Rethinking Development Policy: Deindustrialization, Servicification and Structural Transformation*

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Abstract

This paper takes a fresh look at the current theories of structural transformation and the role of private and public fundamentals in the process. It summarizes some representative past and current experiences of various countries vis-a-vis structural transformation with a focus on the roles of manufacturing, policy, and the changing nature of global production in shaping the trajectory of structural transformation. The salient aspects of the current debate on premature deindustrialization and its relation to a middle-income trap are described as they relate to the path of structural transformation. Conclusions are drawn regarding prospective future paths for structural transformation and development policies as well as for the need for further empirical analysis to inform our current understanding of the process of economic development.

Keywords: Development policies; structural transformation; premature deindustrialization; middle-income trap; push and pull factors; growth diagnostics

JEL Classification: O11, O20, O43, O50, O55

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1 Introduction

Historically, economies have experienced industrialization as part of an endogenous structural transformation characterized by secular changes in the sectoral decomposition of employment and output between agriculture, manufacturing and services that accompany increases in GDP per capita. At low levels of income per capita, agriculture, which is generally the least productive sector of the economy, dominates, followed by manufacturing, normally the most productive sector of the economy, and finally services. Over time, with shifts of the workforce out of agriculture and into manufacturing and services, the average level of productivity economy-wide is enhanced and GDP per capita increases. The narrative described above is the textbook definition of what is commonly known as structural transformation. This process has held pretty well until the early 1970s/80s, but it's been seriously challenged more recently with the sea of economic changes brought up by the most recent wave of globalization and technological revolution. Of particular concern for policymakers and academics around the globe has been the declining share of manufacturing production and jobs over the past two decades. This is because manufacturing has long been considered the main driver of development and income convergence (World Economic Outlook, April, 2018).

This paper aims at taking a first step in rethinking policy under the rapidly shifting landscape in development macroeconomics with pioneer theories and conceptual frameworks of structural transformation being overturned by new phenomena–deindustrialization and servicification being the two key ones. Of course, we are well aware that the task ahead is humbling and our attempt here is merely to initiate a debate which, in our view, could not be more timely or topical for many countries desperately seeking ways to grow.

In section 2, we provide a concise description of some of the important drivers of the traditional path of structural transformation and economic development led by industrialization. The impetus to industrialization in a traditional, agrarian economy may be provided by either *push* or *pull* factors or both. From a theoretical viewpoint, this process is driven by an interplay of productivity gains and non-homotheticity of preferences with relatively inelastic demand for agricultural produce. Despite meeting various preconditions of growth in terms of *private fundamentals* (such as physical capital, technology, skills, and innovation), a country may fail to jump start the process due to lack of *public fundamentals* (broadly speaking, infrastructure and institutions.) Thus, the role of public policy in structural transformation is analyzed and some guidance for identification of effective policies to minimize distortionary effects, both intended and unintended, is provided.

Section 3 outlines opportunities and challenges presented to the process of structural

transformation via industrialization in a globalized world. Access to world markets potentially allows a country to expand its manufacturing production as well as exploit economies of scale, thereby benefiting from faster and sustained increases in productivity. It also exposes the country's manufactures to competition from products of other countries. Finally, a globalized world allows a country to compensate for weaker *private fundamentals* through an inflow of capital and by importing technology and skills. There have been a range of outcomes across countries in response to these opportunities and challenges which are discussed in the section. Short case studies are provided in an online Appendix for the success story of Viet Nam and the challenging case of Ghana.

In section 4, we turn our attention to the phenomenon of *premature deindustrialization*, but begin with a description of the process of deindustrialization that occurs as part of the traditional path of structural transformation to a post-industrial economy. It is characterized by a more rapid *employment deindustrialization* than *output deindustrialization* and is driven by a combination of high productivity growth in manufacturing coupled with low (high) income elasticity of demand for agricultural (service) goods. Within the manufacturing sector, the initial diversification of the production base is replaced by a re-specialization in high-productivity goods. In many countries, as noted by Rodrik (2015), deindustrialization has started "prematurely" with the country's manufacturing share of GDP and employment peaking at lower levels and at lower levels of per capita income. This section provides evidence on *premature deindustrialization* supported by summaries of experiences of a number of countries in Africa, namely, Ghana, Nigeria, and Botswana (details of which are contained in an online Appendix.) An analysis of its causes highlights the role of intense competition among a number countries for relatively stable global demand for manufacturing goods, deficiency in complementary public fundamentals needed to attract foreign capital, technology, and skills, and finally, the *leveraging effect* of globalization, which magnifies initial differences in fundamentals of these countries. If these factors operate to contribute to premature deindustrialization in a country, it is deprived of the benefits arising from unconditional cross-country convergence in productivity that characterizes industrial sectors (Rodrik, 2012). The problem of premature deindustrialization has come to pass for these countries starting to industrialize relatively recently because the countries ahead in the process of development (for example, Brazil, Malaysia, Mexico, and Peru) have been facing a *middle-income trap* and have failed to steadily improve their technological sophistication and "vacate the space" for them.

Section 5 examines the current and future prospects for economic development and struc-

tural transformation. Is a traditional route to structural transformation and economic development a possibility? Can services compensate for the role played by manufactured goods in structural transformation? Why is there a need for a longer-term perspective in policy making in light of the current reality of development options? What else can be done in the meantime? What new challenges are on the horizon for policy makers? These are the policy questions that are addressed here.

Section 6 concludes with some remarks on policy. Overall, the message is that for the countries in the initial phases of economic development and structural transformation, the choices are not very many or very promising. In the light of global realities, only a few, if any, of those countries may have conditions in place to follow the traditional route. High-productivity services may be able to generate strong economic growth, but their potential to aid structural transformation through large-scale labor reallocation to more advanced sectors of the economy and for broad-based income gains is yet to be verified. Absence of any tailwinds arising from either manufacturing production and/or a proven track record of a services-led approach, economic development and structural transformation will have to rely more on support from appropriate public policy to generate strong, dynamic, self-sustaining incentives to strengthen private fundamentals such as technology, skills, and innovation. As this will be a slow, long drawn out process, a longer-term perspective will be required in policy making. Finally, targeted sectoral policies seem to have become a favored tool in many countries' growth strategy plans. These targeted policies along with the threats looming from automation and artificial intelligence are identified as some of the challenges to the theory and practice of economic development that require further analysis.

2 Economic Development, Structural Transformation, and Industrialization

Historically, the process of *economic development* starting from low levels of income per capita has been characterized by *economic growth*, an increase in productivity, and improved living standards over long periods of time, coupled with *structural transformation*, or a significant reallocation of productive resources across various sectors of the economy, starting with *industrialization* of a (primarily) agrarian economy. The benefit of this reallocation is attributable to the more productive manufacturing sector assuming a larger share of the economy, thereby stimulating economic growth.

2.1 Drivers of Structural Transformation and Industrialization

While growth and structural transformation go hand-in-hand, there are differing views on what forces can trigger or jump start the process of economic development. One possible set of such forces that originates within the agricultural sector is referred to as *push factors*. Lewis (1954) argues that there is surplus labor in agrarian economies in the garb of underemployment and disguised employment. As a corollary, steps to expand employment outside of agriculture would jump start economic development by engaging these unproductive workers in productive activities, such as manufacturing. In contrast, Schultz (1953) considers low productivity in agriculture to be a technological feature of that sector and, thus, posits improvements within agriculture as a requirement to trigger economic development. (Also see, Thorbecke, 1970).

Both of these theories of push factors that reallocate labor from agriculture to other sectors of the economy implicitly assume non-homothetic preferences with highly inelastic demand for agricultural goods. These preferences are essential for the arguments of Lewis in order to rationalize the existence of a surplus of labor in that sector. On the other hand, a technological breakthrough in agriculture (such as the green revolution) consistent with Shultz's view, when coupled with non-homothetic preferences with low income elasticities of demand for agricultural goods, could free up agricultural workers to move into the more highly productive sectors of the economy. Thus, from a theoretical perspective, Lewis's viewpoint applies to an economy which is sufficiently productive to produce enough food with labor to spare, whereas Schultz's economy is yet to reach satiation in terms of the domestic production of food.[1]

However, due to the differences in their assumptions about the state of the supply (production) side of the economy, these two views have very different implications for the role of policy in the development process.

With labor to spare, the economy is ready for structural transformation. Historically, the first phase of structural transformation resulted in industrialization, with labor moving from a rural agricultural sector to the urban manufacturing and associated service activities (such as retailing, wholesaling, repairing and maintaining, and reselling, to name a few). The huge potential of sustained productivity increases in the industrial sector can, in turn, generate substantial, sustained economic growth and continued structural transformation leading the

[1] Historically, the green revolution starting in 1960s contributed mightily to economic growth in Asia, Latin America, and Africa, (see Gollin, Hansen, and Wingender, 2016) by increasing agricultural productivity, thereby relieving the "food problem" described by Gollin, Parente, and Rogerson (2007) while freeing up labor to facilitate structural transformation.

economy onto the path of economic development. These possibilities suggest a facilitating role for public policy focused on so-called *pull factors* originating in the manufacturing and services sectors that entice workers to leave their rural agricultural settings for the prospects of higher wages in the urban industrial centers.

In a three-sector general equilibrium model, Święcki (2017) shows that productivity increases in industry and non-homothetic preferences together provide a fully satisfactory account of the entire path of structural transformation from a traditional, agrarian economy through a modern, industrial phase of development, followed by a transition to a post-industrial services-based economy. Non-homotheticity plays a particularly key role in the transition of labor out of agriculture in the early stages of economic development, whereas the movement of labor from industry to services in the later phase is primarily driven by continued increases in industrial productivity (relative to the services.) The specification of non-homothetic preferences that constrain income elasticities of agricultural goods to be less than one and of services to be greater than one generates empirically consistent consumption bundles as the economy expands.

2.2 Challenges to Structural Transformation and the Role of Public Policy

This potential for economic growth and development, however, may not be realized at all, or it may be very slow to materialize for many reasons.

Rostow's (1960) idea of stages-of-growth highlights the importance of sufficient investment (using domestic or foreign saving) to provide the needed capital to complement labor and begin the "take-off" from a traditional, stagnant economy to a modern economy with self-sustained economic growth. Moreover, better technology, improved skills, and greater innovation are progressively needed as structural transformation and economic development proceed further beyond its initial take-off stage. We label these inputs complementary to labor (capital, technology, skills, and innovation) as *private fundamentals.*

However, such increases in capital (and other private fundamentals) are a necessary but not sufficient condition to accelerate growth and induce structural transformation. The transition from a traditional to a modern economy necessitates a set of complex, interrelated changes encompassing all aspects economic structure: production, markets, and institutions. This nexus of inputs generates strong complementarities among decisions of private agents via network effects and the potential for coordination failure that could inhibit the process of structural transformation.

2.2.1 The Role of Public Policy

Rosenstein-Rodan's (1943) idea of a *big push* highlights the role of public policy in jump starting the process of economic development and structural transformation to simultaneously loosen multiple constraints, benefit from economies of scale, and generate needed demand. In particular, government can play a pivotal role in providing physical infrastructure and creating an appropriate institutional environment for the proper functioning of markets, while playing a catalytic role in addressing the coordination problems in private-sector decisions about investment in physical and human capital. We label these desirable public policy responses to the development challenge presented by a lack of appropriate infrastructure and institutions as *public fundamentals.*

As noted in the case of private fundamentals, the exact details of what constitutes good public fundamentals is highly context specific in terms of time, country characteristics, and the economy's phase of structural transformation. However, as Rosenstein-Rodans's view suggests, they play a relatively more important role than private fundamentals in the initial jump-starting of structural transformation and economic growth.

