middle-income segment in at most 28 years UMIC trap = not crossed the upper-middle-income segment in at most 14 years	Panther and Flechtner (2015) Share of four total time periods (1976–2009) during which GDP per capita growth exceeded high-income country average (%)
Jamaica		LMIC trap	0
Jordan	11	LMIC trap	50
Korea, Rep.			100
Lebanon		LMIC trap	100
Libya		LMIC trap	50
Malaysia	5	UMIC trap	100
Mauritius			100
Mexico	6		50
Morocco	9	LMIC trap	100
Namibia		LMIC trap	25
Nicaragua			50
Oman			100
Panama	13	LMIC trap	50
Paraguay	10	LMIC trap	25
Peru	12	LMIC trap	75
Philippines	10	LMIC trap	25
Poland			100
Portugal			50
Romania		LMIC trap	75
Russian Federation			100
Saudi Arabia		UMIC trap	25
Singapore			100
South Africa		LMIC trap	25
Sri Lanka		LMIC trap	75
Swaziland		LMIC trap	50
Syria		UMIC trap	100
Thailand	5		100
Tunisia	10	LMIC trap	75
Turkey	3		
Ukraine			100
United Arab Emirates			50
Uruguay	8	UMIC trap	75
Venezuela, RB		UMIC trap	100
Viet Nam	7		50
Yemen, Rep.		LMIC trap	0

Notes

1. Middle-income countries are defined by the World Bank as having a GDP per capita of \$1,046–\$12,735 in 2014. Countries with a higher GDP per capita are classified as high-income countries, and countries below \$1,046 are classified as low-income countries. Upper-middle-income countries have a GDP per capita of \$4,126–\$12,735, and lower-middle-income countries have a GDP per capita of \$1,046–\$4,125.
2. This dual interpretation of the middle-income trap is explained as follows. The first is that middle-income countries start growing slower than the average country conditional on their income; the second is that while it may be easy to become a middle-income country, it is difficult to move beyond it.
3. This is also central to much of the work linking complexity economics to economic development (Pugliese and others 2015). While addressing the literature's perceived deficiencies on poverty traps and on processes of economic development more broadly, the researchers pointed particularly to the complexity of economic systems at the outset of industrialization, viewing this a dynamic process where complex network-reinforcing production capabilities and product demand emerges. Using a new measure of complexity, they found that more-differentiated and more-complex economies face lower barriers (in GDP per capita) when starting the transition toward industrialization.
4. There have even been discussions of multilateral trade liberalization through specific value chains rather than through trade policy issues (the case thus far; Hoekman and Jackson 2013).
5. In broad strokes this mirrors the findings of the empirical literature of transmission channels for trade and foreign direct investment.

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