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From Flying Geese to Leading Dragons

New Opportunities and Strategies for Structural Transformation in Developing Countries

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Abstract

Economic development is a process of continuous industrial and technological upgrading in which any country, regardless of its level of development, can succeed if it develops industries that are consistent with its comparative advantage, determined by its endowment structure. The secret winning formula for developing countries is to exploit the latecomer advantage by building up industries that are growing dynamically in more advanced fast growing countries that have endowment structures similar to theirs. By following carefully selected lead countries, latecomers can emulate the leader-follower, flying-geese pattern that has served well successfully catching-up economies since the 18th century.

The emergence of large middle-income countries such as China, India, and Brazil as new growth poles in the

world, and their dynamic growth and climbing of the industrial ladder, offer an unprecedented opportunity to all developing economies with income levels currently below theirs—including those in Sub-Saharan Africa. Having itself been a “follower goose,” China is on the verge of graduating from low-skilled manufacturing jobs and becoming a “leading dragon.” That will free up nearly 100 million labor-intensive manufacturing jobs, enough to more than quadruple manufacturing employment in low-income countries. A similar trend is emerging in other middle-income growth poles. The lower-income countries that can formulate and implement a viable strategy to capture this new industrialization opportunity will set forth on a dynamic path of structural change that can lead to poverty reduction and prosperity.

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FROM FLYING GEESE TO LEADING DRAGONS

New Opportunities and Strategies for Structural Transformation in Developing Countries

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WIDER Lecture
Maputo, Mozambique

I would like to thank Célestin Monga, Vandana Chandra, David Rosenblatt, Volker Treichel, and Doerte Doemeland for excellent support in preparing this lecture.

When the World Institute for Development Economics Research (WIDER) was established in 1984 as the first research and training center of the United Nations University, under the visionary leadership of then Secretary General Javier Pérez de Cuéllar, its mandate was clearly set out: “To undertake multidisciplinary research and policy analysis on structural changes affecting the living conditions of the world’s poorest people; to provide a forum for professional interaction and the advocacy of policies leading to robust, equitable and environmentally sustainable growth; and to promote capacity strengthening and training for scholars and government officials in the field of economic and social policy making.” Since then WIDER has contributed enormously to the enhancement of development knowledge.

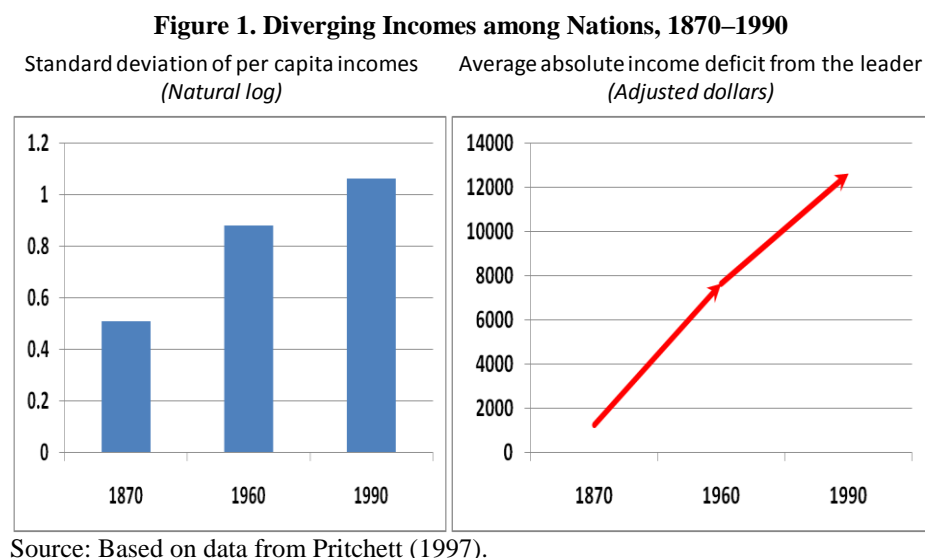
WIDER’s intellectual agenda has never been more timely than it is today. In the aftermath of the Great Recession that reduced world output by 2.2 percent in 2009, slowed progress toward the Millennium Development Goals, and shattered the hopes of millions of people in developing countries, undertaking applied research and policy analysis on development and poverty issues remains a key priority for the global community.¹ Moreover, the world is again facing historic development challenges—from major natural disasters such as earthquakes, tsunamis, floods, and droughts to food and fuel price spikes, high unemployment, and new demands for profound sociopolitical change in the Middle East and throughout Africa—which can only be confronted through sustained and inclusive growth.

Historians tell us that human beings have populated the earth for hundreds of thousands of years. Yet as surprising as it may seem, rapid and sustained income growth is a modern phenomenon that appeared only after the Industrial Revolution in the 18th century. For millennia, most countries stayed at the stage of a relatively backward agrarian economy—disturbed from time to time by war and natural calamities and afflicted by the Malthusian trap. Except for the ruling classes, craftsmen, and merchants—who represented a minority of the population—most people worked in subsistence agriculture, animal husbandry, or fishery.

The Industrial Revolution in England marked the start of a new era in economic history. In the first eight decades of the 18th century industrial growth in England, the leading world economy at the time, averaged only 0.7–0.8 percent a year. The rate rose rapidly in the 19th century and reached average levels of about 2.8 percent a year between 1781 and 1913 (Gerschenkron 1955). Most remarkably, output per employed person doubled between 1840 and 1911. Several other advanced economies—most notably the Western European countries, the United States, and other Western offshoots—were able to follow in the footsteps of England and accelerate their growth. During the past century a few economies in Asia—most notably Japan and the East Asian Tigers, including Hong Kong SAR, China; the Republic of Korea; Singapore; and Taiwan, China—were also able to achieve sustained growth and reached high-income status.

¹ Based on current economic projections, the world remains on track to reduce by half the number of people living in extreme poverty. The number of people living on less than \$1.25 a day is projected to be 883 million in 2015, compared with 1.4 billion in 2005 and 1.8 billion in 1990. However, much of this progress reflects rapid growth in China and India, while many African countries lag behind: 17 countries are far from halving extreme poverty, even as the aggregate goals will be reached (World Bank 2011).

However, most countries in the world failed to have a similar acceleration in their growth.² As a result, there is a big divergence in income level among countries (figure 1). From an insignificant difference at the beginning of the 18th century, per capita income in the developed countries of Western Europe and its offshoots increased to more than 20 times that of the developing countries by the end of the 20th century.



The diverging patterns and performances among world economies are puzzling and have been a major topic of research for development economists for many decades. Yet we have an important clue: Before the 18th century it took about 1,400 years for the Western world to double its income. In the 19th century the same process took about 70 years, and in the 20th century only 35 years (Maddison 1995). That dramatic acceleration in growth rates came about with the rapid technological innovation after the Industrial Revolution and the transformation of agrarian economies into modern industrialized societies, with agriculture’s share of employment declining from more than 80 percent to less than 10 percent. This intriguing trend has led us to recognize that continuous structural change prompted by industrialization, technological innovation, and industrial upgrading and diversification are essential features of rapid, sustained growth.

But if the West took 300 years to innovate and industrialize, Japan less than 100, and the East Asian Tigers only 40 years to catch up, development economists must find the secrets of successful catching-up strategies. More recently other emerging economies, such as China, Brazil, and India, also took off. And the list of low-income countries that are about to join the “club” keeps growing.³ However, other lower-income countries, with more than one-sixth of humanity—the people counted as the “bottom billion,” a term coined by Oxford economist Paul

² Of the 192 member states of the United Nations, only 52 are currently classified as high-income countries. In other words, 140 countries (73 percent) are still considered developing economies.

³ According to the 2008 *Growth Report* by the Commission on Growth and Development, led by Nobel Laureate Michael Spence, 13 economies achieved an average annual growth rate of 7 percent or above for 25 years since the end of World War II. In 2000–08, 29 economies achieved that average annual growth rate, and 11 of them were in Sub-Saharan Africa.

Collier—continue to be trapped in poverty. The mystery of diverging country performances, especially during the second half of the 20th century, persists.

This year's lecture is aimed at shedding some new light on the mystery. It is based on my work on the new structural economics and its implementation strategy, the Growth Identification and Facilitation framework (Lin and Monga 2011).⁴ I hope this lecture helps in understanding how the government of a low-income country can accelerate structural change and income growth by facilitating the development of new industries that reflect the country's latent comparative advantage, and take advantage of new opportunities from the rising of a multipolar-growth world.

The “flying geese–leading dragons” metaphor used in the title sums up the key message of the lecture. Economic development is a process of continuous industrial and technological upgrading in which any country, regardless of its level of development, can succeed if it develops industries that are consistent with its comparative advantage, determined by its endowment structure. The secret winning formula for developing countries is to exploit the latecomer advantage by building up industries that are growing dynamically in more advanced countries that have endowment structures similar to theirs. By following carefully selected lead countries, latecomers can emulate the leader-follower, flying-geese pattern that has served well all successfully catching-up economies since the 18th century.

The emergence of large middle-income countries such as China, India, and Brazil as new growth poles in the world, and their dynamic growth and climbing of the industrial ladder, offer an unprecedented opportunity to all developing economies with income levels currently below theirs—including those in Sub-Saharan Africa. Having itself been a “follower goose,” China is on the verge of graduating from low-skilled manufacturing jobs and becoming a “leading dragon.” That will free up nearly 100 million labor-intensive manufacturing jobs, enough to more than double manufacturing employment in low-income countries. A similar trend is emerging in other middle-income growth poles. The lower-income countries that can formulate and implement a viable strategy to capture this new industrialization opportunity will set forth on a dynamic path of structural change that can lead to poverty reduction and prosperity.

1. The Mechanics and Benefits of Structural Change

Legendary Roman emperor Marcus Aurelius, one of the most influential political leaders and thinkers in world history, famously observed that “the universe is transformation; our life is what our thoughts make it.” He thus outlined the essentially voluntary nature of success. Writing nearly two millennia later, biologist Charles Darwin brought scientific reasoning to Aurelius's observation and took it to another level by emphasizing the inevitability of transformation. In studying what he called “the struggle for existence,” he conjectured that “more individuals are born than can possibly survive. A grain in the balance will determine which individual shall live and which shall die,—which variety or species shall increase in number, and which shall

⁴ The new structural economics proposes to apply a neoclassical approach to study the determination of economic structure and the mechanism of its evolution in an economy. It is called new structural economics rather than structural economics to distinguish it from the structuralism that prevailed in the early years of development economics. See Lin (forthcoming c).

decrease, or finally become extinct... The slightest advantage in one being, at any age or during any season, over those with which it comes into competition, or better adaptation in however slight degree to the surrounding physical conditions, will turn the balance,” (Darwin, [1859] 1964, pp. 467-468).

Economists who have been concerned with the development of poor countries have not quite reached that kind of stark diagnostics. Economics is typically not a zero-sum game, and even the most egregious policy failures rarely push a sovereign country into total bankruptcy and disappearance from the map of the earth.⁵ After all, few national economies perish simply because of natural selection. But the basic insight that underlies Aurelius’s and Darwin’s intuition applies to some extent to economic development: long-term growth depends on continuous structural transformation.

This section discusses the mechanics and benefits of structural change, which characterizes the evolution of successful countries from low-income, rural agrarian economies into urban industrial economies with a much higher per capita income. It argues that countries that remain poor are those that have failed to achieve successful structural transformation away from their agrarian past. While several researchers have studied that crucial dynamics and documented some stylized facts about it, conceptualizing positive structural change and providing a clear policy framework for policy makers in developing countries has been challenging. The new structural economics, which takes into account lessons from world economic history and advances in economic theory, provides a pragmatic approach for facilitating structural change and sustained growth in developing countries.

Early Insights on the Leader-Follower Dynamics

Structural transformation, broadly defined as “the interrelated processes of structural change that accompany economic development” (Syrquin 1988, p. 206), has been a subject of active research since the beginning of the modern growth period. Within that rather broad characterization, various authors have offered different meanings for that concept. The most common relates to the relative importance of sectors in the economy, in terms of production and factor utilization. From that perspective it appears that the main changes in structure studied by early development economists were the acceleration of technological innovation, the increase in the rate of capital accumulation, and the shifts in the sectoral composition of growth, often with changes in the main location of economic activity (urbanization).

⁵ Krugman observes that “the idea that a country’s economic fortunes are largely determined by its success on world markets is a hypothesis, not necessary truth; and as a practical, empirical matter, that hypothesis is flatly wrong. That is, it is simply not the case that the world’s leading nations are to any important degree in economic competition with each other, or that any of the major economic problems can be attributed to failures to compete on world markets. . . . The bottom line for a corporation is literally its bottom line: if a corporation cannot afford to pay its workers, suppliers, and bondholders, it will go out of business. So when we say that a corporation is uncompetitive, we mean that its market position is unsustainable—that unless it improves its performance, it will cease to exist. Countries, on the other hand, do not go out of business. They may be happy or unhappy with their economic performance, but they have no well-defined bottom line. As a result, the concept of national competitiveness is elusive” (1996, pp. 5 and 6).