Public intervention, however, must be carefully designed. Ironically, public policies which may help industrialization and growth initially, may become a stumbling block for realizing the full potential of industrialization. The classic example of such a policy is import-substituting industrialization (ISI) that was initially pursued by Brazil and India. The policy of ISI, in real time, would not have seemed to be a wrongheaded one to support a nascent manufacturing sector for countries with large domestic markets for goods that were just beginning to industrialize. Unfortunately, in the long run, it compromised the ability of the industrial sector to be internationally competitive in the, now-globalized, world. In India, the harmful effects of the policy were further compounded by the virtual elimination of even domestic competition via a complex/corrupt system of licenses and permits (License-Permit Raj operating until the early 1990s).

In contrast, smaller countries of East Asia with limited domestic markets, such as, South Korea and Taiwan, initially adopted the policy of export-promoting industrialization (EPI) (with government support). The resulting competitive pressure on their manufacturing sector allowed their economies to realize increases in industrial productivity on a sustained basis, ultimately paving the way for the second phase of their structural transformation into services-based economies.

Hausmann, Rodrik, and Velasco (2007) put forward a framework for efficient public interventions based on the idea of *growth diagnostics.* While private sector decisions are generally

adversely affected by multiple market and coordination failures and externalities, growth diagnostic provides a systematic approach to identifying one or a few of those constraints that are binding in nature at a particular point in time, thereby improving the efficacy and reducing the distortions arising from policy interventions.

3 Structural Transformation and Industrialization in a Globalized World

In order to further our analysis of structural transformation and economic development in today's globalized world, it is useful to first outline the challenges and opportunities presented by globalization (or, more generally, open economy considerations) to the process of structural transformation.

3.1 Opportunities and Challenges on the Demand Side

From the perspective of demand for manufactured goods, an open economy gives rise to at least two additional considerations. A closed economy would have to create a diversified industrial base to meet domestic demand for industrial goods. While there are benefits of having a diversified industrial sector, unless a country has a large population of potential consumers, it would fail to fully exploit or exhaust economies of scale in many of these products. By having open goods trade, an economy can specialize in production and enhance its productivity by fully exploiting economies of scale. This is clearly a beneficial aspect of globalization. However, open goods trade also exposes a country to the forces of comparative advantage, which can go in either direction.

As documented by Felipe and Mehta (2016), the global share of manufacturing in employment and output has been remarkably constant (at 14% and 16%-17% respectively) over 1970-2010. Countries with a comparative advantage in manufacturing can garner proportionally higher shares of this global demand and, hence, further benefit from globalization by accelerating the first phase of their structural transformation. This will allow them to reap the rewards of continued productivity growth in the industrial sector through an upgrading and strengthening of private fundamentals, such as technology and skills via innovation and learning. Our earlier examples of South Korea and Taiwan fall into the category of countries that were able to leverage global demand to their advantage in this way.

There are both benign and not-so-benign scenarios associated with the reallocation of

manufacturing activity across countries in response to forces of comparative advantage in an integrated world economy. In the most favorable scenario, rising opportunity costs of producing manufactures in developed countries naturally reduces their comparative advantage in manufacturing. Production, therefore, shifts to developing countries undergoing structural transformation and industrialization (in accordance with Vernon's (1966) product cycle theory of international trade.)

As a large number of low-income countries simultaneously start to work toward structural transformation and industrialization, a still positive, but less favorable outcome, may come to pass. Not all developing countries are able to take advantage of the natural shift of manufacturing activity from developed to developing countries (due to lack of comparative advantage.) For example, Brazil's experience devoid of tailwinds of strong supporting public fundamentals, over the last three decades, falls into this category.

However, the least favorable outcome is where a country's lack of comparative advantage not only precludes it from taking advantage of global industrial demand, but also causes it to lose ground by becoming a net importer of manufactures. There are two ways in which a country can finance these imports or balance the current account. Even though it may have low productivity, it may have a comparative advantage in agriculture and could export agricultural goods. Thereby, it would fail to fully exploit the opportunity to improve productivity via industrialization. As a number of low-income countries are rich in natural resources, export of these goods constitutes another way to finance the import of manufactures. The experience of many countries such as Ghana, Malawi, and Bostwana in the group of countries in sub-Sahara Africa (SSA) falls into this category.

3.2 Opportunities and Challenges on the Supply Side

We now turn to the impact of being an open economy from the perspective of the supply side of the economy. The severity of the many challenges to industrialization faced in the private sector of the economy can be mitigated in an open economy. Capital inflows through either portfolio investment or foreign direct investment (FDI) can reduce a shortage of capital. Both trade and FDI can be strong catalysts for improvement in technology and skills either indirectly by diffusion or directly by transfer or training. These benefits of globalization would improve productivity and reduce costs in the industrial sector (in the absolute sense and, hence, relative to agriculture) as Viet Nam has been able to accomplish over the last three decades of its structural transformation.

The globalized world, therefore, not only provides access to larger markets for manufac-

tures, but also offers opportunities for a country to strengthen its comparative advantage to capitalize on this access to a larger, world market. A country that is able to exploit these opportunities will be able to accelerate the pace of industrialization and structural transformation.

3.3 Structural Transformation, Industrialization, and Global Value Chains

During the most recent wave of globalization, we have witnessed a major shift in the way markets and production, international trade and investments are organized. In particular, recent shifts in the architecture of economic markets has required that firms, especially those trading abroad, restructure their operations internationally through outsourcing and other offshoring of activities. Production of goods and services have become parts of global value chains (GVCs) where the different stages of the production process are located across different sectors in different countries (Marcolin et al., 2016; Ahmad et al., 2017).

This fragmentation of the production process has had two major, related economic effects. First, it has provided further impetus to industrialization and growth by further increasing productivity as firms try to minimize cost by locating the various stages of their production across different locations resulting in a complicated, but efficient international assembly line. Nonetheless, GVCs enable previously domestic activities such as design, production, management, marketing, distribution, and even services like R&D, financing and accounting to be disbursed all over the globe and connected via "value chains." Second, the very same incentives have provided opportunity to the countries to further sharpen the edge of their comparative advantage (whose role is highlighted above) by narrowing the range of processes and intermediate goods and services in which to specialize.

As GVCs are becoming the dominant force of world trade in goods, in developing and emerging markets, necessary skills and intermediary parts are available at low prices. At the same time, trade in services has become necessary for the efficient functioning of GVCs. Clearly GVCs present a new paradigm in world economic markets and challenge standard trade theories and policies alike.

3.4 Country Experiences with Industrialization in a Globalized World: The Role of Policy in Structural Transformation

The experience of the "Asian Tigers" (South Korea, Taiwan, Singapore, and Hong Kong) typifies what is possible by leveraging openness to accelerate industrialization and structural transformation and, hence, economic growth. Not only have they industrialized successfully, but they have also steadily moved up the "value chain" vis-à-vis the technological sophistication of their manufactured goods. The Asian Tigers have emerged from their status as LICs to join the club of "high income countries" (Sarel, 1996).

Figure 1 displays the development path of a number of countries that have attained the "middle-income" status, defined as an average per capita income level of $3000. The figure depicts GDP per capita in U.S. dollars plotted against the number of years since reaching the $3000 threshold. China, Thailand, Indonesia, Brazil, Malaysia, Mexico, and Peru have all been able to successfully transition to a middle-income economy. However, the performance of Brazil, Malayasia, Mexico, and Peru, since acquiring the middle-income status has been starkly poor compared to that of South Korea and Taiwan. The failure of these countries to continue to make progress towards joining the ranks of the high-income countries, after their initial successful transition to middle-income status, is a phenomenon that has been labeled a *middle-income trap*, which is discussed later.

Viet Nam has recently transitioned from low-income country (LIC) status to a (lower) middle income status, with the aid of a successful policy of export promotion that drew labor from agriculture to manufacturing, where between 1985 and 2000, employment in agriculture fell from 34 to 17 percent, while employment in manufacturing rose from 14 to 25 percent. It exploited the *"leveraging effect"* inherent in the nature of globalization, which arises from the complementary nature of private (foreign) capital, technology, and skills and public fundamentals, thus enabling it to successfully integrate its production facilities into global value chains, while raising the productivity of its workers. (We refer the reader to the case study in the online Appendix A.1.1.)

Contrary to Viet Nam's experience, in the absence of an appropriate public policy stance, Ghana's economy has faced tremendous headwinds in the process of structural transformation, which may have also led to a premature stunting of industrialization, a phenomenon which Rodrik (2015) calls *premature deindustrialization*, to which we will turn in the next section. This has effectively threatened its transition to the middle-income status. (We refer the reader to the case study in the online Appendix A.1.2.)

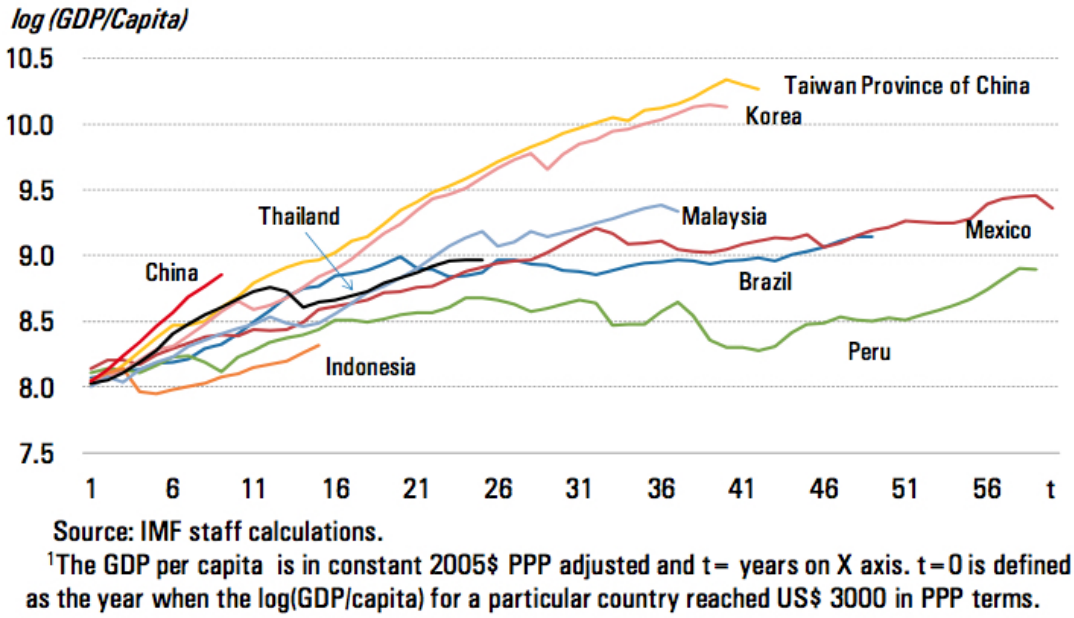

Figure 1: Growth Trajectories for Middle-Income Countries
Source: Aiyar, Duval, Puy, Wu, and Zhang, "Growth Slowdowns and the Middle-Income Trap," *IMF Working Paper*: March, 2013

4 Premature Deindustrialization

We begin by describing how the process of deindustrialization has traditionally occurred in developed economies as they have transitioned to more services oriented, post-industrial economies. We discuss later how this "servicification" has played out in both middle- and low-income countries.[2]

4.1 Natural Deindustrialization and Structural Transformation to a Post-Industrial Economy

For advanced economies, the process of structural transformation has undergone a significant change at some point in the economy's evolution into a post-industrial phase of economic development. The share of the economy's workforce in manufacturing peaked and began to decline. This employment shift out of manufacturing occurred as a result of the high productivity growth in that sector that is coupled with an elasticity of substitution between

[2]For recent evidence on the growing importance of services in global trade, we refer the reader to Loungani *et al.* (2017).

manufactured and non-manufactured goods that is less than one. This *employment deindustrialization* of the economy is accompanied by shifts of employment into services from both the agricultural and manufacturing sectors. Non-homothetic preferences play a role here, with the low income elasticity of demand for agricultural goods limiting the growth in the relative demand for those goods, and the high income elasticity of demand for services strengthening demand for services. However, Święcki (2017) finds the major driving force behind structural change in the post-industrialization phase of development is the sector-bias technological change that is coupled with a low elasticity of substitution in demand for goods between sectors. This low elasticity of substitution results in an increased flow of resources from the high productivity manufacturing sector to the lower productivity services sector.

Samaniego and Sun (2016) attribute this "humped-shaped" profile of manufacturing's share of employment versus income or GDP per capita, as these now-developed economies moved through the industrialization followed by the deindustrialization phases of development, in large measure to productivity differences within manufacturing. With manufactured goods seen as substitutes for one another (with an elasticity of substitution greater than one) resources shift over time toward production of the high-productivity goods. If the economy is initially well endowed with resources devoted more heavily to the industries that fail to dominate output in the long run, then the economy will initially diversify its production within the manufacturing sector. At some point, with dwindling resources in the low productivity industries, the manufacturing sector will enter into a period of re-specialization, thereby reversing the trend toward greater diversification. This U-shaped feature that Samaniego and Sun (2016) characterize as the "stages of diversification" is seen to coincide with the humped-shaped depiction of employment and output patterns of economic development that are broadly identified with classical structural transformation.

Advanced economies have thus seen sharp declines in manufacturing's share of employment. For example, Rodrik (2015) reports that since the 1950s, manufacturing employment in the U.S. has fallen from approximately 25 percent of total employment to less than 10 percent. However, there has not been a corresponding decline in manufacturing's share of value-added in GDP which has remained stable (at least since 1970) at approximately 13 percent. This absence of *output deindustrialization* is not shared by all advanced economies, but is in all cases less pronounced than employment deindustrialization. It suggests that the primary factor influencing the employment shift during the post-industrialization phase of development is labor-saving technology. This conclusion is bolstered by the evidence provided by Rodrick (2016) that for an aggregation of 40 countries heavily weighted toward

advanced economies, employment declines in manufacturing (from 1995-2009) were almost entirely concentrated in the low-skill job classifications, with a modest increase evident in the high-skill jobs.

4.2 Premature Deindustrialization: A Summary

The broad-based decline of manufacturing employment in advanced economies between 1970 and 2010 due primarily to productivity gains in the manufacturing sector, appear to have been largely nullified on a global basis by shifts in supply chains whereby manufacturing employment rose in lower productivity economies, primarily in Asia. On balance, Felipe and Mehta (2016) find that average manufacturing productivity globally, based on data from 64 countries representing 82 percent of the world's population, has tended to mirror global productivity across all sectors. The global share of total employment concentrated in manufacturing remained relatively stable at approximately 14 percent, while manufacturing's share of output remained nearly unchanged throughout this period at approximately 17 percent. This finding suggests limitations imposed on countries wishing to seek enhanced economic growth through rapid industrialization. While benefiting from the secular increases in world output and consequent expansion of global production and employment in manufacturing, they are nonetheless all competing for a stable share of world output. Not all countries can hope to succeed in raising their individual share of the worldwide production of manufactures.

This global competition among economies to increase their share of the world's production of manufactured goods has produced winners and losers. Among the losers are middle-income economies that have recently experienced what Rodrik (2015) refers to as "premature deindustrialization." This phenomenon is characterized by a peak in the country's manufacturing share of GDP occurring at an earlier stage of development than had previously been the case at the onset of the post-industrialization phase of development of advanced economies. That is, the shares of employment in manufacturing are lower before they begin to decline and this peak occurs at a lower level of per capita income or GDP. Rodrik (2015) estimates that countries that only recently entered into the deindustrialization phase since 1990 had a peak of manufacturing's share of employment of 18.9 percent at a per capita income level of 4,273 constant 1990 dollars versus those countries that begin deindustrializing prior to 1990 having peaked at an employment share of 21.5 percent and a per capita income level of 11,048 constant 1990 dollars. Consequently, productivity growth is retarded, as labor shares are increasingly absorbed by lower productivity jobs in agriculture

and services, without the advantages of unconditional convergence that, as discussed in more detail later, had previously boosted productivity during the industrialization of the economy. For those economies, income per capita is thus relegated to a lower growth trajectory, which in some cases has approached stagnation.

Gollin, Jedwab, and Vollrath (2015) document how urbanization in resource-rich LICs induce a Dutch disease that skews employment shifts toward nontradable personal services rather than high-productivity manufacturing and modern, tradable services. They label these urban centers "consumption cities," which they distinguish from "production cities" in which urbanization is characterized by more traditional structural transformation associated with industrialization. They argue that this phenomenon typifies the majority of SSA countries. Examples include Ghana, Nigeria, and Botswana, all of which have experienced rapid output growth due to gold, oil, and diamonds, respectively. Given that extractive industries employ very few workers, the export revenues have resulted in these countries importing manufactures with the consequent shift of employment from agriculture to low-productivity services. (See online Appendix A.2 for case studies for these countries.)

4.3 Premature Deindustrialization: Causes and Consequences

Several factors combine to explain why some countries have successfully leveraged globalization to enjoy economic growth, industrialization, and structural transformation, whereas others have failed to grow or have started to deindustrialize prematurely.

The first factor is the evidence reported by Felipe and Mehta (2016) that the global shares of manufacturing employment and output have been relatively stable from 1970 to 2015. Therefore, given that these countries taken together comprise a significant portion of the world's population, the resulting competition to enter the global market for manufactures as part of the process of economic development has reduced their ability to rely on additional international demand for manufactured goods.

Second, while foreign capital, technology, and skills can substitute for domestic scarcity of these private factors that are key to industrialization, these foreign inputs still rely on complementary public inputs, broadly speaking, infrastructure and institutions, to be able to strengthen the comparative advantage of the destination countries in manufacturing. Viet Nam, singled out in the earlier discussion of LICs as an incredible success story in recent times, considerably improved its public fundamentals to grow and industrialize at a rapid pace for the past 30 years. Contrary to Viet Nam's experience, many SSA countries, for example, Nigeria, have suffered greatly due to poor infrastructure that has deterred

investment in and an upgrading of manufacturing facilities that would have enabled them to compete in international markets. (See Adeyinka, Salau, and Vollrath, 2017.)

A final factor influencing a country's ability to compete internationally with its manufactures is the leveraging effect inherent in the nature of globalization itself that was alluded to earlier. With open, global markets for goods, large amounts of international resources, such as capital and technology, can move to countries with stronger public fundamentals to magnify the differences in advantage of various countries in manufacturing. This phenomenon has been especially evident in the reallocation of supply chains globally that has benefited the countries that have been able to tap into the production of components of manufactured goods, without having to develop a domestic network of vertically integrated production facilities.

The countries that do not have strong public fundamentals (or strong private fundamentals to compensate for weak public fundamentals[3]) will, thus, become importers of manufactures. Moreover, as they are excluded from fully exploiting the benefits of industrialization and technological and skill development and the upgrading that goes along with that experience, they will fail to improve the quality of their products as they proceed with structural transformation. As a result, the process of structural transformation and industrialization is likely to terminate prematurely, leading to the phenomenon of premature deindustrialization.

It is feared that premature deindustrialization deprives a country of a very important phase of economic growth needed to improve living standards by keeping labor stuck in agriculture or causing it to move to a lower rung of services which, typically, also have lower productivity growth. In contrast, the industrial sector in a low-income industrializing country is able to sustain prolonged periods of productivity growth due to the property of unconditional cross-country convergence in productivity, when comparisons are made within industrial sectors. This allows it to experience rapid growth as it transitions toward the growth path of more advanced economies, provided it channels employment in sufficient quantities into these *escalator* industries. For example, based on a sample of 188 countries, Rodrik (2012) estimates an average rate of convergence in manufacturing industries of 2.9 percent per year, which would translate into an additional boost to productivity of over 6 percent for the industries in the bottom 20 percentile of his sample. Along this transition, the manufacturing sector assumes a larger share of both output and employment, with largely unskilled workers moving into more productive activities. Further, consistent with

[3]We note here that contributors to McMillan, Rodrik, and Sepúlveda (2017) do not distinguish between private and public fundamentals *per se*. However, the distinction is useful when considering, as we do here, the role of public policy in promoting economic development.

our discussion above, Rodrik (2012) also stresses that this process requires a degree of openness and global competitiveness of the economy, such that the demand for these tradable manufactured goods is not restricted by a domestic market consisting of largely low income consumers. Moreover, complementarities in the production of these goods can play a critical role. In particular, absence of public policies to stimulate a build up of the requisite physical capital and the creation of infrastructure needed to support a rapid expansion of manufacturing could inhibit this avenue of structural change.

4.4 Middle-Income Trap (or Malaise?) and Premature Deindustrialization

The fact that the problem of premature deindustrialization has come to pass only recently is, in part, also an outcome of the disappointing development experience of countries such as Brazil, Malaysia, Mexico, and Peru, since their transition to the middle-income status. Unlike the Asian Tigers, they have not been able to steadily move up the "value chain" vis-à-vis the technological sophistication of their manufactured goods and have failed to join the club of "high income countries."

One view of this phenomenon is that it represents more than a slowdown in the rate of convergence, or even a divergence, of the affected economies' income levels with high-income countries. From this perspective, the affected economies have entered into a *middle-income trap* characterized by a "bad, but stable equilibrium," emergence from which would require some external shock or significant policy intervention.[4] It is argued that these countries suffer from the competitive pressures from, on the one hand, the low wages paid in low-income countries that are dominant in mature industries which rely on imitation and employ low-skilled workers in manufacturing, and from, on the other hand, the aggressive product innovations of high-income countries with an abundance of higher skilled workers.(A more detailed description of the Latin American experience is available in the online Appendix A.3.)

The middle-income trap, *or economic malaise*, in which many of these middle-income countries find themselves has compounded the tremendous crowding and competition in supply of manufactures already arising from the rapid structural transformation and industrialization of China (and to some extent India) comprising a significant share of world population. It is, therefore, not that surprising that many low-income countries that are

[4]See Agenor (2016) for a survey of this literature.

latecomers to the process of structural transformation and industrialization have not been able to take full advantage of their potential for improvement of living standards via sustained economic growth and have started deindustrializing prematurely. Their predicament may become further compounded by the incipient wave of labor-saving technology, such as AI-enhanced robotics.

5 Prospects of Economic Development and Structural Transformation Going Forward

In light of the trend toward premature deindustrialization in the recently industrializing low-income countries, this section outlines some of the plausible paths of development and structural transformation that may be open to these countries. It concludes with a discussion of the need for longer-term perspective in policy making in light of the current reality of the development options, especially to avoid the middle-income trap in the future.