Simon Kuznets took up the task of understanding and documenting long-run transformation through a series of stylized facts, though he was reluctant to offer a theory of development. His empirical studies identified four features of modern economic growth: First, there is a change in the sectoral composition of the economy as the share of the nonagricultural sectors increases and that of the agricultural sector decreases (figure 2). Second, this sectoral shift is mirrored in the pattern of employment; that is, the proportion of the labor force employed in the nonagricultural sectors rises while that in the agricultural sector decreases (figure 3). Third, there is a redistribution of the population between the rural and urban areas. And fourth, there is an increase in the relative size of the capital-labor ratio in the nonagricultural sectors of the economy.

**Figure 2. A Partial Illustration of the Kuznets Facts:
Evolution of Sectoral Shares of U.S. Employment, 1800–2000**

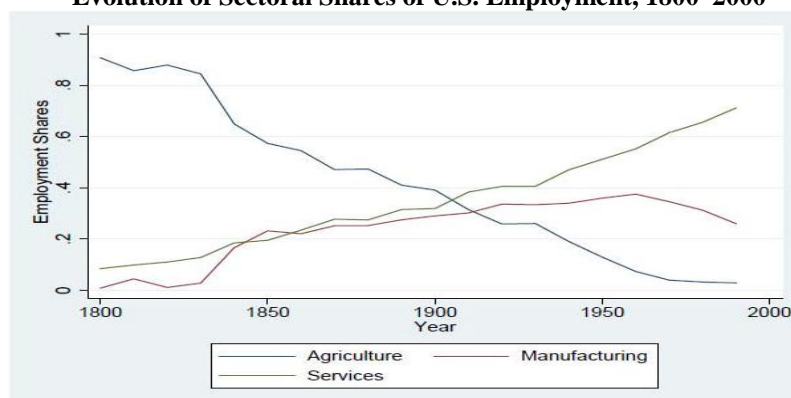
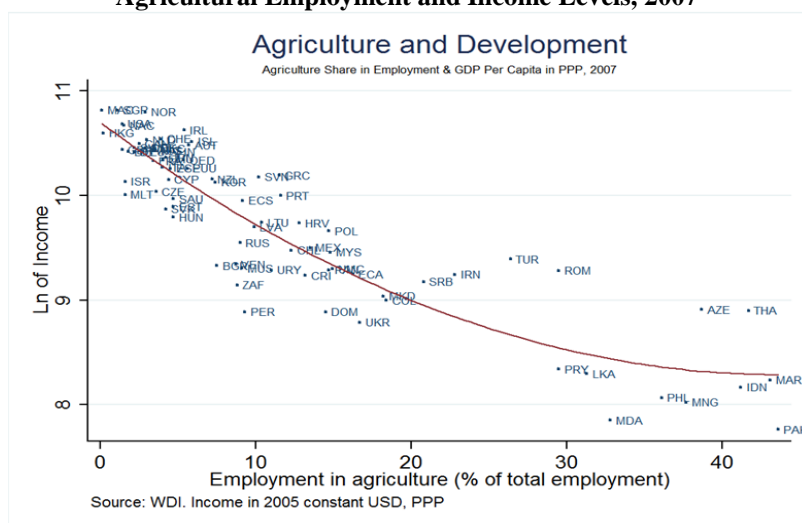


FIGURE 20.1. The share of US employment in agriculture, manufacturing and services, 1800-2000.

Source: Author's adaptation from Kuznets (1966, ch. 3).

**Figure 3. Agriculture and Development:
Agricultural Employment and Income Levels, 2007**

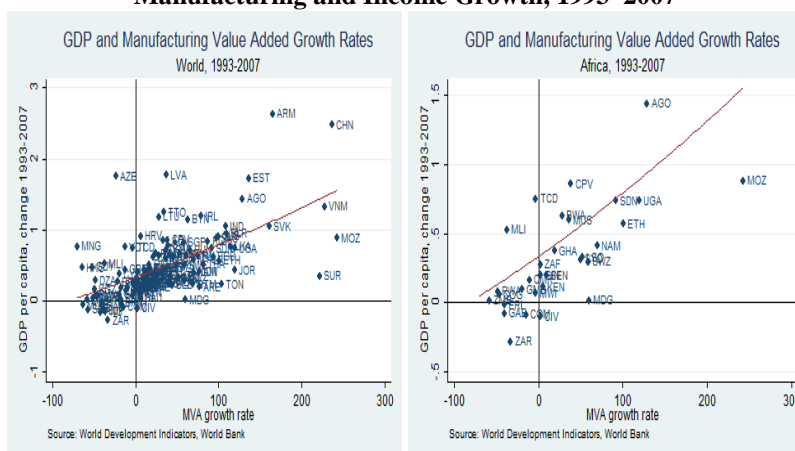


Source: WDI. Income in 2005 constant USD, PPP

Kuznets concluded from these observations that “*some* structural changes, not only in economic but also in social institutions and beliefs, are required, without which modern economic growth would be impossible” (1971, p. 348; emphasis in the original). That view was corroborated by Chenery, who defined economic development as “a set of interrelated changes in the structure of an economy that are required for its continued growth” (1979, p. xvi). And by Abramowitz, who noted that “sectoral redistribution of output and employment is both a necessary condition and a concomitant of productivity growth” (1983, p. 85).⁶

Industrialization in particular was recognized as one of the main engines of economic growth, especially in the early stages of development.⁷ Its essential characteristics include an increase in the proportion of the national income derived from manufacturing activities and from secondary industry in general, except perhaps for cyclical interruptions; a rising trend in the proportion of the working population engaged in manufacturing; and an associated increase in the per capita income of the population (see Bagchi 1990). Few countries have achieved economic success without industrializing. Only in circumstances such as an extraordinary abundance of natural resources or land have countries been able to do so (UNIDO 2009). This is confirmed by the strong positive correlation that one can find in recent years (1993–2007) between the growth of value added in the manufacturing sector and the change in GDP per capita. As figure 4 shows, the correlation is even stronger in Sub-Saharan Africa than in the rest of the world.

**Figure 4. Industrialization as an Engine of Growth:
Manufacturing and Income Growth, 1993–2007**



Looking at these facts, early development economists embarked on a search for a theory of structural change. Rostow (1960) advanced one of the most widely debated early theories of structural transformation, the “stages of development” theory, which posits that the central stage (or takeoff phase) features two key elements: a sharp increase in the rate of capital accumulation and the emergence of a “leading sector” that fosters the change in the production structure. Rostow proposed a unique path to development and the need for each country to meet certain

⁶ Matthews, Feinstein, and Odling-Smee expressed a more nuanced view when they wrote that “neither structural change nor growth in GDP is an exogenous variable; both result from a complex of interacting causes on the supply side and demand side” (1982, p. 250).

⁷ Earlier analyses of the process, dating back to the 1950s and 1960s, found that manufacturing in particular tends to play a larger role in total output in richer countries and that higher incomes are associated with a substantially bigger role of transport and machinery sectors. See Datta (1952); and Kuznets (1966).

“prerequisites” before taking off. Not surprisingly, and despite the great insight of “leading sectors” that suggested the ideas of agglomeration and clustering, his theory has generated a lot of criticism.⁸

A pertinent framework that also focused on structural transformation was that of Alexander Gerschenkron, who noted that prerequisites for growth can be substituted for. Analyzing the catching-up process among European countries after the Industrial Revolution, he observed that rapid industrialization started from different levels of “economic backwardness” and that capital accumulation was not a precondition for success. In fact, “the more backward a country’s economy, the greater was the part played by special institutional factors [government agencies, banks] designed to increase the supply of capital to the nascent industries” (Gerschenkron 1962, p. 354).⁹

An obvious criticism of Gerschenkron’s work was that he studied only the path followed by relatively high-income Western countries to catch up with England.¹⁰ Kaname Akamatsu’s work on Japan, a country starting from a much lower level of income than the Western countries, was therefore of great interest for developing countries. In a seminal paper initially published in the 1930s but translated into English only in the 1960s, he documented what he called the “wild-geese-flying pattern” in economic development, noting that “wild geese fly in orderly ranks forming an inverse V, just as airplanes fly in formation” (1962, p. 11). His observation is illustrated pictorially in figure 5, from a note prepared by the National Graduate Institute for Policy Studies in Tokyo for the GRIPS Development Forum in 2002.¹¹

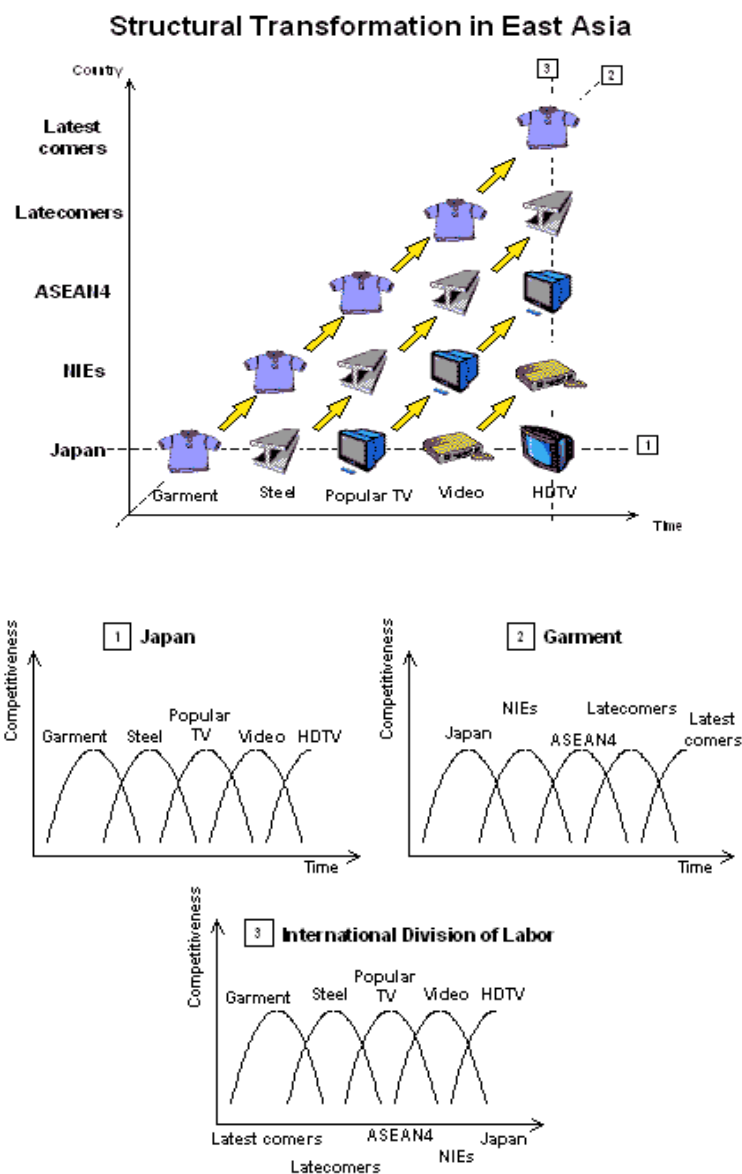
⁸ From the point of view of the new structural economics, any economy can start a dynamic growth path if the government can facilitate development by the private sector of industries that are consistent with the economy’s comparative advantage determined by its existing endowment structure. Therefore, a sharp increase in capital accumulation is not a necessary condition. The accumulation of capital will increase if the economy starts growing dynamically. Therefore, the increase in capital accumulation is a consequence of rather than a precondition for dynamic growth. For other comments on Rostow’s theory, see, most notably, Hoselitz (1960).

⁹ From the point of view of the new structural economics, the targeted industries for catching up should be consistent with a latecomer country’s latent comparative advantage so that the state’s role is limited to facilitating the private sector’s entry into the new industry by overcoming the coordination and externality issues, which are beset with market failures. The most advanced country’s industries will not be a catching-up country’s latent comparative advantage if the gap between the two countries’ levels of development is too large. Private firms in those industries will not be viable in open, competitive markets. Their initial investments will depend on the government’s large capital mobilization, and their continual operations will require the government’s continual subsidies and protections. The attempt to develop industries too far ahead of a country’s level of development is the root cause of the failure of many governments’ interventions in their country’s industrial development.

¹⁰ According to the estimation by Maddison (2010), the per capita incomes of Germany, France, and the United States were about 60–75 percent of Britain’s in 1870.

¹¹ GRIPS’s note draws on Kojima (2000); and Schroeppel and Nakajima (2002). See <http://www.grips.ac.jp/module/prsp/FGeese.htm>.

Figure 5. Asian Wild-Geese-Flying Pattern



Source: GRIPS (<http://www.grips.ac.jp/module/prsp/FGeese.htm>).

Note: ASEAN4 = Indonesia, Malaysia, the Philippines, and Thailand. NIEs = newly industrialized economies, Hong Kong SAR, China; Korea; Singapore; and Taiwan, China.