5.1 Industrialization Again?

While current discussions (see Rodrik, 2015) seem to suggest that the path of economic development and growth through industrialization is closed to current low- and middle-income countries, that prognosis may be too pessimistic.

Once again, we highlight the fact that the global employment and output share of manufacturing has been relatively stable for forty years (Felipe and Mehta, 2016). Thus, if China is able to successfully start the next phase of structural transformation from industrial to a post-industrial, modern services-based economy without suffering from a middle-income trap, it would allow a number of small countries to fill the resulting void in manufacturing. The process would be further aided if other countries such as Brazil are able to extricate themselves from the middle-income trap or malaise into which they have fallen.

However, it is not clear, how helpful this fact is to countries that are currently suffering from premature deindustrialization. Any significant impact of such possible global growth outcomes, if they were to occur, will occur only over the medium to longer term.

5.2 Can Services Do the Trick?

A robust feature of latecomers to industrialization in Africa is the movement of labor into traditional (nontradable) services. These countries are Ethiopia, Ghana, Keyna, Malawi,

Senegal, Tanzania, and Zambia. Enache, Ghani, and O'Connell (2016) document that the wholesale and retail trade sector has seen the largest increase in employment share over the last two decades (1990-2000 and 2000-2010) in almost all of these countries. They also find this pattern of later transition out of agriculture and large increases in employment into the wholesale and retail trade sector in Asia for Thailand and India. Moreover, this sector also has low rates of formalization. For example, Osei and Jedwab (2017) report a formalization rate of only 5.90% for wholesale and retail trade.

To shed some light on the economic forces shaping this pattern of structural change in these economies, we first point to evidence in Enache et al. (2016). They find that this movement of labor into wholesale and retail trade is not correlated across countries with the productivity of this sector. In particular, this happens in countries with low productivity (Ghana, Kenya,and Senegal) and in countries with high productivity (Ethiopia, Malawi, Tanzania, and Zambia) in this sector. This rules out supply side, productivity-based factors to be a major explanatory force.

Instead, this is a rather straightforward outcome of the nature of their pattern of international specialization in trade. Agriculture and resource-extraction industries are driving the increase in income in these countries. As they use proceeds from the export of these primary commodities to buy tradable manufactures, it is accompanied by increases in demand for traditional, nontradable services which are complementary to manufactures. As Burstein, Neves, and Rebelo (2003) show that distribution costs are very large for the average consumer good: more than 40% of the retail price in the US and roughly 60% of the retail price in Argentina.

While such structural transformation may generate growth (*e.g.*, through unconditional cross-country convergence in services as documented in World Economic Outlook, April, 2018), it is unlikely to be a source of long-term growth due to its inability to generate sustained increases in productivity. Thus, a credible services-based alternative to economic development and structural transformation has to rely on growth on high-productivity, tradable services.[5] In this respect, India's experience is instructive.

[5]Despite facing higher international barriers than goods (Miroudot, Sauvage, and Shepherd, 2013), services are rapidly becoming an increasingly important component for global production and world trade. Based on a newly created dataset Loungani *et al.* (2017) note: "A detailed analysis of patterns and stylized facts reveals that exports of services are not only gaining strong momentum and catching up with exports of goods in many countries, but they could also trigger a new wave of trade globalization." This dataset can help study potentially far-reaching implications of the growth of services production and trade for welfare, income distribution, resilience, labor allocation, and also the nature of structural transformation, vis-a-vis, its desirability. However, also see Rodrik (2018) for a more cautious assessment, as in this paper.

Since 1990, India has experienced extraordinarily rapid economic growth. This growth was not primarily due to industrialization, but rather from a shift in employment from agriculture to high-productivity services, driven by India's embrace of globalization and the ongoing IT revolution. However, India's success may be hard to duplicate in other countries. The platform on which this success was built rests on features somewhat unique to India: Its post-War emphasis on scientific and technological training, along with the Indian diaspora resulted in a cadre of highly trained workers prepared for the demands of high-productivity service-sector jobs. English is the lingua franca of much of the international communications in tradable services, and the historical British rule of India left an important segment of the population fluent in English. (We refer the reader to a case study of India's structural transformation in the online Appendix A.4.)

5.2.1 High-Productivity Services: Some Remarks on Their Potential

While the Indian experience with services-led growth elegantly demonstrates the idiosyncrasies of the process of economic development, the central role was still played by the strong private fundamentals. Without access to appropriate technological knowhow and the availability of technical manpower, the process would not even commence.

However, in trying to replicate the Indian experience elsewhere, the private fundamentals certainly would not be sufficient by themselves. There is a minimum threshold level of communication and IT infrastructure that is needed to enable the private sector to move to capitalize on these private fundamentals. In addition, in most countries, it would be desirable to augment these steps with government policies that help connect its budding domestic activity in this area to the international market (for example, through encouragement of FDI). In the case of India, the need for such policy measures was obviated by the existence of the Indian diaspora at the right place at the right time.

Two remarks can be made while comparing services-led and industrialization-based choices. On the one hand, while good public fundamentals help across the board, the requirement of public fundamentals is not as onerous for enabling growth powered by high-productivity services than by industrialization. On the other hand, services-led growth requires stronger private fundamentals, as technology and skills needed to work in the high-productivity sector are farther removed from those of unskilled labor that can be more readily absorbed in the manufacturing sector, especially in the early phase of structural transformation.

In the end, however, as far as the Indian experience suggests, while it is appropriate to be optimistic about a services-led growth outcome, its potential to engage a large share of

labor that is being released by a shrinking agriculture (and industrial) sector is yet to be fully demonstrated.

There is, in fact, a reason to be circumspect. The paradigm of manufacturing-based growth has the advantage of a synchronous increase in domestic demand for the manufactures produced locally. Under the right conditions, the global markets generate additional demand which can accelerate growth and structural transformation. However, the fact remains that a lot of the employment in manufacturing is supported by domestic demand for these goods.[6] The path of (high-productivity) services-led growth, on the other hand, involves a leap-frogging of the production structure of the economy relative to that of its demand. Even in the best-case scenario, with the tailwind of strong and well-aligned private and public fundamentals, it still places the burden of increases in production and employment in the high-productivity services sector, almost entirely on global demand and exports, and thereby, in most cases, potentially limiting the upside.

5.3 Need for a Longer-Term Perspective in Policy Making?

Traditionally, in a low-income country, the focus of the development process is on the accumulation of capital and the improvement of infrastructure. With the support of appropriate public policy, it generates strong dynamic, self-sustaining incentives to strengthen private fundamentals such as technology, skills, and innovation. However, it appears that the countries that are latecomers to the process of economic development and structural transformation, having been deprived of the advantage of a virtuous cycle of productivity growth and an increase in employment in manufacturing, would be denied this opportunity. The prognosis of a services-led growth is not very sanguine either. Thus, in order to generate sustained economic growth and increases in living standards, the accumulation of these private fundamentals has to be a more deliberate process for these countries with strong support from public policy. Moreover, as this will be a slow, drawn out process, a longer-term perspective will be required in policy making.

While the details of policy prescriptions are likely to be very specific to the circumstances of a country, some broad contours of the longer-term aspects of public policy can be defined. This exercise can be usefully informed by the challenges being faced by developing countries

[6] In the later phase of industrialization, economies move from a diversified industrial base to a more specialized production structure with dominance of a few higher-quality goods having strong economies of scale. Thus, in that case, domestic consumption of local manufactures may be relatively small. However, as overall consumption of manufactures is not, it indirectly supports employment in local manufacturing as these goods are exported to finance the import of other industrial goods.

currently in the so called middle-income trap. Based on Agenor (2016), these problems can be summarized as:

1. inadequate infrastructure,
2. diminishing marginal benefits from physical capital investments,
3. exhaustion of cheap labor and imitation gains,
4. insufficient human capital to compete with high-income countries in innovation,
5. misallocation of talent, with too much human capital devoted to the production of goods in low-growth sectors of the economy,
6. lack of access to funding needed to finance risky investments in innovative technologies, and
7. income inequality inhibiting the acquisition of human capital through limited access of low-income households to educational opportunities.

As this list suggest, over a longer horizon, the lack of appropriate skills and innovation seems to be the important challenges. These private fundamentals are slow to gather strength in general, and more so for the latecomers for reasons highlighted above. Thus, the policy actions of their governments should be more broad-based going beyond improving infrastructure, attracting FDI, and improving the business climate. As the list above suggests, market failures lie behind many of the problems inhibiting the prospects for enhancing growth, the nature of which is country-specific, and may require local remedies. Some evidence from country reforms exhibiting so-called "positive deviance" suggests that contextual pragmatism will likely be the most successful approach to policy reforms.[7] In addressing these problems, policies should also specifically incentivize individuals to invest in skill upgradation and businesses to invest both in skill upgradation of their workforce and innovation in order to sustain growth over the longer term and prevent stagnation at middle-income levels. Evidence in support of this view is provided by Tamura, et al. (2019), who employ a new data set on human capital per worker to perform a standard growth accounting exercise and find that variation in inputs across 168 countries accounts for more than 50 percent of the long-run variation in living standards.

[7]Andrews (2015) suggests that the majority of countries that have implemented successful policy reforms followed a "problem-driven, iterative adaptive" process whose benefits may be slow to become fully realized.

The need for longer-term perspective notwithstanding, political myopia quite often inhibits the ability of policymakers to make investment decisions that are optimal in the long term. For example, Atolia, et al. (2019) study the budget-constrained decisions of investing in *economic infrastructure*, such as roads, versus *social infrastructure*, such as schools. They conclude that myopia may bias the policy decisions toward economic infrastructure, and forego the greater long-term benefits that would accrue from greater investment in social infrastructure. Thus, the challenge that the low-income countries face is daunting and the deck seems to be stacked against them.

Recall, the fragmentation of the production process and creation of global value chains has provided opportunity to the countries to exploit comparative advantage in a narrow range of processes and intermediate goods. In some ways, this is good news for developing countries as, by mitigating the coordination problem, it allows them to benefit incrementally from focused investments in infrastructure, innovation and human capital/skill upgradation—it is not necessary to have expertise in producing a good or delivering a service in totality; doing a smaller part well is an economically viable activity as well. By bringing forward in time the gains from government's policy initiatives, perhaps it provides a partial offset to the problem of political myopia.

5.4 What Else to do in the Meantime?

In view of the absence of manufacturing (as well as high-productivity services) as the main driving force of economic development in many LICs and the problems associated with political myopia, a word on the potential benefits of modern agricultural production in the short run is warranted. Specifically, in light of the scope for sizable productivity and quality gains within this sector and the importance of agriculture as a source of employment in LICs, the development policy should reconsider the role of agriculture in orchestrating a strategy over short-to-medium-term horizon.

In the context of this paper, one may argue that the process of structural transformation and product diversification/upgradation evolves over a continuum, spanning changes not only across, but also within sectors of the economy. For many LICs, a large share of the population is employed in agriculture, the least productive sector, and rapid diversification into manufacturing, as argued previously, remains challenging. Thus, for the economic benefits from diversification to reach the poorest group, agricultural development could take a more central role. There are substantial potential productivity and quality gains from transforming the agricultural sector that differ from the past. Through fostering high value-added

agricultural products, entry into new products, and quality upgrading (e.g., by promoting the transition from subsistence agriculture to production for the market), modern agricultural production feeding the new demand for organic foods in advanced economies could emerge as a viable development strategy in the meantime.

The scope for quality upgrading is not limited to manufacturing: as countries develop, the quality of both manufacturing and agricultural products increases substantially, with lengths of quality ladders varying considerably across products in both sectors. Empirical analysis in Henn et al. (2013) using a newly-constructed cross-country dataset on export diversification and transformation since the mid-1960s reveals that there is ample scope to upgrade the quality of LICs' existing export basket and/or introduce new higher value-added products, not only in manufacturing but also in agriculture. Reduction of barriers to entry tends to boost diversification and upgradation by reducing costs and encouraging entrepreneurs to spread their reach beyond established activities. This is most evident in transition economies such as Vietnam, where reversal of collectivization went hand in hand with liberalization, or that which constitutes liberalization (from production quotas etc.). This allowed farmers to invest, expand the range of products, and compete (see McCaig and Pavnick, 2017). By combining complementary policies with short- and medium-term focus and a long-term view, perhaps one can devise a viable strategy of economic development and structural transformation.

5.5 New Challenges on the Horizon

Another major change in the world economy is the role of mechanization and artificial intelligence (AI) in modern production. Recent advances in technology adoption and automation have considerably changed production processes and are leading to increased robot adoption around the world. There is growing evidence that advances in robotics are radically transforming markets (Brynjolfsson and McAfee, 2014; Ford, 2015). According to estimates by Frey and Osborne (2017), automation could displace about half of all jobs in the United States and other advanced economies in the decades to come.

How will the robot revolution affect developing economies? While much of the recent literature has focused on the potential impact of the robot revolution on advanced economies, Berg et al. (2019) show that the impact of AI may be as severe in developing countries as it is in advanced economies. These authors show in a two-sector, two-region model with three factors of production (labor, capital, and robots) that the robot revolution can lead to divergence in income levels between advanced and developing economies in the long run

if robots substitute for labor. During the transition, the level of output can drop in the developing economy, despite an increase in robot productivity, as resources are channeled out to the advanced economies to finance a faster path of automation.

In a world with extensive global fragmentation of production of goods and services, there are extended global value chains in which countries may rely on a narrowly defined niche of a production process. In such a situation, the effects of AI mechanization can indeed be very large: For example, a breakthrough in AI in voice recognition can pretty much wipe out medical transcription activity that may be a significant part of high-value added sectors of the economy of a small developing country. Therefore, the governments in developing economies will now be challenged with policy choices to tackle the evolving process of structural transformation in the face of not only the ongoing global revolution of GVCs and the up-and-coming one of AI mechanization, but also their potentially perverse interaction.

6 Conclusion

As a large number of countries have attempted to embark on the path of structural transformation, not all of them have been able to employ the traditional strategy to develop and modernize their economies with the help of industrialization. Competition in global markets for manufacturing has led some countries to deindustrialize prematurely. Whatever the country experience is, one key lesson from our analysis is that seeking answers from the basic structural transformation model alone would not be wise any longer. The manufacturing sector, which has been the backbone of most advanced economies for decades, by driving up productivity and creating millions of jobs, seems incapable now of delivering similar outcomes for low-income countries in general. This could not be more obvious than in the growth experience of many sub-Sahara African countries, which despite experiencing unprecedented growth acceleration in the 1990s and the 2000s, saw dismal growth in manufacturing with no signs of change in sight. For these countries in particular, the path to development may look very different than what has been taking place in developing East Asia (e.g. Bangladesh, Cambodia, Laos, and Vietnam), where there seems to have been an extension of the franchise created by the Chinese manufacturing phenomenon.

The policymakers may, in their development strategies, choose to focus, instead, on improving agricultural productivity or making bold moves in transitioning their economies to producing services. With many developing economies facing a fierce wave of urbanization

resulting in the creation of "mega (consumption) cities," could the latter option prove viable for structural transformation with sustainable growth through an increased demand for non-tradable services? Perhaps for some countries, in conjunction with some other idiosyncratic factors, it may, but it is much more difficult to imagine this becoming the over-arching model of future economic development. What our analysis also shows is that while a few countries have been able to grow rapidly by concentrating on high-productivity tradable services, its potential for structural transformation by absorbing large amounts of labor is not clear. In contrast, the manufacturing sector is able to absorb large amounts of labor, thereby allowing for a widespread distribution of strong, dynamic gains of enhanced skill levels of the workforce, upgrades of technology, and product and process innovation. In the absence of these private efforts, a greater reliance would have to be placed on public policy to create incentives for strengthening these private fundamentals. Furthermore, as these fundamentals are likely to evolve slowly, they should come under the focus of public policy early on in the process of economic development with an emphasis on long-run, sustainable economic growth and structural transformation.

Over the last decade or so, and given the shifting landscape of the global production process, there has been an elevated appetite by developing economies to resort to targeted sectoral policies—commonly known as "industrial policies." For a very long time, such policies have been rejected by economists and policy makers alike as vastly inefficient with catastrophic economic consequences when gone wrong. More recently though, such policies, which very well could target services sectors, have reemerged as potentially legitimate tools in the development strategies of countries facing market failures and adverse conditions generated by the new global economic architecture. As countries try to find their place in an increasingly complex global value chain, targeted sectoral policies seem to be a favorable tool in a government's policy toolkit.

Do data provide support for such targeted policy interventions in a world with a global production structure? How would the next wave of automation accompanied by AI affect policy choices? These are some of the challenges to existing theories of growth and development that need to be addressed and incorporated into the framework for thinking about appropriate policy responses of the government in developing countries. Incorporating these new pieces in a new development theory requires filling in some major gaps especially regarding data. For one, an understanding of the role of manufacturing in structural transformation suggests that we need to work harder in both macro and micro datasets that cover a wide range of developing economies. Extending the work on EUKLEMS at the sectoral level and

going even more granular by focusing on experiences in particular countries for example as done by the work on Margaret McMillan (e.g. Diao, Kweka, MacMillan, 2018; Diao, Harttgen, McMillan, Kweka, 2017; McMillan, Rodrik and Sepulveda, 2017) would be necessary. In addition, more and better data on services including trade in services in developing economies (e.g. Borchert and Mattoo, 2009; Anderson et al. 2018; Loungani et al., 2018) is key to putting the pieces together on how services could play a role in development.

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A Appendix to *Rethinking Development Policy: Deindustrialization, Servicification and Structural Transformation*

This appendix includes country-specific case studies that supply the details behind much of the analysis in the paper by Atolia, et al. (2019).

A.1 Case Studies on Industrialization

A.1.1 Viet Nam: A Success Story

Viet Nam is an important example of a low-income country (LIC) that successfully transitioned to (lower) middle income status. As Figure A.1 illustrates it has also experienced very rapid growth for the past 20 years since attaining the $800 GDP per capita (in 2000 US dollars.) Unlike the early industrializations of India and Brazil, Viet Nam did not have a large domestic population base and could not rely principally on import substitution for structural transformation away from its dominant agrarian economy. Instead, its growth depended on export promotion with trade liberalization (as in the case of South Korea and Taiwan) and sufficient infrastructure spending needed to attract FDI into the country. This emphasis on openness coupled with a resolve to strengthen public fundamentals is reflected in the extraordinary growth of imports and exports as reported by McCaig and Pavcnik (2017) from 15 and 5 percent of GDP, respectively, in the mid-1980s to 88 and 78 percent of GDP, respectively, by 2010. Agriculture's share of employment was cut in half from 34 percent in 1986 to 17 percent in 2009; while manufacturing's share rose sharply, from 14 percent to 25 percent, over this same period. Employment in the services sector rose more moderately, from 46 percent of GDP in 1986 to 54 percent by 2008. Accompanying this shift in employment among sectors was the shift out of household businesses and into enterprises, where productivity is demonstrably higher. Overall, McCaig and Pavcnik (2017) estimate that the movement out of agriculture during the 1990s and 2000s accounted for more than one-third of the 5.1 percent average annual growth in productivity during the period.

One important dimension of the successful structural transformation of Viet Nam is the radical change in Viet Nam's exports as seen in Figures A.2-A.5, which provide detailed snapshots of its export structure in 1985 and 2015. Over a period of 30 years, Viet Nam has transformed itself from primarily an exporter of agricultural products to a country for which machines and other advanced products contribute as much as 50 percent to its exports. In

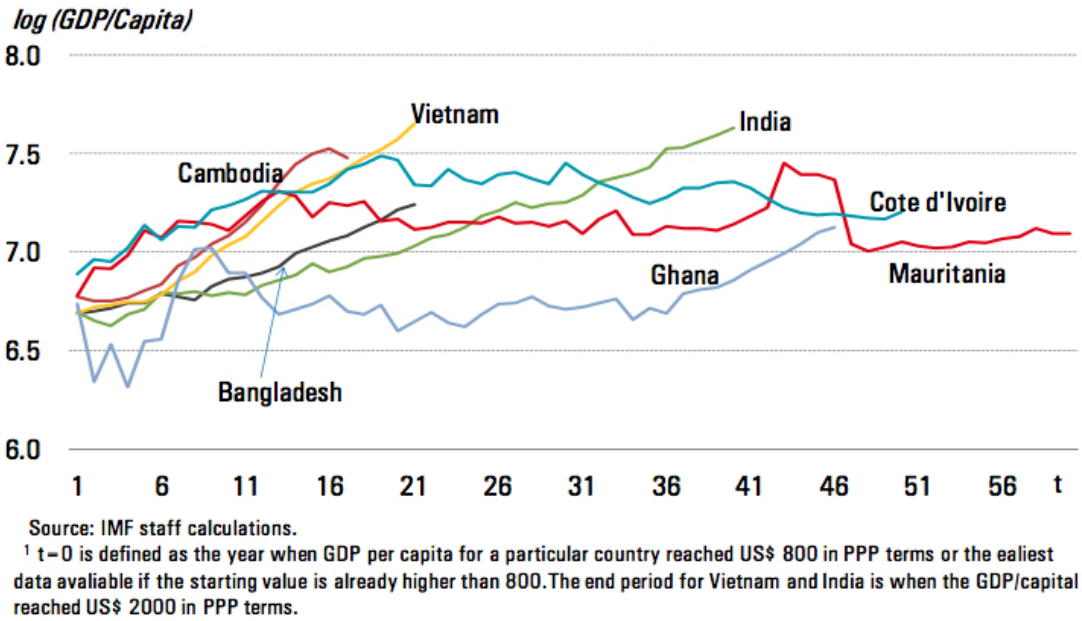


Figure A.1: Growth Trajectories for Low-Income Countries
Source: Aiyar, Duval, Puy, Wu, and Zhang, "Growth Slowdowns and the Middle-Income Trap," *IMF Working Paper*: March, 2013

fact, Viet Nam has been able to use global markets not only to expand manufacturing but also to use this market access to exploit economies of scale and enjoy continued gains in productivity—via newly acquired technology, skills, and innovation.

Viet Nam's import structure for 2015 in Figures A.6 and A.7 provides further evidence. A comparison of this import structure with the export structure shows that Viet Nam's economy is well integrated into global production networks and supply chains. For many sectors/goods, such as, manufactures, textiles, and chemicals, Viet Nam is both an importer and exporter, with a significant proportion of imported goods being inputs into the exported products.