The “flying geese” pattern describes the sequential order of the catching-up process of industrialization by latecomer economies. It focuses on three dimensions: the intraindustry dimension, the interindustry dimension, and the international division of labor dimension. The first dimension involves the product cycle in a particular developing country, whereby the country initially imports the good, later moves to production combined with imports, and finally moves to export of the good (and may even become a net exporter). The second dimension involves the sequential appearance and development of industries in a particular developing country, with industries being diversified and upgraded from consumer goods to capital goods or

from simple to more sophisticated products. The third element involves the relocation of industries across countries, from advanced to developing countries as the latter undergo the process of convergence.

Are the Asian geese described by Akamatsu still flying? This pattern does appear to have persisted in Asia over the past two decades. For example, in the early 1990s China was already a dominant player in some light manufactures such as footwear and toys (table 1). Japan continued to be a dominant player in toys but was clearly moving up the technology ladder to more sophisticated games, such as Nintendo and Sony PlayStation. China, a low-income country in the 1990s, also still exported live animals on a large scale. In the 2000s it was able to move up the product ladder to more sophisticated manufactures and overtake Japan in world export shares in plastics, electrical machinery and parts, and television receivers. Korea was a major player in exports of live animals in the early 1990s but has now moved out of that primary sector. India lags in market shares but has gradually moved up in footwear.

**Table 1. Geese Still Flying in Asia:
Country Rankings in Selected Industries, 1992 and 2008**

Country	Live animals		Pharmaceuticals		Footwear		Iron & steel	
	1992	2008	1992	2008	1992	2008	1992	2008
China	1	1	2	3	1	1	3	1
India	5	4	3	1	4	2	4	4
Japan	3	3	1	2	5	5	1	2
Korea, Rep.	2	5	4	4	2	4	2	3
Thailand	4	2	5	5	3	3	5	5
Country	Plastics		Electrical machinery, parts		Television receivers		Toys	
	1992	2008	1992	2008	1992	2008	1992	2008
China	3	1	3	1	3	1	1	1
India	5	5	5	5	5	5	5	5
Japan	1	2	1	2	1	2	2	2
Korea, Rep.	2	3	2	3	2	3	3	4
Thailand	4	4	4	4	4	4	4	3

Source: World Bank, WITS database.

Note: Rankings established from data at the two-digit level for exports in the WITS database.

The international division of labor and production offers another angle for examining the flying-geese pattern. Table 2, based on historical trade statistics for footwear, offers credibility to the flying-geese hypothesis. It is constructed using revealed comparative advantage indexes for lead countries and latecomers in that industry. The table shows that Japan had a revealed comparative advantage in the early 1960s, during the earlier light manufacturing phase of its development. Later on other countries moved into the picture and began to take over larger shares of global production. The pattern displayed does not conform precisely with a “pure” dynamics of “flying geese.” Real-world data always involve some “noise” because products with different sophistication and different capital and technology intensities may be grouped in the same category. And government interventions may cause some deviation of industrial structure away from the optimal one determined by the country’s comparative advantage. Still, the general picture is consistent with the theory.

**Table 2. Flying Geese and the International Division of Production:
Asian Economies with a Revealed Comparative Advantage in Footwear, 1962–2000**

RCA in Footwear								
1962	1965	1970	1975	1980	1985	1990	1995	2000
Japan	Japan							
China	China	China	China	China	China	China	China	China
	Taiwan, China	Taiwan, Ch.	Taiwan, Ch.	Taiwan, Ch.	Taiwan, Ch.	Taiwan, Ch.		
	S.Korea	S.Korea	S.Korea	S. Korea	S. Korea	S. Korea		
		Pakistan		Philippines	Philippines	Philippines		
				Thailand	Thailand	Thailand	Thailand	Thailand
					Indonesia	Indonesia	Indonesia	Indonesia
					India	India	India	India
						Vietnam	Vietnam	Vietnam
						Sri Lanka	Sri Lanka	Sri Lanka
							Myanmar	Myanmar
							Bangladesh	Bangladesh
							Fiji	Fiji
							Cambodia	Cambodia

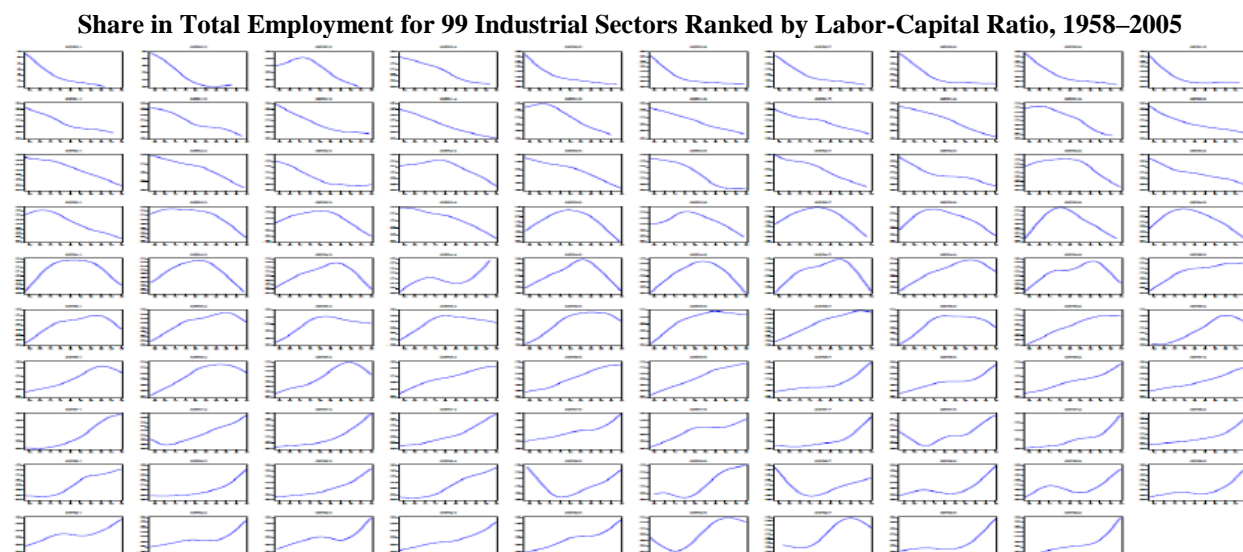
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Source: UN COMTRADE.

Note: Revealed comparative advantage is calculated as the share of footwear in the economy's exports divided by the share of footwear in global exports. The comparative advantage of a particular economy is "revealed" when this ratio is greater than 1. All economies in the table except China are ranked by income level.

The development of manufacturing industries in the United States shows a similar flying-geese pattern. Figure 6 shows the shares in total employment over the period 1958–2005 for 99 manufacturing industries, ranked from the most labor intensive to the most capital intensive, in the United States. Overall, the employment shares for the most labor-intensive industries declined continuously over the period, from a high to a low level; for those in the middle range the employment shares first increased and then declined; and for the most capital-intensive ones the employment shares increased throughout the period, from a low to a high level.

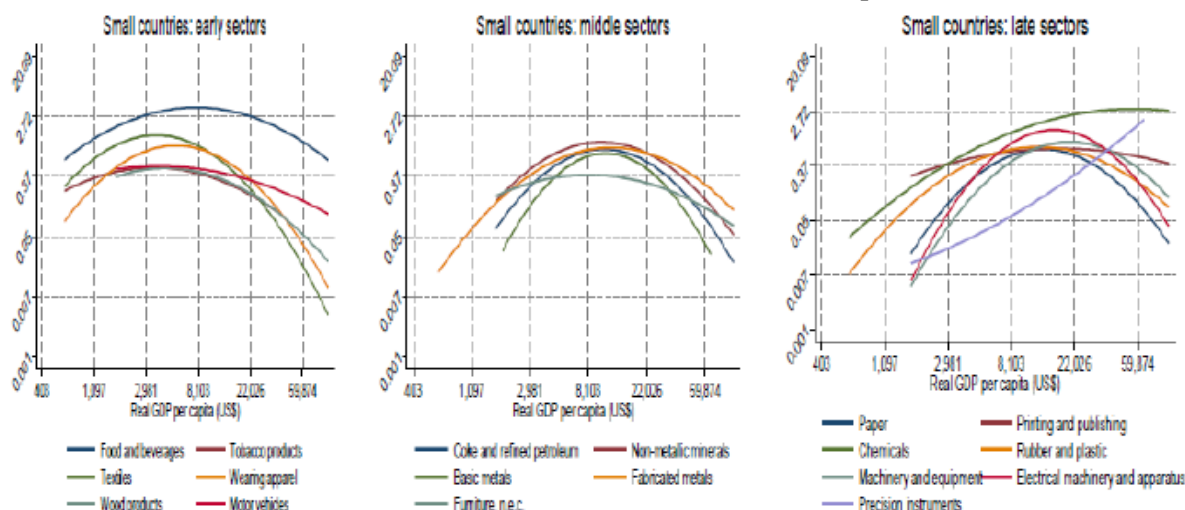
Figure 6. Flying-Geese Pattern in the United States:



Source: Ju, Lin, and Wang, 2011.

Across countries with different per capita income levels the pattern of change in the share of manufacturing industries in GDP is also consistent with the flying-geese hypothesis. Figure 7 plots the value added shares in total GDP for 18 manufacturing industries against real GDP per capita in 148 small countries in 1963–2006. The value added share for each industry follows an inverse V-shape, first increasing with real GDP per capita and then declining. The pattern of change is similar for large countries (Haraguchi and Rezonja 2010).

**Figure 7. Flying-Geese Pattern in 148 Small Countries:
Value Added Shares of 18 Industries and Real GDP Per Capita, 1963–2006**



Source: Haraguchi and Rezonja 2010.

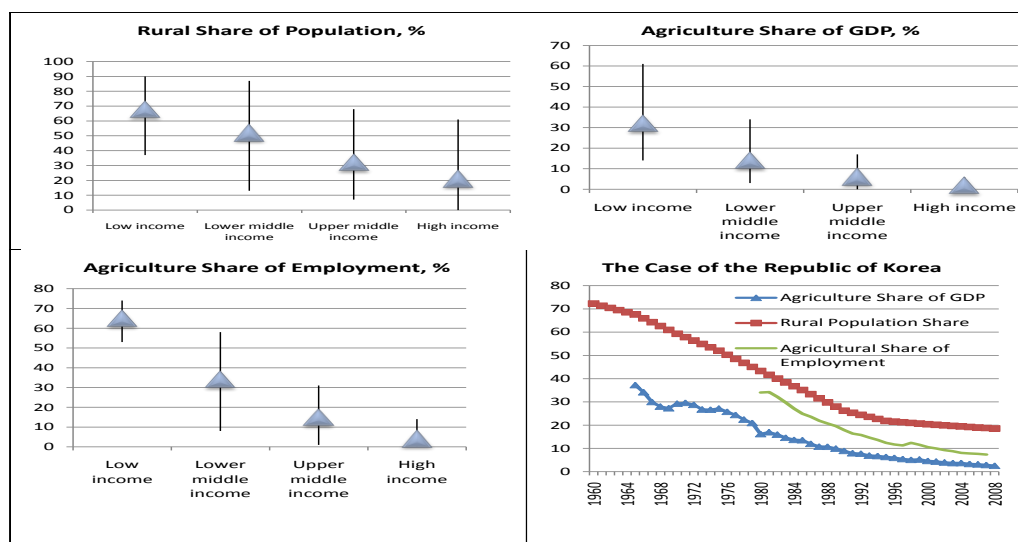
Note: Industries are at the ISIC two-digit level. Real GDP per capita is measured in 2005 U.S. dollars.

Established Stylized Facts—and Unexplained Failures of Transformation

The empirical literature on the catching-up process has gathered a lot of evidence on economic development as a process of structural change and on the patterns associated with that change.¹² It has established that in some fundamental ways low-income countries all look very similar. They have a large share of the population living in rural areas and employed in agriculture. And much of that agricultural activity is confined to subsistence agriculture. The basic starting point is therefore a transformation out of agricultural activities in rural areas. One can observe the same evolution very clearly whether by looking at a cross-section of countries by level of per capita income or by looking at the pattern of production of a single country over time. As figure 8 shows, higher-income countries have a lower share of the population living in rural areas, a lower share of production in agriculture, and a lower share of employment in agriculture. The developed countries and the countries that successfully caught up with them have all had dramatic structural changes in the composition of employment and value added in primary, secondary, and tertiary industries. By contrast, low-income countries have failed to achieve similar structural changes.

¹² See for example Syrquin (1986); Syrquin and Chenery (1986); Fei and Ranis (1964); and Haraguchi and Rezonja (2009, 2010).