A.1.2 The Challenging Case of Ghana

Ghana, with very similar initial conditions to Viet Nam, and despite being a success story in SSA in terms of economic growth, has had a starkly different outcome in terms of leveraging the global economy for industrialization. Ghana's GDP in 2015 was $37.54 bn with exports of $10.5 bn and imports of $13.8 bn resulting in a trade deficit of $3.28 bn partly financed by overseas development assistance (ODA) averaging 5.93% of GNI for 1960-2015 and 8.51%

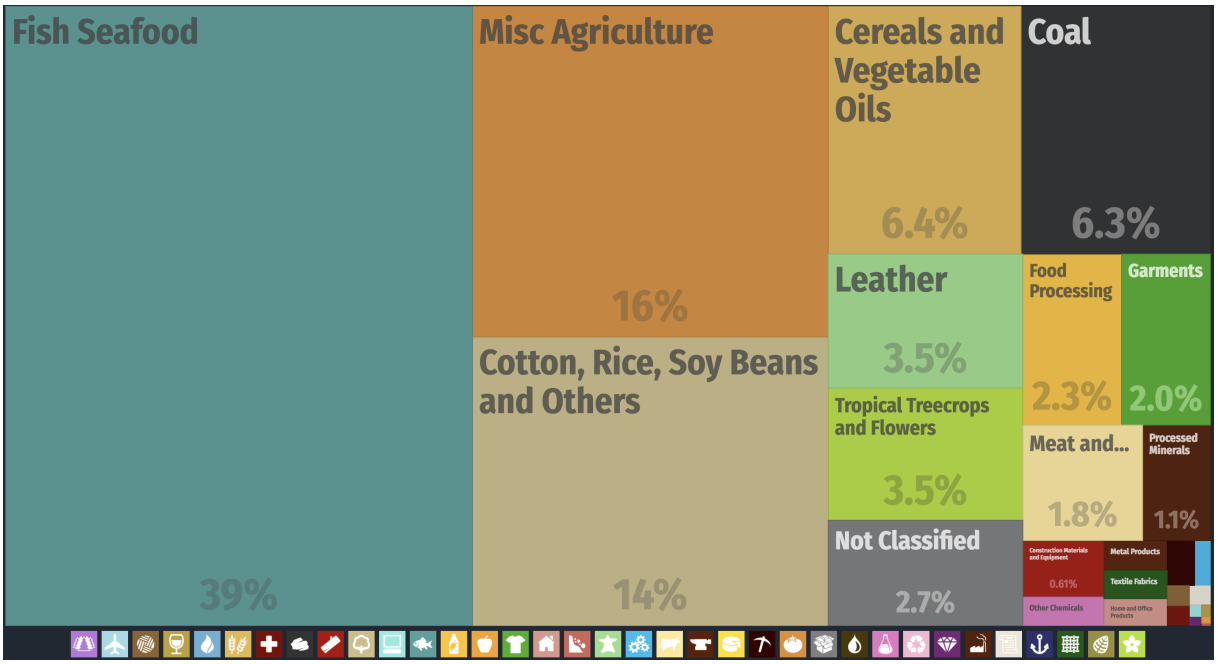


Figure A.2: Viet Nam: Export Structure at SITC2 Disaggregation in 1985 (atlas.media.mit.edu)

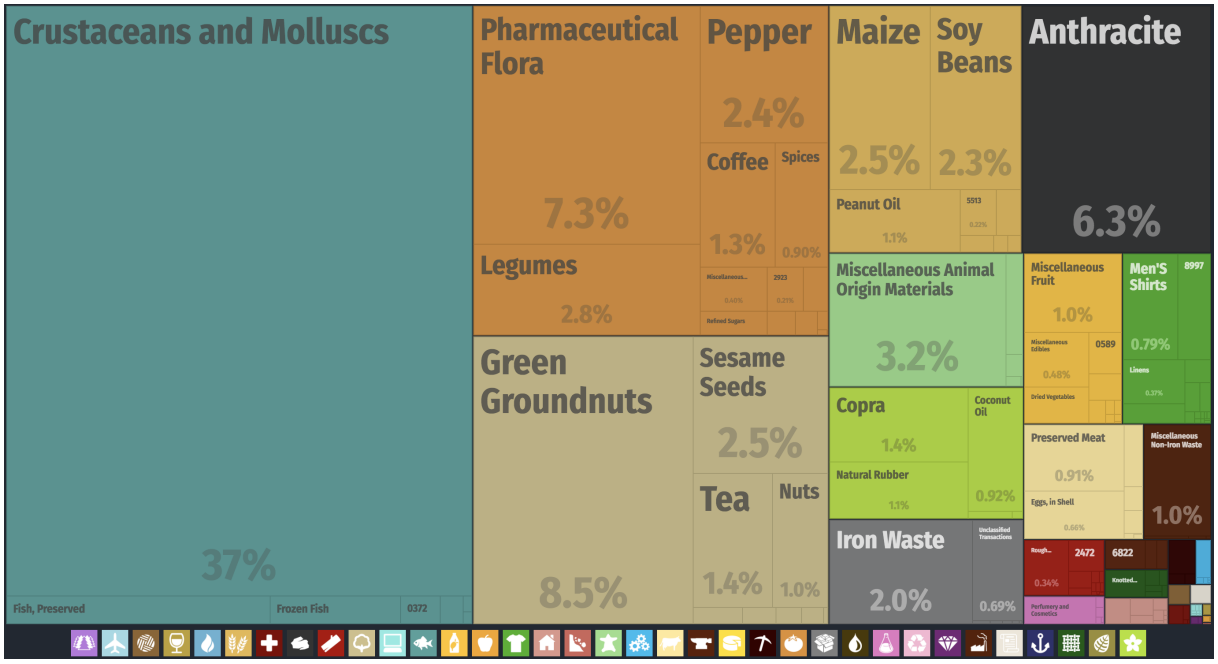


Figure A.3: Viet Nam: Export Structure at SITC4 Disaggregation in 1985 (atlas.media.mit.edu)

Figure A.4: Viet Nam: Export Structure at HS2 Disaggregation in 2015 (atlas.media.mit.edu)

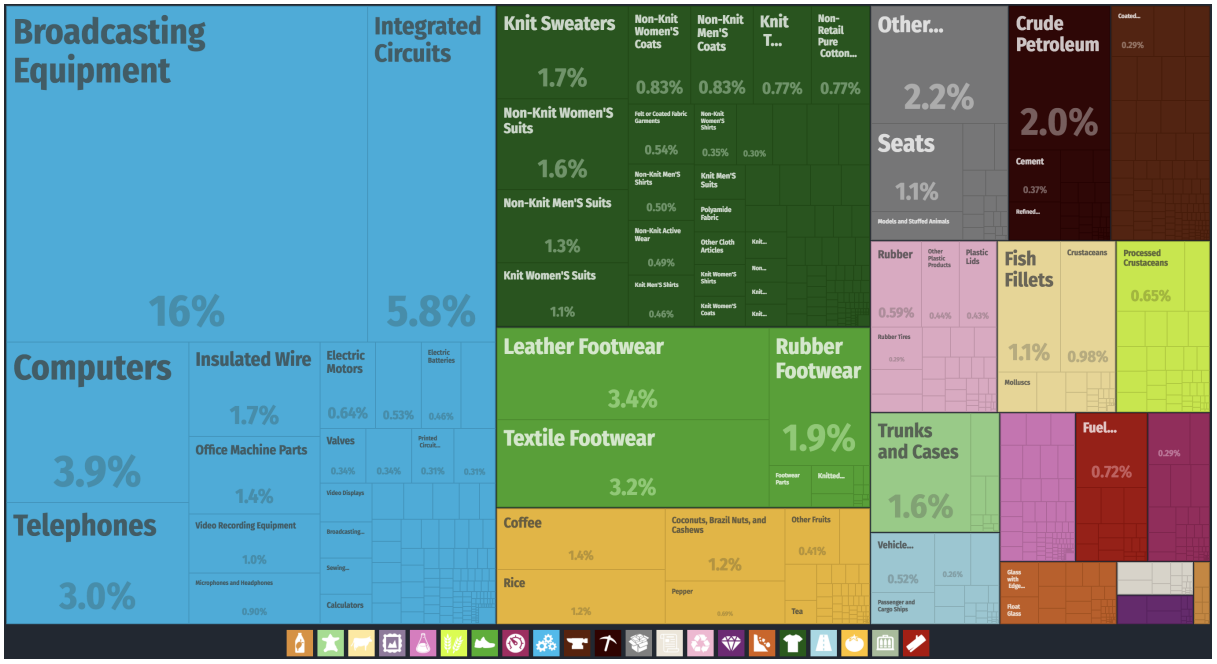


Figure A.5: Viet Nam: Export Structure at HS4 Disaggregation in 2015 (atlas.media.mit.edu)

Figure A.6: Viet Nam: Import Structure at HS2 Disaggregation in 2015 (atlas.media.mit.edu)

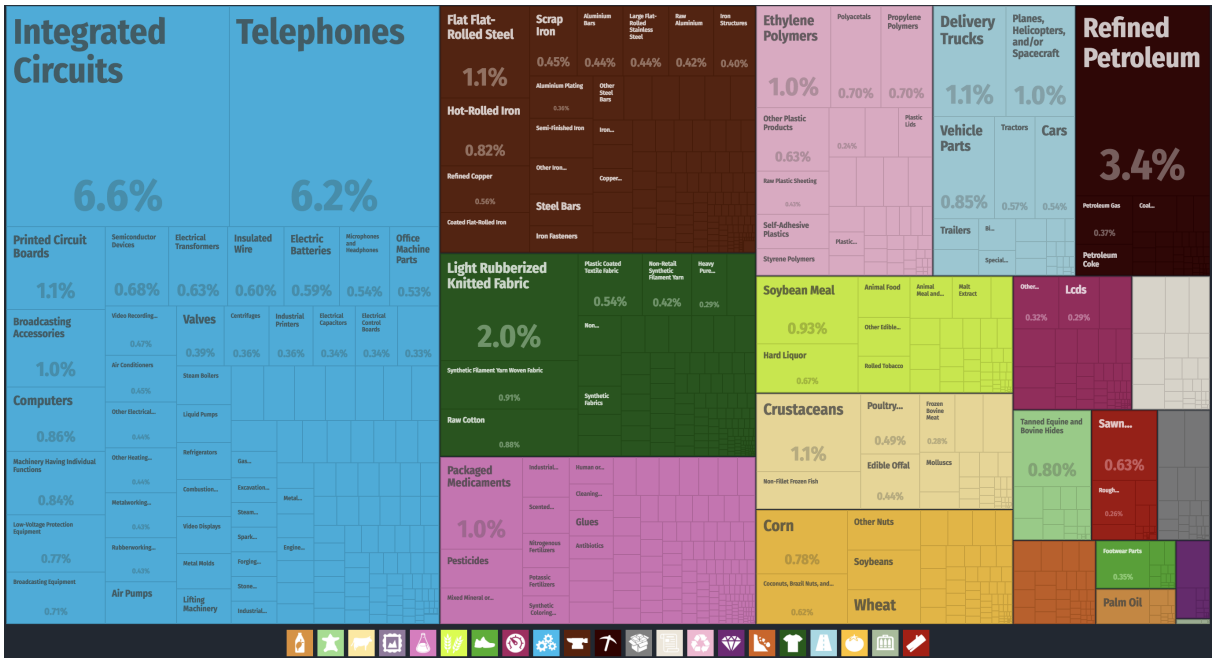


Figure A.7: Viet Nam: Import Structure at HS4 Disaggregation in 2015 (atlas.media.mit.edu)

for 1991-2015 (World Bank Data).

Figures A.8-A.11 provide detailed snapshots of Ghana's export structure in 1985 and 2015. Unlike Viet Nam's exports which have seen a radical transformation over this period, Ghana's exports have undergone very little diversification. The only major change was the emergence of Gold as its biggest export pursuant to rejuvenation of gold mining as part of the Economic Reforms Program of the early 1980s. In stark contrast to Viet Nam, natural resources (minerals and metals) account for 61.8% of Ghana's exports in 2015 and agricultural (and animal) products for about 35.8%, with contribution of manufactured goods being only 3%. Thus, Ghana essentially only exports natural resources and agricultural products. Moreover, those exports are highly undiversified with 85% of export revenue coming from Gold, Cocoa and its derivative products, and Crude Petroleum. Ghana has, therefore, failed to use global markets to expand manufacturing, let alone using this market access to exploit economies of scale and the consequent continued gains in productivity via newly acquired technology, skills, and innovation. In fact, as Osei and Jedwab (2017) report, the informal clothing and furniture sectors that "serve the domestic market and that are not that different from nontradable services" accounted for almost 40% of the total manufacturing employment in 2000.

In contrast, Figures A.12 and A.13 provide a very different picture, with a highly diversified nature of Ghana's imports in 2015 that consists of goods with a varied degree of processing and manufacturing. While import structure is typically quite diversified for a country, what is notable in the case of Ghana is its strong bias towards consumer goods. A closer look at the two figures shows that these manufactured and agro-processed goods constitute more than 80% of Ghana's imports. In light of the lack of diversification of its export structure, this makes Ghana a significant net importer of industrial goods. Moreover, Ghana is clearly far from becoming part of the global production networks and supply chains.

Figures A.14 and A.15 shed some more light on these trends for Ghana. They show how the origin of imports for Ghana has changed from 1985 to 2015, with the countries from Asia (such as, China, India, South Korea, and Viet Nam) replacing those from Europe (such as, the United Kingdom, Germany, Netherlands, and Italy) as primary source of imports. When combined with Ghana's export and import structure, this trend in import origins shows that Ghana was unable to maintain its standing in the field of manufacturing in light of the much stronger performance of these Asian countries buttressed by their combination of better public and private fundamentals. Despite the superficial similarity of trends in origin of imports for Viet Nam (Figures A.16 and A.17) and Ghana, these trends, when

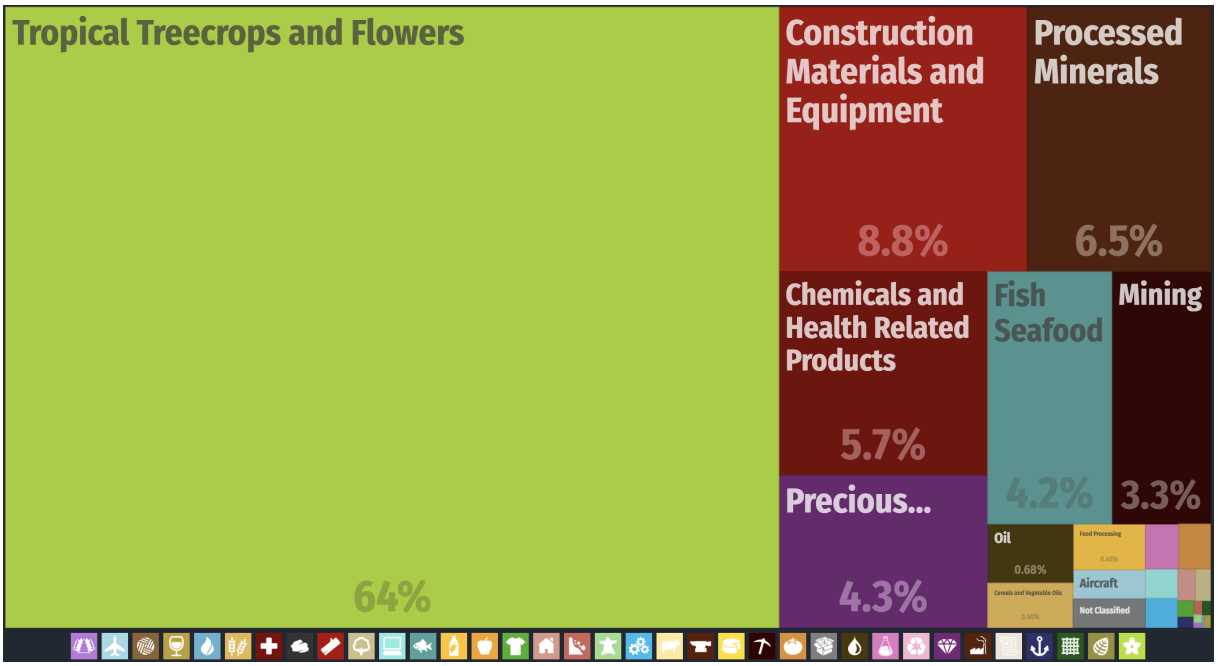


Figure A.8: Ghana: Export Structure at HS2 Disaggregation in 2015 (atlas.media.mit.edu)

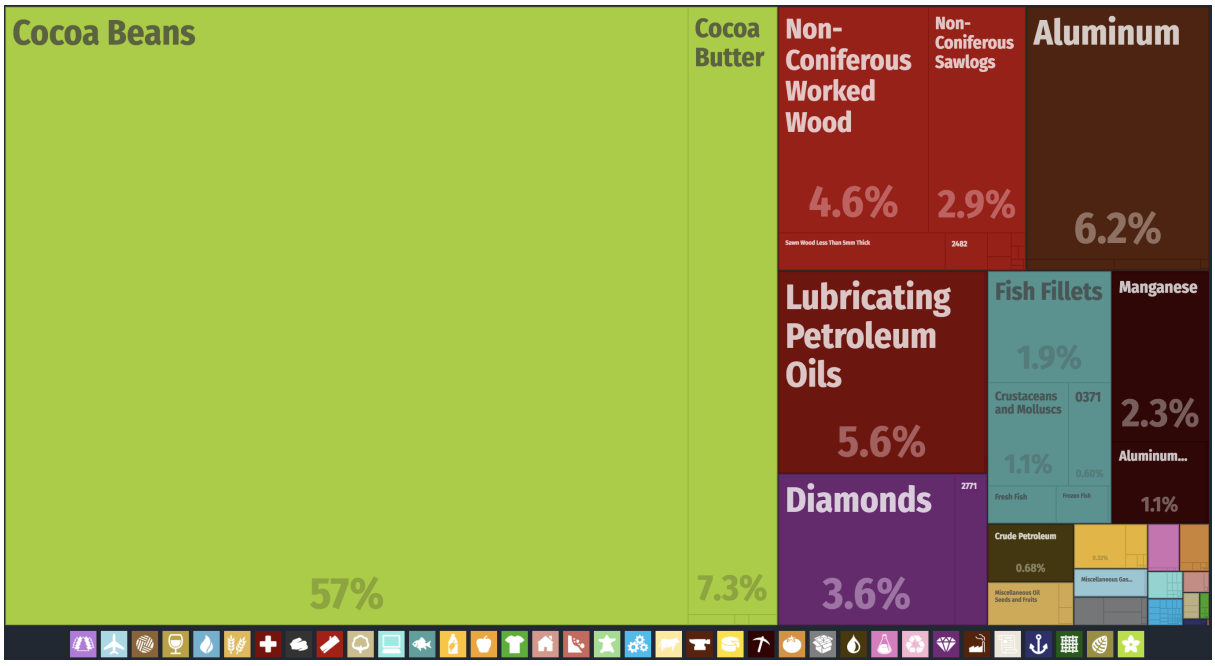


Figure A.9: Ghana: Export Structure at HS4 Disaggregation in 1985 (atlas.media.mit.edu)

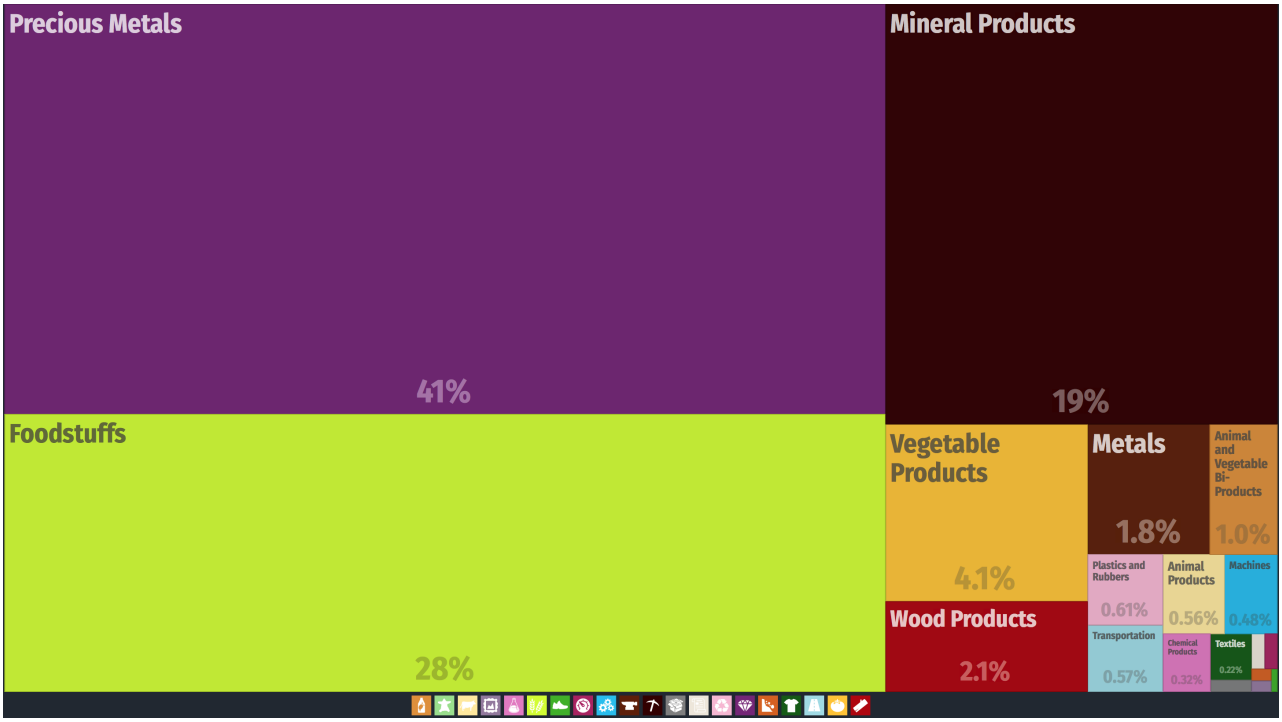


Figure A.10: Ghana: Export Structure at HS2 Disaggregation in 1985 (atlas.media.mit.edu)