Figure 8. Observed Patterns of Structural Change across Country Income Groups



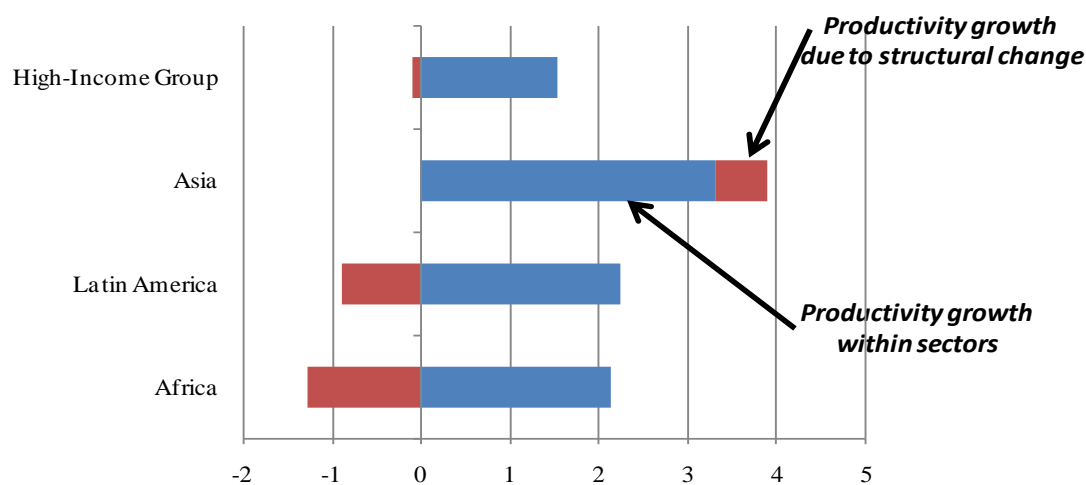
Source: World Bank, World Development Indicators database.

Note: Data for rural population and GDP shares are for 2008. Data for employment shares are for 2000 for low-income countries (because of limited data availability) and for 2006 for other country groups. Some small island states with very high rural population shares were removed as outliers from the high-income and upper-middle-income groups. Lines represent the range of values within each country group, and triangles the average.

Yet development strategies have often failed to deliver sustained growth and structural transformation in many developing countries, especially in Latin America and Africa. A recent assessment by McMillan and Rodrik (2011), based on a decomposition of productivity growth into two components (sectoral productivity and structural change), is illustrative.¹³ It shows that most of the difference between the recent growth in Asia and that in Latin America and Sub-Saharan Africa can be explained by the variation in the contribution of structural change to overall labor productivity (figure 9).

¹³ McMillan and Rodrik (2011) construct a simple index based on the idea that productivity differentials exist both between broad sectors of the economy and within modern manufacturing activities. These gaps are indicative of the allocative inefficiencies that reduce overall labor productivity. But they can potentially be an important engine of growth. When labor and other resources move from less productive to more productive activities, the economy grows even if there is no productivity growth *within* sectors. This kind of structural change can be an important contributor to overall economic growth.

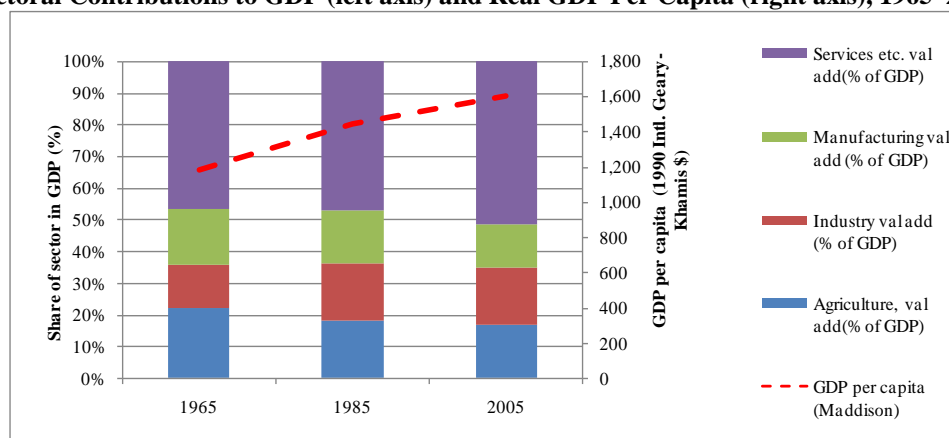
**Figure 9. Contribution of Structural Change:
Decomposition of Productivity Growth by Country Group, 1990–2005**



Source: McMillan and Rodrik 2011.

The situation of African economies is of particular interest because they constitute the core of the development challenge today. They exhibit many signs of limited structural transformation that corroborate the empirical analysis by McMillan and Rodrik and explain why progress has remained slow since independence. In 1965 agriculture contributed 22 percent of Sub-Saharan Africa's GDP, services 47 percent, and industry 31 percent (of which manufacturing contributed 17.5 percent). In 2005 it was estimated that agriculture still contributed a healthy 15 percent of GDP, while services contributed 52 percent and industry 33 percent (of which manufacturing represented less than 15 percent; figure 10).

**Figure 10. Limited Structural Transformation in Sub-Saharan Africa:
Sectoral Contributions to GDP (left axis) and Real GDP Per Capita (right axis), 1965–2005**



Sources: For sectoral contributions to GDP, World Bank, World Development Indicators database; for GDP per capita, Maddison.

The sustained decline in the agricultural share of the labor force that is one of the stylized facts of economic development has not been observed in Sub-Saharan Africa. The region's economies

were overwhelmingly rural in 1960, with agriculture accounting for 85 percent of the labor force. While the rural share of the population has fallen steadily over the past four decades, in 2009 it was still, at 63 percent, slightly above the 1960 average for other developing countries. With high population growth, the small change meant that rural population density increased substantially, putting pressure on arable land per capita.

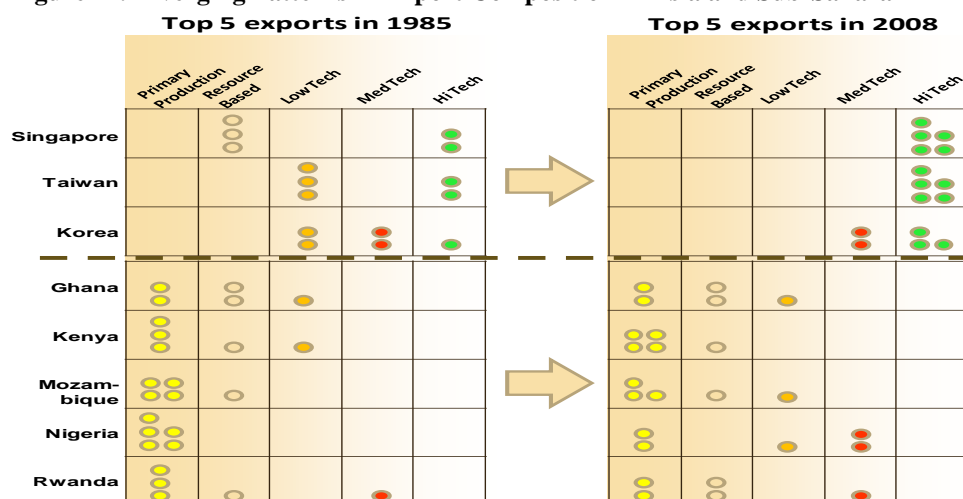
In a closed economy a decline in the agricultural share of the labor force can be sustained only if labor productivity in agriculture increases rapidly enough to feed a growing urban population. In an open economy food can be imported, but agricultural productivity remains a key determinant of agricultural household income and overall living standards and an essential source of foreign exchange for imported capital goods. But there is little evidence that the modest observed shift out of agriculture in Africa was driven by advances in rural labor productivity. Over the 40-year period 1960–2000 agricultural value added per worker rose at a trend rate of 0.5 percent a year in Sub-Saharan Africa, less than a third of the prevailing rate in other developing regions.¹⁴ Empirical studies using growth accounting techniques generally conclude that the growth in real GDP per worker in Sub-Saharan Africa has been driven by the contributions of physical and human capital accumulation per worker and that total factor productivity (the so-called growth residual) has often been nil or negative (Hall and Jones 1999; Ndulu, O’Connell, and Bates 2007).

Not surprisingly, the development of manufacturing has remained very slow in many African economies. Indeed, between 1993 and 2007, 21 of 31 Sub-Saharan African countries for which data are available experienced deindustrialization.

Economic diversification has also been limited in Africa, as evidenced by the high degree of vulnerability of Sub-Saharan African countries to shocks and volatility of annual growth rates, much higher than in other developing regions. Many of these small economies rely primarily on exports. Yet exports have remained concentrated in a narrow band of primary commodities with volatile prices (see Monga 2006) and in many cases have become more concentrated over time through the exploitation of mineral resources (see Gersovitz and Paxson 1990; and Berthelemy and Soderling 2001). Indeed, African countries have remained exporters of commodities or low-technology exports while Asian economies have been broadly successful in transforming their export sectors toward high-tech, higher value added goods (figure 11).

¹⁴ According to Ndulu, O’Connell, and Bates (2007), cereal yields did only slightly better, rising at 0.74 percent a year as compared with 2.4 percent in the rest of the world. They also note that relative food prices show little evidence of a systemic food crisis, but the answer may lie in rising food imports: the ratio of net imports of food to GDP rose by 1.4 percentage points a decade in Sub-Saharan Africa, eight times faster than in the rest of the world.

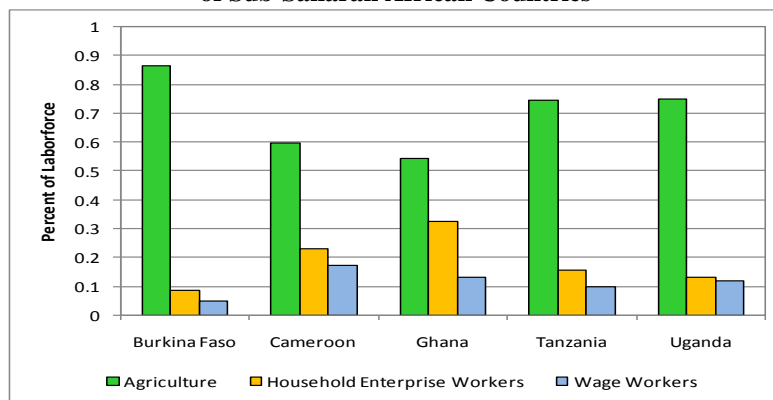
Figure 11. Diverging Patterns in Export Composition in Asia and Sub-Saharan Africa



The stagnation in export upgrading is not surprising: Sub-Saharan Africa's shares of world manufacturing production and exports have declined over the past three decades, from 0.4 and 0.3 percent in 1980 to 0.3 and 0.2 percent in 2008.

The limited number of employment opportunities created over recent decades in the formal sector should therefore be viewed as perhaps the most disturbing indicator of the lack of structural transformation in Sub-Saharan Africa. Figure 12, which presents only a small sample of countries because of data limitations, nevertheless tells a story that is typical of the region. It shows that wage employment is very small and that agricultural workers constitute the bulk of the labor force.

Figure 12. Composition of Employment in a Typical Group of Sub-Saharan African Countries



Source: Fox 2011.

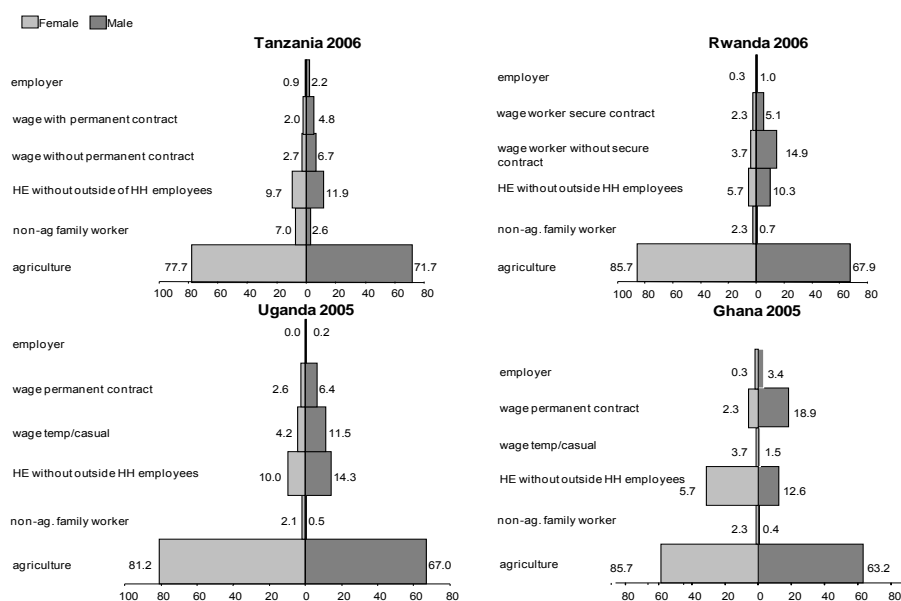
Note: Data are for the most recent year available.

The fragility of Sub-Saharan Africa's labor markets is even more obvious if one digs deeper to look into the distribution of employment, excluding or including agriculture, in another typical sample of countries (figure 13). Even in Ghana, Rwanda, Tanzania, and Uganda—countries that

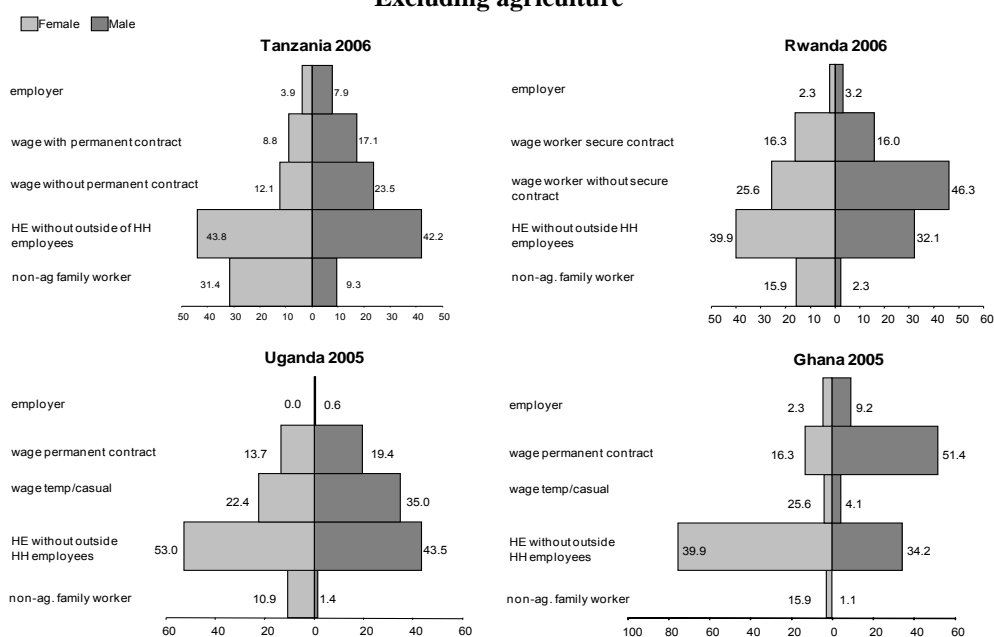
have made remarkable economic progress in recent years—the share of wage earners in the labor force (with or without permanent contracts) is usually around 2 or 3 percent.

**Figure 13. Fragility of Labor Markets in Sub-Saharan Africa:
Distribution of Employment in Selected Countries**

Including agriculture



Excluding agriculture

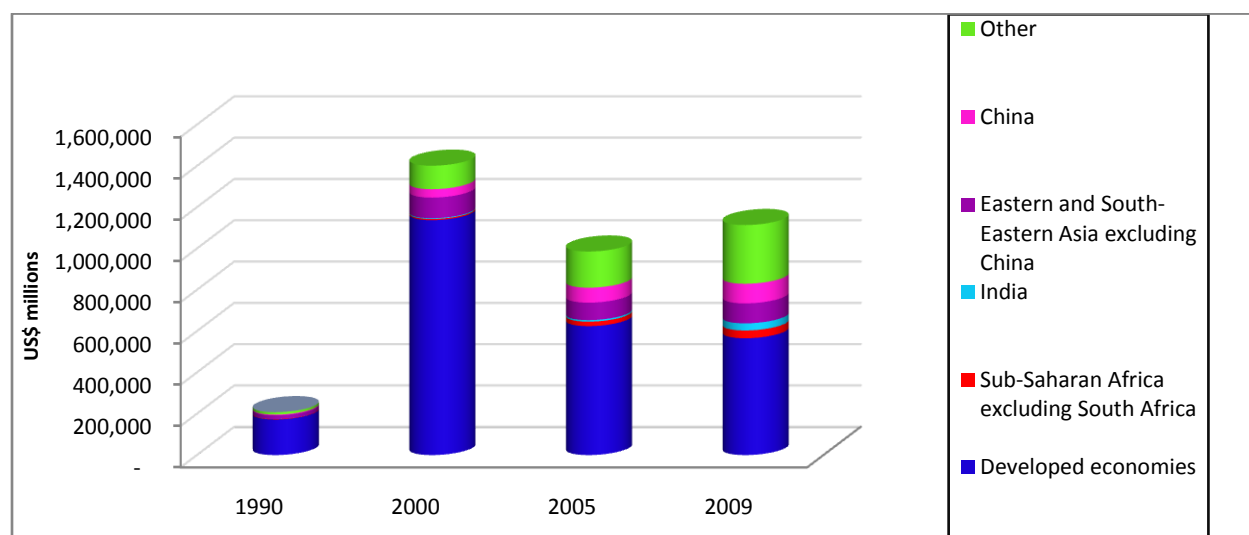


Source: Fox 2011.

Note: HE = household enterprise. HH = household.

The failure to develop and upgrade their industrial structure and to diversify is a particularly disturbing stylized fact of African economies. Unlike other developing regions, especially Asia, Sub-Saharan Africa has gained only limited benefits from deindustrialization in high-income countries. The transition toward a service-dominated economic structure in the United States, the European Union, Japan, and other high-income OECD countries, often stimulated by innovation and technological upgrading, has involved a retreat of their industrial sector. Globalization and the quest for competitiveness and profitability have led many firms in those countries to relocate their labor-intensive manufacturing production to middle- and low-income countries—as shown by the evolution of foreign direct investment flows in recent years (figure 14). So far Sub-Saharan African countries, excluding South Africa, received only a small amount of those investment flows.

**Figure 14. A Relocation of Labor-Intensive Manufacturing:
Global Flows of Foreign Direct Investment, 1990–2009**
(current prices and exchange rates)



Source: Author's calculations based on data from UNCTAD, *World Investment Report* (various years).

2. Intellectual Lessons from Failures and Successes of Structural Transformation

As Syrquin notes, “much of the interest in structural transformation derives from its possible implications for development policy” (1988, p. 209). The many insights of early development thinkers such as Akamatsu, Gerschenkron, and Kuznets certainly enriched the stock of development knowledge. However, they did not answer some of the most burning questions and issues facing policy makers in developing countries.

The Elusive Quest for Structural Transformation

Observing that “the central problem in the theory of economic development is to understand the process by which a community which was previously saving and investing 4 or 5 percent of its national income or less, converts itself into an economy where voluntary saving is running at about 12 to 15 percent of national income or more,” Lewis concluded that “the central fact of economic development is that the distribution of incomes is altered in favour of the saving class” (1954, pp. 155 and 156). His analysis assumed that saving is a prerequisite and constraint to sustained growth. This is not necessarily the case.¹⁵ But even assuming that it is indeed the case, a key question for structural transformation remains: how to foster capital accumulation in poor countries?

Besides the so-called saving constraint, some researchers introduced foreign exchange requirements or human capital as additional limitations to economic growth (see for example Chenery and Bruno 1962; and Chenery and Strout 1966). Again, assuming that these assumptions are true, there is an unanswered question: how to overcome such obstacles?

Other important questions have also remained on the structural change agenda: How to facilitate the clustering of firms that produces economies of scale? And how to facilitate the emergence of the “leading sectors” that can propagate growth and linkages to other industries? Even in resource-rich countries there have been many instances of fast growth based on the exploitation of natural resources that did not lead to structural transformation—most notably when employment in the industrial sector did not expand fast enough to absorb a growing labor force. Well-known cases include mineral-rich African countries such as Chad, the Republic of Congo, the Democratic Republic of Congo, Gabon, Guinea, Niger, and Sudan.

In its attempt to provide answers to these puzzling questions, the recent literature on structural transformation has expanded its field of inquiry to look into such issues as economic diversification, export composition, and industrial and technological upgrading. Economic diversification protects countries from vulnerability to shocks and reflects the pace at which low-income economies reallocate their resources to take advantage of emerging opportunities. Empirical research suggests that growth rates tend to be lower in economies that fail to engage in that process and that technological progress is faster in relatively sophisticated sectors (see Hulten and Isaksson 2007). Imbs and Wacziarg (2003) show that in early stages of development, sectoral *diversification* is accompanied by geographic agglomeration. In later stages of development, however, sectoral *concentration* is accompanied by geographic deagglomeration.

Export composition also seems to matter for sustained growth and structural transformation. In a recent study examining the issue, however, Lederman and Maloney (forthcoming) conclude that *how* a country exports may matter even more. One of their main observations is that externalities and rents are not associated with all goods equally, which provides grounds for government interventions to encourage the development of certain goods more than the market would naturally do.¹⁶

¹⁵ See footnote 8 and the discussion below.

¹⁶ Lederman and Maloney also note how difficult it is to measure which goods have more potential for rents or externalities, which leads them to caution.

Other recent approaches to structural transformation have emphasized the determinants of technological upgrading and innovation, which are essential ingredients for long-run productivity growth. In low-income countries, where budgets for research and development are scarce and industries located far from the technological frontier, technological upgrading and innovation typically take the form of adaptation and adoption of known technologies rather than the introduction of new ones (see Libecap and Thursby 2008; Aghion 2006; and Aghion and others 2005).

Despite the importance of these issues, mainstream development economics in recent decades has paid only limited attention to industrialization and its role in structural transformation. This may be explained primarily by the failure of industrial policies in developing countries, and the theoretical argument that the state cannot do better than the private sector in identifying new industries. The pervasive failures of government interventions—notably in Latin America, Africa, South Asia, and the countries of the former Warsaw Pact—have led to the dominant view that policies aimed at “picking winners” are bound to create unsustainable and socially costly distortions.

While some countries have actively and successfully pursued industrial policies—mainly in East Asia—the dominant view in the economic literature is still a skeptical one. In their critical review of rationales for industrial policy, Pack and Saggi (2006) note sarcastically that the knowledge civil servants need to successfully design and implement government interventions would make them omniscient. But much of the literature on industrial policy fails to make an important distinction among country strategies: policies supporting new industries that are inconsistent with the comparative advantage of the economy or attempting to protect old industries that have lost comparative advantage generally fail, while policies facilitating the development of new industries that are consistent with the comparative advantage of the economy often succeed (see Lin and Monga 2011).

Beyond the widespread skepticism about industrial policies, establishing the empirical regularities of the changing patterns of industrial structure and technological upgrading across the world is not a straightforward exercise. Industrialization has been a key feature of successful developing economies lifting themselves out of poverty, but the recent trend in the most advanced economies has been toward deindustrialization—that is, a decline in manufacturing employment as a share of the total that mirrors a decline in the share of manufacturing value added in GDP. This trend has been observed not only in the United States and Europe but also in the newly industrialized East Asian economies (Hong Kong SAR, China; Korea; Singapore; Taiwan, China). By contrast, the share of employment in the services sector has increased steadily in both high- and low-income economies.

These trends, whether similar or contrasting, reflect fundamentally different patterns of change. Deindustrialization in advanced and successful developing economies might suggest at first glance that domestic spending on manufactured goods has declined while spending on services has increased. But empirical analyses and country studies reveal that this is not the case. Measured in real terms, the share of domestic expenditure on manufactured goods has been

broadly stable for decades.¹⁷ Thus deindustrialization simply reflects higher productivity in manufacturing than in services, with the patterns of trade specialization among the advanced economies explaining why the trend is faster in some countries. It is therefore a feature of successful economic development.

These observations justify much of the skepticism among economists about government interventions in the process of economic development. Yet they also underline the need for development economics to provide a clear intellectual framework for understanding the dynamics of structural change and its potential benefits for low-income economies.

To understand why the ambitious policy objectives set by developing country leaders in the 1950s and 1960s led to poorly designed strategies, one must go back to the starting point of long-term macroeconomic analysis—the review of the key characteristics of endowment structure. In developing countries, where there is typically a relative abundance of natural resources or unskilled labor and a scarcity of human and physical capital, only labor-intensive and resource-intensive industries will have comparative advantages in open, competitive markets; by contrast, in developed countries, with abundant capital and relatively scarce labor, capital-intensive industries will be the most competitive (see Heckscher and Ohlin 1991; and Lin 2003).

Acknowledgment of that basic truth should be the cornerstone of any viable development strategy. Yet the development paradigm adopted by most developing country leaders after World War II and erected as the dominant social thinking in development economics in the 1950s and 1960s—structuralism—essentially advocated heavy industrialization strategies. The rationale was often a noble one, as these leaders had big dreams for their countries, wanting them to compete on the global technological frontier as quickly as possible. Thus the strategy advised developing countries to develop the same advanced industries as those in the high-income industrialized countries.

It was a fatal mistake: the structuralist paradigm was a comparative-advantage-defying strategy because it advised countries to give priority to developing capital-intensive heavy industries even though capital in their own economies was scarce. The strategy implied very high production costs compared with those in countries that developed similar industries but followed their comparative advantage. Firms facing such high production costs could not survive in an open, competitive market—unless the government was willing and able to grant them strong protection through large-scale subsidies or tax incentives.

Examples of such strategies include Indonesia's launching a ship construction industry in the 1960s, when its GDP per capita was only 10 percent of that of its main competitor at the time, the Netherlands, and the attempt to build an auto industry in Zaire (now the Democratic Republic of Congo) in the 1970s, when the country's GDP per capita was only 5 percent of the level in the industry leader. The common denominator of these strategies was that the government targeted industries in countries whose per capita income was far higher than its own country's (table 3).

¹⁷ According to Rowthorn and Ramaswamy (1997), expenditure on services in current price terms has increased in the advanced economies. But this growth can be accounted for by the fact that labor productivity has grown more slowly in services than in manufacturing, pushing up the relative price of services and making manufactured goods relatively cheaper.

Consequently, the country was unable to produce the goods at a cost advantage and therefore unable to compete in these industries.

Table 3. The Economics of Unrealistic Ambitions

Country	Industry	Time	Main producer at Time	Real GDP pc Latecomer Country	Real GDP pc Leading Country	Income Ratio Follower versus Leader
China	Automobile	1950s	USA	577	10,897	5%
DRC	Automobile	1970s	USA	761	16,284	5%
Egypt	Iron, Steel, Chemicals	1950s	USA	885	10,897	8%
India	Automobile	1950s	USA	676	10,897	6%
Indonesia	Ships	1960s	Netherlands	983	9,798	10%
Senegal	Trucks	1960s	USA	1,511	13,419	11%
Turkey	Automobile	1950s	USA	2,093	10,897	19%
Zambia	Automobile	1970s	USA	1,041	16,284	6%

Source: Author's calculations based on data from Maddison (1995).

To implement the comparative-advantage-defying strategy, developing country governments had to protect numerous nonviable enterprises in the priority sectors. Administrative measures to which governments resorted to reduce the investment and operation costs of nonviable enterprises included granting those enterprises a market monopoly, suppressing interest rates, overvaluing domestic currency, and controlling prices for raw materials. Such interventions caused widespread shortages in funds, foreign exchange, and raw materials. Consequently, governments also had to allocate resources directly to these enterprises through administrative channels, including national planning in the socialist countries and credit rationing and investment and entry licensing in nonsocialist developing countries. For ease of implementation, many countries also relied on state-owned enterprises to develop the targeted industries.

Protection also led to other types of costs. Prices of imports and of import-substituting goods increased relative to the world price, pushing the economy to consume the wrong mix of goods from the point of view of economic efficiency. Markets fragmented as the economy produced too many small-scale goods, again resulting in loss of efficiency. Protectionism also lessened competition from foreign firms and encouraged monopoly power among domestic firms whose owners were politically well connected. Moreover, it created opportunities for rents and corruption, which raised input and transaction costs.

In some cases (mainly in Eastern European and other socialist countries of the former Soviet Union) the industrial development brought about by the comparative-advantage-defying strategy appeared to be successful at the beginning because large-scale investment through massive state mobilization of resources increased the growth rate and improved productivity indicators. But firms in the capital-intensive sectors depended for their survival on the government's subsidies and protection, and when the state could no longer mobilize resources for further investment, the economy became stagnant. Moreover, the investment in the capital-intensive sectors generated little employment. The labor force remained mostly in the rural sector.

The failure of the old structuralist policies to deliver structural transformation, economic growth, and prosperity was interpreted as an indication that government interventions in the economy were bound to fail because of the inevitable distortions of prices and incentives and the resulting misallocation of resources. These views in turn prompted a shift in development thinking toward the free-market approach that became known as the Washington Consensus, which promoted economic liberalization, privatization, and the implementation of rigorous stabilization programs. In terms of growth and employment generation, however, the results of the policies presented as alternatives to the failed old structuralism were at best controversial (see Easterly 2001, 2005; and World Bank 2005a). The Washington Consensus quickly came to be perceived as “a set of neoliberal policies that have been imposed on hapless countries by the Washington-based international financial institutions and have led them to crisis and misery” (Williamson 2002).

Why did the Washington Consensus, which attempted to correct the mistakes of the old structuralist approach, also fail to foster structural transformation and sustained growth in Africa and other low-income countries? The simple answer is that it focused on the government failures without fully taking into consideration the crucial market failure issues of coordination and externalities inherent in the process of industrial upgrading and diversification.

To reach the income levels of advanced countries, a developing country needs to upgrade its industrial structure to the relative capital intensity of those countries. However, the process of upgrading the industrial structure to a higher level consistent with the factor endowment cannot rely solely on the market mechanism. For example, starting a new industry may be difficult because of lack of complementary intermediate inputs or adequate infrastructure for the new industry even if the targeted industry is consistent with the economy’s comparative advantage determined by its factor endowment. Private firms may not be able to internalize the investments for the production of those intermediate inputs or the provision of infrastructure in their upgrading or diversification decisions. Therefore, the government has an important role to play in providing or coordinating investments in necessary infrastructure and complementary inputs.

In addition, innovation, which underlies industrial upgrading and diversification, is a risky process because it entails a first-mover problem. Both failure and success of a first mover create externalities. When first movers fail, they pay the cost of failure and produce valuable information for other firms. When they succeed, their experience also provides valuable information to other market participants about the type of industries that can be profitable in the country. If new firms enter on a large scale, this may largely eliminate the possible rents that the first mover may enjoy. In a developed country a successful first mover generally is rewarded with a patent and can enjoy the administratively created rent. But in a developing country a patent may not be available because the industry is likely to have already existed in higher-income countries.

Thus while first movers, no matter whether they succeed or fail, generate useful information for other firms, they face an asymmetry between the loss of failure and the gain of success. Unless the government provides some compensation for the information externality they generate, firms will have little incentive to be first movers. And without first movers, an economy will not have industrial upgrading and diversification and the dynamic growth that results.

Putting the Pieces of the Puzzle Together: The New Structural Economics

Once asked about some of his most enduring life lessons, American humorist Arnold H. Glasgow replied: “Success is simple. Do what’s right, the right way, at the right time.” That straightforward piece of advice could not have served well policy makers in developing countries who have struggled for decades to come up with effective economic development strategies. The first difficulty in doing “the right thing” is to know what the right thing is. Had they chosen to simply learn from history and carefully analyze what helped to propel into prosperity countries as diverse as England (catching up with and surpassing the Netherlands in the 16th century), the United States (catching up with England in the 19th century), Japan after the Meiji Restoration, and a few others throughout the 20th century, perhaps they could have meditated upon the words of Confucius, who said: “By three methods we may learn wisdom: first, by reflection, which is the noblest; second, by imitation, which is the easiest; and third, by experience, which is the most bitter.”

The historical and empirical evidence discussed above suggests that a reexamination of sustainable growth strategies for developing countries should devote special attention to structural change and its corollary, industrial upgrading and diversification, and to an imitation (not replication) of the successful approaches that have allowed a small group of countries to move from low- to high-income status. The new structural economics outlined in some of my previous work proposes such a framework and complements earlier approaches to economic development (see Lin 2009, forthcoming c). It takes the following principles into consideration.

First, the structure of an economy’s factor endowment, which determines the economy’s comparative advantage, is given at any specific level of development and differs from one level to another. Therefore, the optimal industrial structure of the economy will differ at different levels of development. Besides differences in the capital intensity of industries, different industrial structures imply differences in optimal firm size, scale of production, market range, transaction complexity, and nature of risks. As a result, each industrial structure requires corresponding soft and hard infrastructure to facilitate its operations and transactions. Examples of hard infrastructure are power, transport, and telecommunications systems. Soft infrastructure includes the financial system and regulation, the education system, the legal framework, social networks, values, and other intangible structures in an economy. In fact, the optimal industrial structure determines the economy’s production frontier, and whether or not the actual production will locate on the frontier depends on, among others, the adequacy of infrastructure.

Second, each level of economic development is a point on a continuum from low-income agrarian to high-income industrialized, not a dichotomy of two stages: poor versus rich or developing versus industrialized. Given the endogeneity of industrial structure at each level of development, the targets of industrial and infrastructure upgrading in developing countries should not necessarily be the same as those in high-income countries.

Third, following its comparative advantage to build up its industries is the best way for any developing country to sustain industrial upgrading and economic growth. By doing so, the country will be most competitive domestically and internationally. It will have the highest possible income and the most to save at its level of development. Investment will also have the

highest possible return and therefore provide the highest incentives to save. As a result, capital will accumulate at the fastest possible rate. The country's endowment structure will thus change from relatively resource or labor abundant to relatively more capital abundant, and its comparative advantage to more capital intensive. Latecomers engaged in industrial upgrading can benefit from the advantage of backwardness, as Gerschenkron explained, by borrowing technology from more advanced countries—as observed by Kuznets in his analysis of the leader-follower relationship and by Akamatsu in his analysis of the flying-geese pattern. Therefore, latecomers have the potential to grow much faster than forerunners.

Fourth, the market is a necessary mechanism for a country to follow its comparative advantage in the process of development. The reason is that only through market competition will the relative prices in an economy reflect the relative abundance of factors and induce firms to develop industries according to the economy's comparative advantage. But because market failures are inherent in the process of industrial upgrading and diversification, government facilitation is required to help firms overcome coordination and externality issues when the economy moves from one level of development to another.

That new approach to development is not just a theoretical argument. Based on historical evidence, it explains how latecomers in the development process can exploit their backwardness. It also provides a practical economic strategy for countries willing to follow the flying-geese pattern, which has served so many successfully catching-up countries since the advent of the modern growth period. It is all the more relevant today, with the emergence of new growth poles, the spectacular progress of large economies such as China, India, and Brazil, and the many opportunities of globalization opening new economic space and new possibilities for low-income countries.

As policy makers in poor countries contemplate the difficult challenges facing their countries after decades or even centuries of mistaken strategic choices, they should not cede to despair but assess the many options that lie ahead of them. As dire as their country situation may seem, it is not desperate. Indeed, in an increasingly globalized world, where more and more countries have moved toward high-income status, developing country leaders should keep in mind the advice of American motivational author Denis Waitley, who wrote: “Losers live in the past. Winners learn from the past and enjoy working in the present toward the future.”

3. A Unique Window of Opportunity for Africa: The Graduation of China (and Other Middle-Income Countries)

In the aftermath of the recent global recession, World Bank President Robert Zoellick described the new economic landscape:

If 1989 saw the end of the “Second World” with Communism's demise, then 2009 saw the end of what was known as the “Third World”: We are now in a new, fast-evolving multipolar world economy—in which some developing countries are emerging as economic powers; others are moving towards becoming additional poles of growth; and some are struggling to attain their potential within this new system—where North and South, East and West, are now points on a

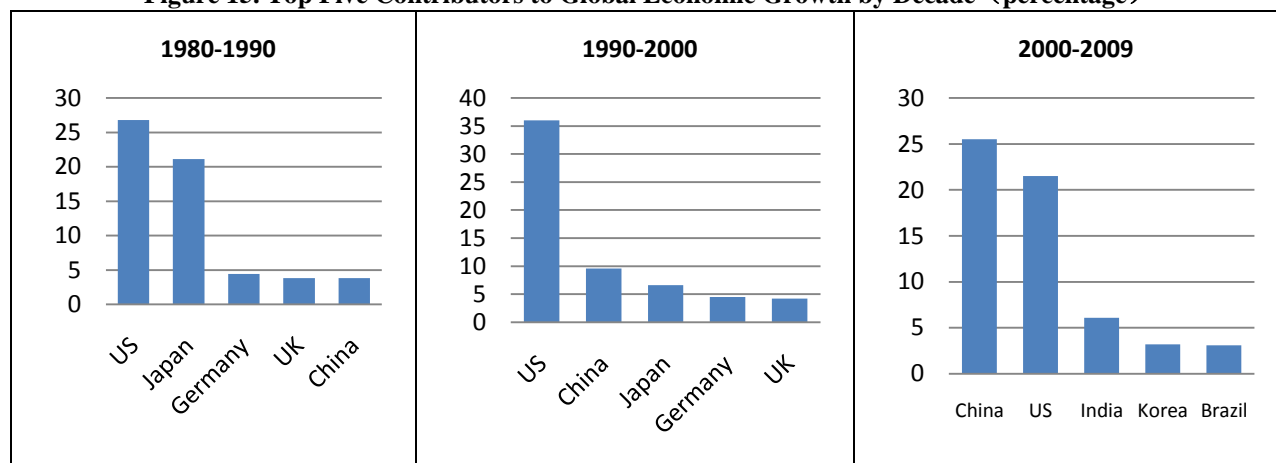
compass, not economic destinies. . . . We are witnessing a move towards multiple poles of growth as middle classes grow in developing countries, billions of people join the world economy, and new patterns of integration combine regional intensification with global openness. (2010)

As Zoellick's words suggest, today's rapidly evolving world economy is opening important opportunities for low-income countries. Following the logic of the new structural economics and its underlying flying-geese patterns in economic development, this section discusses those opportunities, most notably China's emergence as "the world's factory" for labor-intensive industries and its upcoming graduation from such economic activities.

Multipolarity and Its Potential Dividends

During the first decade of this century a burst of convergence occurred as developing countries grew substantially faster than high-income countries. As a result of this superior growth, widespread across developing regions, the world has indeed entered a new era, with emerging economies becoming new growth poles. In the 1980s and 1990s, among the top five contributors to global growth, all except China were G7 industrialized countries. But in 2000–09 all except the United States were emerging economies—with China having become the top contributor (figure 15). The trend is being reinforced in the aftermath of the 2007–09 global crisis: the recovery is characterized by a two-speed pattern, with developing countries as a group growing more than twice as fast as high-income countries.

Figure 15. Top Five Contributors to Global Economic Growth by Decade (percentage)



Source: Author's calculations based on data from World Bank, World Development Indicators database.

That shift in economic weight is likely to produce major benefits for the world economy, with positive effects for both high-income and developing countries. For high-income countries the growth of emerging economies will expand markets for their exports of capital goods and intermediate goods. For many developing countries that are still major producers of agricultural and natural resource commodities, higher consumption and production levels in the new growth poles will continue to support adequate prices for their commodity exports. In addition, firms and governments in emerging economies will provide funds for infrastructure and natural resource investment in developing countries.

These benefits are already happening—and are likely to continue into the future. Propelled by domestic demand for raw materials, Brazil has rapidly expanded investment and trade with Africa, with imports from the continent rising from \$3 billion in 2000 to \$18.5 billion in 2008.¹⁸ Similarly, bilateral trade between China and Africa increased from \$10 billion in 2000 to \$91 billion in 2009 and China's investment in Africa jumped from \$490 million in 2003 to \$9.33 billion in 2009 (China, Information Office of State Council. 2010). Indeed, Chinese finance has a growing role in Africa, the developing region facing the greatest constraints on access to finance (Wang 2009). Meanwhile, the government of India—observing that 5 of the world's 12 fastest-growing economies are Sub-Saharan Africa, a continent richly endowed with natural resources—has announced plans to invest \$1.5 trillion in infrastructure development in Africa in the next decade.¹⁹

More important than these beneficial trade and financial flows, the dynamic growth of the new poles will provide golden opportunities for industrialization in lower-income countries. China, because of its size and income level, should be of particular interest. After a long period of sustained growth (at 9.9 percent annually in real terms for 30 years), the Chinese economy is now at an important crossroad, with wages rising rapidly and surplus labor disappearing. All countries experiencing economic success over such a long period eventually face such challenges, and China will need to upgrade its industrial structure and enter new industries in order to maintain its dynamic growth. As China moves into more sophisticated product markets, it will leave market space for other developing countries to enter the more labor-intensive industries.

A Tectonic Shift Ahead—with Opportunities

The early 1980s marked the beginning of a new era of economic development in which China has emerged as a powerhouse. It is hard to remember that only 30 years ago, in 1980, China was much poorer than most countries in Sub-Saharan Africa; its GDP per capita, at \$195, was lower than that of Ethiopia or Mozambique. In 1990 China was still a low-income country, with a per capita income (measured in purchasing power parity) 30 percent lower than the Sub-Saharan African average. Today China is a middle-income country, with a per capita income three times the Sub-Saharan African average, at nearly \$4,000. Its share of world GDP is nearing 9 percent, and its economy ranks as the world's second largest, next only to the United States. Without oil, cocoa, coffee, cotton, timber, diamonds, or uranium to export, China, a country of 1.3 billion people, has achieved spectacular progress.

China achieved this success over the past three decades through the disciplined implementation of a realistic economic strategy that was consistent with the country's endowment structure and made great use of its comparative advantage in labor-intensive industries. China followed a two-

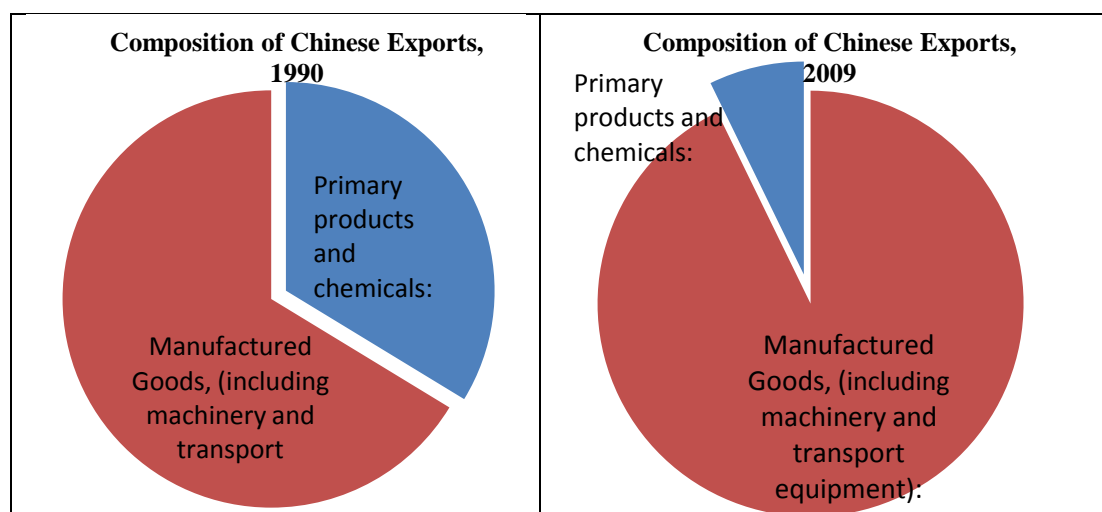
¹⁸ See Lapper (2010). In Mozambique, for example, Brazilian companies are working to develop coal reserves, build a power station, and construct rail and port infrastructure to bring the coal to export markets. In Angola a Brazilian firm has become the largest private sector employer, with activities including food and ethanol production, offices, factories, and supermarkets.

¹⁹ Statement by Indian Minister of Commerce and Industry Anand Sharma reported by *Leadership* (Abuja, Nigeria), January 15, 2010.

pillar strategy: First, adopting a dual-track approach to reforms—giving transitory protections to old comparative-advantage-defying, capital-intensive sectors and liberalizing entry to comparative-advantage-conforming, labor-intensive sectors, and thereby simultaneously achieving both stability and dynamic transformation. Second, as a latecomer, choosing an economic development strategy that taps the potential of the advantage of backwardness along the lines of the flying-geese pattern.²⁰ Looking forward, China can still rely on the advantage of backwardness and has the potential to maintain dynamic growth for another 20 years or more.²¹

Behind China's growth over the past three decades has been a dramatic structural transformation—in particular, rapid urbanization and industrialization. At the start of economic reforms in the 1980s China was primarily an agrarian economy. Even in 1990, 73.6 percent of its population lived in rural areas, and primary products accounted for 27.1 percent of GDP. In 2009 these shares had declined to 27.1 percent and 11.3 percent. A similar change occurred in the composition of China's exports. In 1990 primary products made up an important share of merchandise exports. Today almost all of China's exports are manufactures (figure 16).

Figure 16. The Structural Transformation of China's Exports



Source: World Bank, WITS database.

China is unquestionably the dragon in the global marketplace for low-tech products today. In the four product categories in which it has the highest global market concentration, China's share of global exports exceeds 35 percent—and in travel goods and handbags is close to 50 percent (table 4). Most impressive is the rate at which its share has grown. For travel goods and handbags, for example, its share in 1976 was only 1.6 percent.

²⁰ For further discussion of these two points, see Lin (forthcoming b).

²¹ The estimation by Angus Maddison (2010) shows that China's per capita income in 2008 was 21 percent of U.S. per capita income (measured in purchasing power parity). This income gap indicates that there is still a large technological gap between China and the industrialized countries. China can therefore continue to enjoy the advantage of backwardness before closing up the gap. China's current status relative to the United States is similar to that of Japan in 1951, Korea in 1977, and Taiwan, China, in 1975. Annual GDP growth was 9.2 percent in Japan in 1951–71, 7.6 percent in Korea in 1977–97, and 8.3 percent in Taiwan, China, in 1975–95. China's development strategy after the reform in 1979 is similar to that of these three economies (Lin forthcoming a).

**Table 4. The Dragon in the Global Marketplace for Low-Tech Products:
China's Percentage Share of Labor-Intensive Exports, 1976–2009**

SITC CODE	PRODUCT	1976	1980	1990	2000	2005	2009
83	Travel goods, handbags	1.6	2.8	5.6	31.7	38.2	47.5
75	Office mach. & automatic data process. Equipment	0.0	0.0	0.3	5.2	25.1	40.4
85	Footwear	1.4	1.7	7.4	25.9	32.8	39.0
84	Articles of apparel and clothing accessories	2.1	4.2	9.3	18.5	27.0	35.9

Source: UN COMTRADE (SITC two-digit level).

An important consequence of China's rapid rise to dominance as a global exporter of labor-intensive products has been the absorption of its vast reserves of unskilled labor, especially from rural areas. Some labor economists still predict that China will remain a "labor surplus" country until 2014. But the growing demand for service sector employees as well as the reluctance of some workers to leave rural areas will gradually stretch China's job market, particularly at the low end (McMillan 2011). So will China's shift, following the flying-geese pattern of development, from labor-intensive industries toward a more advanced industrial structure, with machinery increasingly dominant in manufactured exports. Labor productivity is indeed a key driver of wage dynamics. As the economy continues the process of industrial upgrading against the backdrop of burgeoning global demand for labor-intensive products, wage rates will rise and erode China's competitive edge in such products.

Indeed, China has already seen rapid growth in wages. Manufacturing wages rose from just over \$150 a month in 2005 to around \$350 in 2010 (about \$4,200 a year).²² As a consequence, the wage gap between China and some upper-middle-income countries is closing, and this trend is almost certain to continue over the coming decade. China's 12th Five-Year Plan projects that the economy will grow at 7 percent a year on average during 2011–15—and, for the first time in the country's history, proposes that real wages will grow at least as fast as GDP. Both growth rates are likely to be achieved. That would imply a doubling of real monthly wages over the next decade, to around \$700 a month. If the likely continued currency appreciation is added up, China's real wages could approach \$1,000 a month within a decade, the level in such upper-middle-income countries as Brazil and Turkey today—and \$2,000 a month by 2030, the level in Korea and Taiwan, China today.

China is at a stage like that reached by Japan in the 1960s and Hong Kong SAR, China; Korea; Singapore; and Taiwan, China, in the 1980s. To continue growing dynamically against the background of declining wage competitiveness, China will have to follow the path of the earlier Asian "geese" and start to relocate its labor-intensive industries to low-income countries.²³ Indeed, this is already happening. A large share of China's outward foreign direct investment in Africa, which had reached \$9.33 billion by the end of 2009, has gone to manufacturing (22 percent), second only to the share in mining (29 percent). And China is building six economic

²² Data from Oxford Analytica, March 28, 2011.

²³ Based on the estimation by Maddison (2010), China's per capita income (measured in purchasing power parity) was 6,725 international dollars in 2008, the same level as in Japan in 1966, Korea in 1986, and Taiwan, China, in 1983. These economies started to relocate their labor-intensive manufacturing industries at that income level, Japan to the East Asian Tigers and Korea and Taiwan, China, to mainland China.

and trade cooperation zones in the Arab Republic of Egypt, Ethiopia, Mauritius, Nigeria, and Zambia (China, Information Office of State Council 2010). More such initiatives are likely to happen.

How Big Might the Benefits Be?

As China moves forward, there will be a major difference with earlier patterns of industrial upgrading: its economy is significantly larger than those of the geese that led the first round of structural transformation in Asia (table 5). China has an estimated 85 million workers in manufacturing, most of them in labor-intensive sectors. The reallocation of these workers to higher value added, more sophisticated products and tasks will open up great opportunities for labor-abundant, lower-income countries to step in and produce the labor-intensive manufacturing goods that China leaves behind. As a result, China will not be a *goose* in the traditional leader-follower pattern of industrialization for a few lower-income countries but a *dragon*.

Table 5. Comparing Manufacturing in China with That in Earlier Geese at Similar Levels of Development

Country	Year	GDP per capita (constant US\$)		Manufacturing		
		2000 US\$	2005 US\$ (PPP)	Share of value added (%)	Share of labor (%)	Employment (millions)
China	2009	2,206	6,200	43	17.7	85
Japan	1960	5,493	6,976	35	20.0	9.7
Korea, Rep.	1982	3,709	6,123	25	14.6	2.3

Sources: World Bank, World Development Indicators database; International Labour Organization, LABORSTA; China, National Bureau of Statistics (2010).

In the absence of detailed data on manufacturing employment in all African countries, one can only conjecture about the size of the potential gains for the region. Still, even back-of-the-envelope calculations suggest that the benefits would be enormous. In 2009 alone, China exported \$107 billion of apparel to the world, compared with Sub-Saharan Africa's total apparel exports of \$2 billion (2 percent of Chinese apparel exports). Let's assume that as a result of rising wages, 1 percent of China's production of apparel is shifted to lower-wage African countries. All things equal, that alone would boost African production and exports of apparel by 47 percent. A 5 percent shift of Chinese export-related investments in the industry could translate into \$5.4 billion in additional exports—a 233 percent increase.

Even rough employment estimates suggest the potential gains in manufacturing jobs. Africa's population (north and south of the Sahara) is 1 billion, slightly less than India's 1.15 billion. In 2009 manufacturing value added was 16 percent of GDP in India, 13 percent in Sub-Saharan African countries, and 16 percent in North African countries such as Egypt, Morocco, and Tunisia.²⁴ India's employment in manufacturing was 8.7 million in 2009. So it is reasonable to assume that total manufacturing employment in Africa is at most 10 million. This suggests that relocation of even a small share of China's 85 million labor-intensive manufacturing jobs would

²⁴ Data from the World Bank, World Development Indicators database.

go a long way toward creating new opportunities for employment and sustained growth in Africa.²⁵ Clearly, the potential opportunities for Africa's labor-intensive economies, which today are exporting mostly minerals are enormous.

The story for low-income countries elsewhere in the world is similar. In 2009, with a total population of 846 million and 13 percent of their GDP coming from manufacturing, their employment in the sector likely amounted to no more than 10 million. Thus, just as for African countries, China's industrial upgrading would provide them a golden opportunity for dynamic manufacturing-led growth. But for developing countries everywhere, the ability to benefit from the opportunities depends on their quickly formulating and implementing credible economic development strategies that are consistent with their comparative advantage and the flying-geese paradigm.

A Road Map for Seizing the Moment: The Growth Identification and Facilitation Framework

The coming graduation of China and other middle-income growth poles from low-skilled manufacturing jobs is timely for low-income countries. But it is especially so for those in Sub-Saharan Africa. Despite the region's grim long-run performance and the potentially heavy economic and human cost of the recent global crisis, there is renewed optimism about its economic prospects: since the mid-1990s Africa has embarked on a new and higher growth trajectory. The main challenge facing African leaders is to avoid the policy mistakes of the past and instead implement the winning strategy.

Africa may be on the verge of an economic takeoff, recent empirical work suggests. Young (2010) sees an "African growth miracle" in his analysis of such measures as real consumption, housing quality, and health and education. His results show that for the past two decades living standards in Sub-Saharan Africa have been rising by more than 3 percent a year—more than three times the rate indicated in international data sets. Using a new methodology to estimate income distribution, poverty rates, and inequality and welfare indexes for African countries in 1970–2006, Pinkovskiy and Sala-i-Martin (2010) conclude that African poverty is falling—and is falling rapidly. Moreover, they find that the growth spurt that began in 1995 appears to have reduced African income inequality rather than increased it. Radelet has identified 17 African countries that achieved annual per capita growth rates of 2 percent or more in 1996–2008 by putting behind them the conflict, stagnation, and dictatorships of the past and replacing them with steady economic growth, deepening democracy, improved governance, and decreased poverty (see Radelet 2010). Five fundamental changes are seen to be at work: more democratic and accountable governments, more sensible economic policies, the end of the debt crisis and

²⁵ The creation of manufacturing jobs, especially through foreign direct investment, generally leads to the creation of jobs in other sectors through backward and forward linkages (see UNCTAD, *World Investment Report 2006*) and through multiplier effects as additional employment raises income levels. Backward linkages tend to be weaker in developing countries because it is often difficult to source local products. But forward linkages can have a substantial effect on employment. In Lesotho, for example, computable general equilibrium model simulations indicate that the employment of 56,000 workers in the garment sector, sustained by foreign direct investment flows, could have led to the creation of 77,000 additional nonmanufacturing jobs (see World Bank 2005b). In India it is estimated that creating 2.5 million jobs in the information technology sector could lead to 8.3 million additional jobs (NASSCOM 2011).

changing relationships with donors, the spread of new technologies, and the emergence of a new generation of policy makers, activists, and business leaders.

Indeed, the improvement in Sub-Saharan Africa's performance has been made possible largely by greater political and macroeconomic stability, a stronger political commitment to private sector growth, and higher investment in infrastructure and education (see Okonjo-Iweala 2010). High prices for oil, minerals, and other commodities have contributed substantially to GDP growth. But new research by the McKinsey Global Institute shows that resources accounted for only about a third of the improvement in performance. The rest resulted from internal structural changes that have spurred the broader domestic economy (see Leke and others 2010). Most economies in the region have been implementing macroeconomic, institutional, and sectoral reforms to improve the business climate and reduce transaction costs. For example, by 2010, 28 Sub-Saharan African countries had adopted the Extractive Industries Transparency Initiative, aimed at improving the transparency of company payments for and government revenue from oil, gas, and mining. The region has the fastest-growing cellular telecommunications market, increasing from less than 2 million mobile phones in 1998 to more than 400 million in a decade. Industries such as banking, retail, and construction are also booming, and private investment inflows are surging, though from a low level.

While the region's collective GDP is still roughly equal to that of a single emerging economy such as Brazil (about \$1.6 trillion in 2008), its recent economic progress cannot be underestimated. Since 1990 Sub-Saharan Africa has almost tripled its exports and diversified its trade partners.²⁶ Natural resources will clearly continue to be the region's main source of export revenue as global demand grows. But with continued reforms and increasing foreign direct investment going to industries with overt or latent comparative advantages, African economies are likely to become more diversified in the future, with the global demand for nontraditional exports also growing.

Still, per capita growth rates in the range of 2–3 percent a year may not be enough to combat poverty and generate prosperity. So far, Africa's economic development has been driven primarily by higher consumption—supported in part by an inflow of remittances in response to improved macroeconomic policies—and the growing contribution of natural resources to GDP. For growth to be sustainable and to create jobs, it also needs to be supported by structural change based on manufacturing-driven industrialization.

It is therefore imperative that African countries follow the flying-geese pattern to seize the opportunity provided by the industrial upgrading of China and other leading dragons. The key challenge is to find a way to sustain the momentum and foster structural transformation in Sub-Saharan Africa so as to achieve annual growth rates of 8 percent or more. This is feasible if policy makers help their economies develop industries according to their comparative advantage and tap the potential of the advantage of backwardness.

²⁶ Okonjo-Iweala (2010) notes that the share of Sub-Saharan Africa's exports going to the European Union and the United States fell from 73 percent in 1990 to 49 percent, (2008). During this time the region's exports to China increased from \$64 million to more than \$13 billion.

Policy makers in any developing country can do so through the Growth Identification and Facilitation framework, which I have proposed elsewhere as an implementation tool for the new structural economics. The framework provides a user-friendly, six-step approach to help identify the industries with latent comparative advantages and facilitate competitive private sector development (see Lin and Monga 2011):

- First, identify those dynamically growing tradable goods and services that China and other fast-growing, lower-middle-income countries have successfully produced for a period of about 20 years. These are likely to be new industries consistent with the country's latent comparative advantage.
- Second, among the industries on that list, identify those that domestic private firms have already entered spontaneously and try to pinpoint any obstacles that may be preventing them from upgrading the quality of their products or any barriers that may be discouraging other private firms from entering. This could be done using value chain analysis or the Growth Diagnostics Framework suggested by Hausmann, Rodrik, and Velasco (2005). The government can then implement policies to remove the constraints at home, carrying out randomized controlled experiments to test the effectiveness of the policies in eliminating the constraints before scaling them up to the national level.
- Third, in industries on the list that are new to domestic firms, encourage investment by firms in China or other higher-income countries producing those goods, since those firms would have an incentive to relocate production to the lower-income country so as to reduce labor costs. The government could also set up incubation programs to assist the entry of private domestic firms in these industries.
- Fourth, take advantage of unexpected opportunities that may arise from the country's unique endowments or from new technological breakthroughs around the world. The government should pay close attention to successful discoveries and engagement in new business niches by private domestic enterprises and provide support to scale up those industries.
- Fifth, in a country with poor infrastructure and an unfriendly business environment, set up special economic zones or industrial parks to help overcome barriers to firm entry and foreign investment. These can create preferential environments that most governments, because of budget and capacity constraints, are unable to implement for the economy as a whole in a reasonable time frame. Establishing industrial parks or zones can also facilitate the formation of industrial clusters.
- Sixth, grant pioneer firms in the identified industries time-limited tax incentives, cofinancing of investments, or access to foreign exchange—to compensate for the externalities created by first movers and encourage firms to form clusters. Because the identified industries are consistent with the country's latent comparative advantage, the incentives provided by the government could and should be limited in both time and financial cost and, to avoid rent seeking and political capture, should not take the form of monopoly rent, high tariffs, or other distortions.

Two other points are worth mentioning. First, while the emphasis has been on the importance of industrialization to achieve structural transformation and dynamic growth in developing countries, technological innovation and productivity improvement in agriculture cannot be overlooked. In low-income countries, where most people live on agriculture, improving agriculture will be important not only for reducing poverty but also for generating economic surplus to support industrialization. Governments need to facilitate the innovation and extension of agricultural technology and improvement of infrastructure for agricultural production and commercialization.

Second, resource-abundant developing countries, besides ensuring transparency in and good management of the wealth generated from the natural resources, should invest part of the wealth in infrastructure and human capital. This will facilitate the economy's diversification into nonresource sectors, creating jobs and promoting inclusive growth—and turning the resources from a curse into a blessing.

4. Conclusion

Structural transformation is the condition for sustained growth and poverty reduction. This subject was at the center of development thinking after World War II thanks to such researchers as Simon Kuznets (who pioneered research on national income and its components), Alexander Gerschenkron (who suggested that there are advantages to backwardness), Kaname Akamatsu (who documented the flying-geese pattern of Asian economies catching up with industrialized Western economies), and old structuralists (who tried to provide a solution for narrowing the gap in industrial structures between advanced and developing countries). Development economists were able to establish empirically that shifting resources out of traditional agriculture and other low-productivity primary activities sustains the productivity gains that characterize economic development. As a result, industrialization (especially manufacturing) was recognized as one of the main engines of economic growth.

Concerned about market failures, and wanting to catch up with industrialized countries as quickly as possible, many researchers and policy makers in developing countries that had emerged from colonialism were obsessed with quick modernization strategies. The old structuralist import-substitution strategies often adopted in the 1950s and 1960s led to misguided and unrealistic government interventions. Countries with a large labor supply but little capital often engaged in heavy industries that defied their comparative advantage. These were costly mistakes, typically resulting in pervasive distortions, macroeconomic imbalances, low growth, and little or no structural transformation, especially in terms of a reduction in agriculture's share of employment.

Unfortunately, the remedies for these policy mistakes often consisted simply of rejecting almost any government interventions in industrial development and structural transformation on the ground that they could only lead to government failures. In the late 1970s and 1980s, under the dominant new development paradigm known as the Washington Consensus, it was assumed that if the business environment was improved, the private sector would spontaneously seize business opportunities, creating jobs and prosperity.

A generation later many developing countries still have not experienced structural transformation. Instead, many of them have experienced structural regression, with manufacturing contributing a declining share of GDP.

Only a small group of countries in Europe, Asia, Latin America, and Africa have been able to engineer sustained dynamic growth and structural transformation and achieve convergence with high-income countries. They have generally done so by using market mechanisms and government facilitation to replicate, in different contexts, the same types of development paths that allowed previously successful countries to ignite what Kuznets called the period of “modern economic growth.”

The lessons from history and from economic theory are now clear: regardless of size, location, or natural resources, all developing countries can achieve annual growth rates of 8 percent or more for decades and embark on the path of prosperity, provided that they carefully follow their comparative advantage, tap the potential of the latecomer advantage, and engage in activities that will dynamically transform their economic structure. This WIDER lecture has suggested a framework for doing just that. Drawing from previous work on the new structural economics, it has provided a consistent analysis of economic success and failure—and explained how lower-income countries today may benefit from the opportunity arising from the dynamic industrial upgrading of leading dragons such as China and other large emerging economies.

For low-income countries in Africa and elsewhere, the news is good: in an increasingly globalized world, opportunities for economic transformation abound. Far from being a curse, the emergence of a multipolar-growth world is in fact a blessing for even the most backward economies—because it provides them the opportunity to enter a new age of rapid industrialization and structural transformation. In the next decade China, with some 85 million labor-intensive manufacturing jobs today, will have to move up the industrial ladder and therefore graduate from low-skilled sectors. This will free up a gigantic reservoir of employment possibilities that African and other low-income countries can tap. The dynamic growth of other middle-income economies—such as Brazil, India, and Indonesia—will provide a similar opportunity. But to fully benefit from those opportunities, policy makers in low-income countries must quickly plan for it and implement credible development strategies. Abraham Lincoln might have been wrong when he said that “the best thing about the future is that it comes only one day at a time.” The future is now. The World Bank’s dream of a world free of poverty may finally become a reality.

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