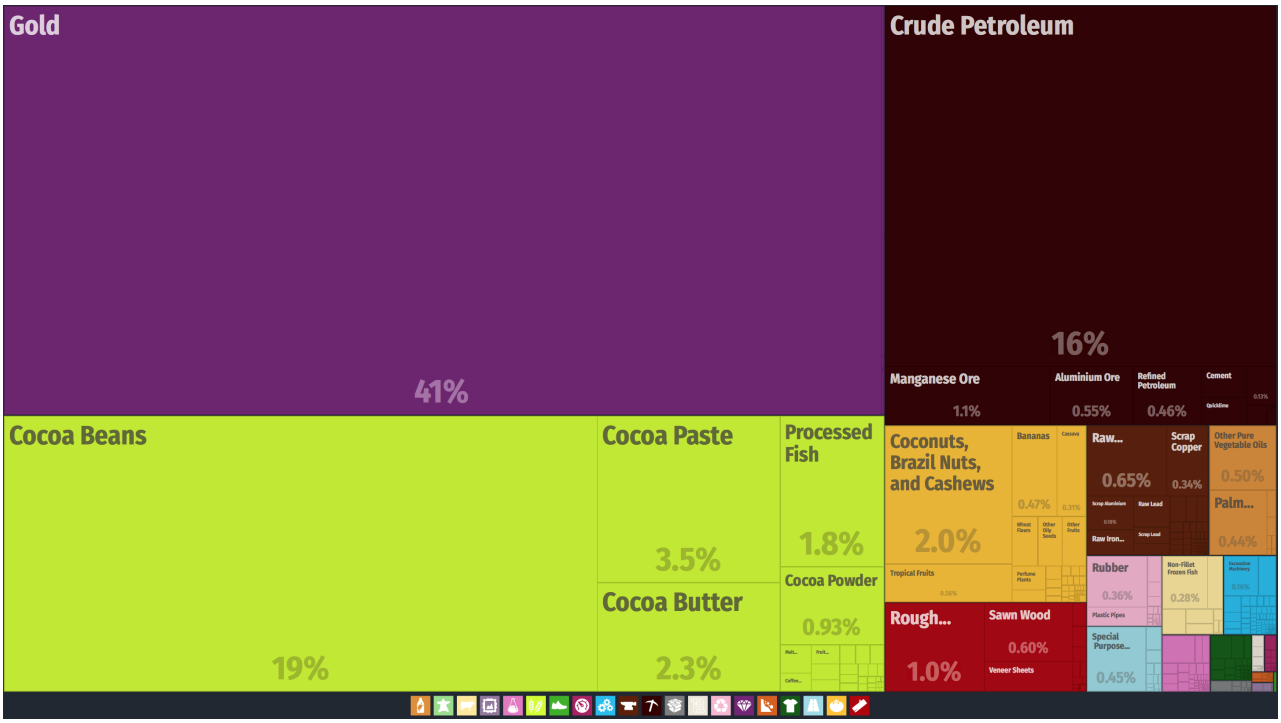


Figure A.11: Ghana: Export Structure at HS4 Disaggregation in 2015 (atlas.media.mit.edu)

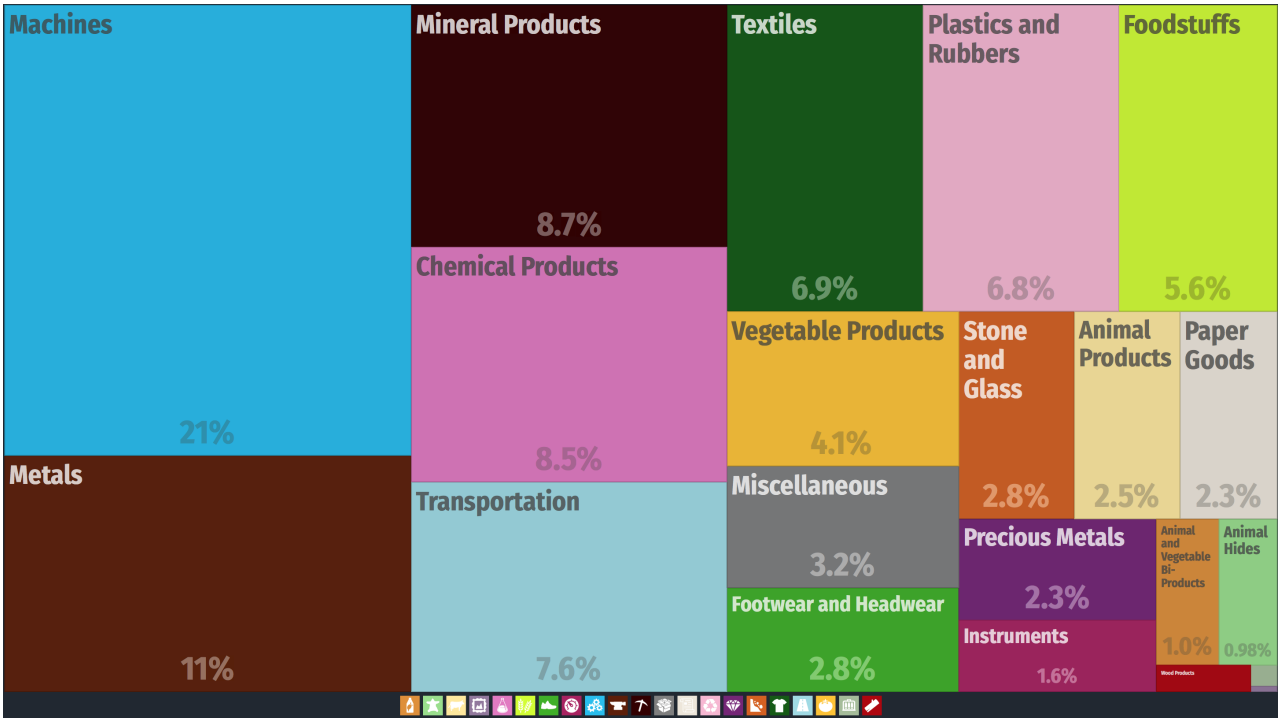


Figure A.12: Ghana: Import Structure at HS2 Disaggregation in 2015 (atlas.media.mit.edu)

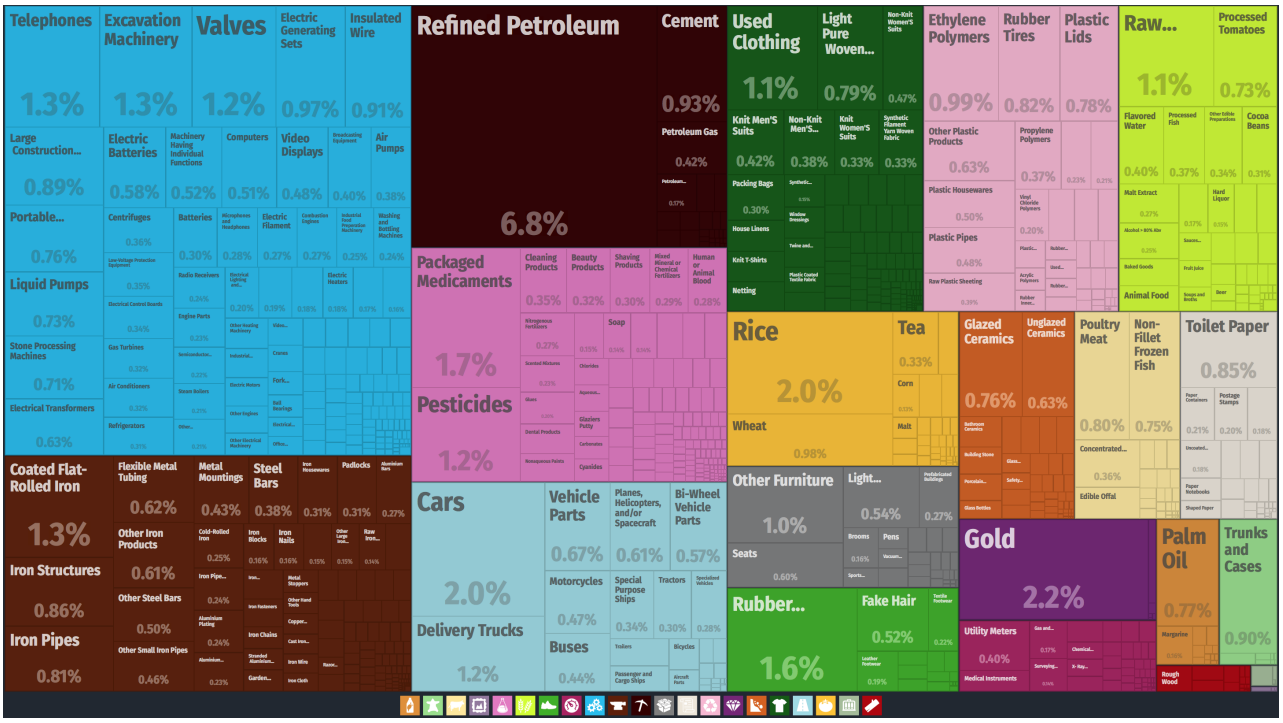


Figure A.13: Ghana: Import Structure at HS4 Disaggregation in 2015 (atlas.media.mit.edu)

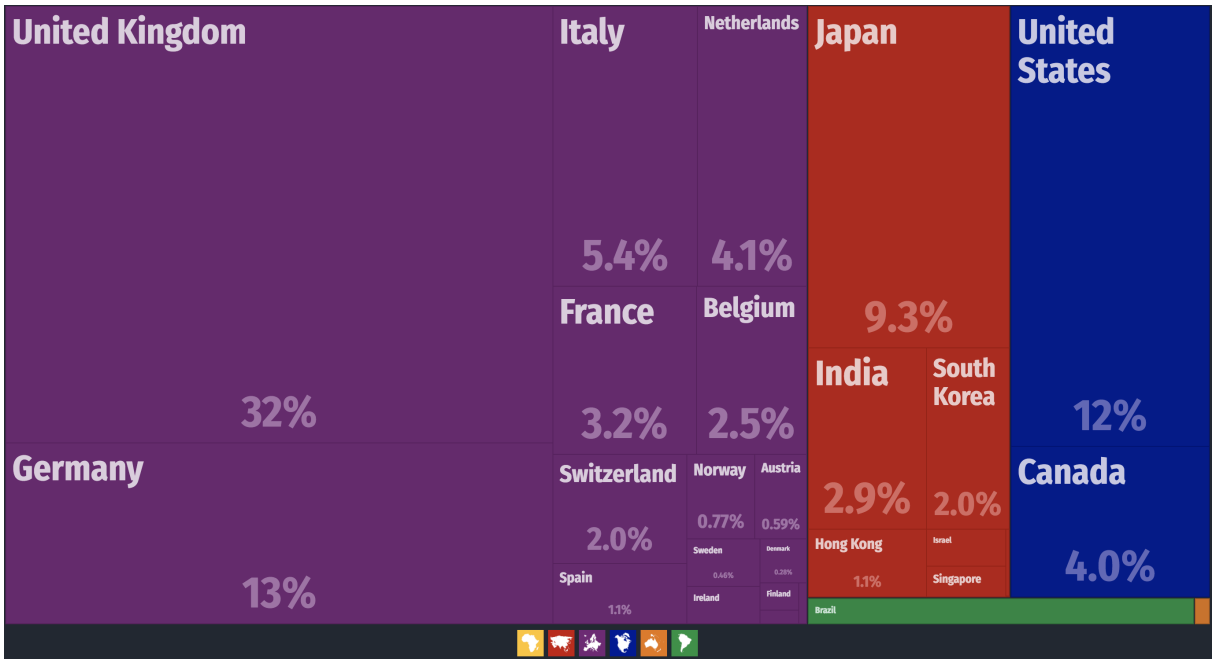


Figure A.14: Ghana: Origin of Imports in 1985 (atlas.media.mit.edu)

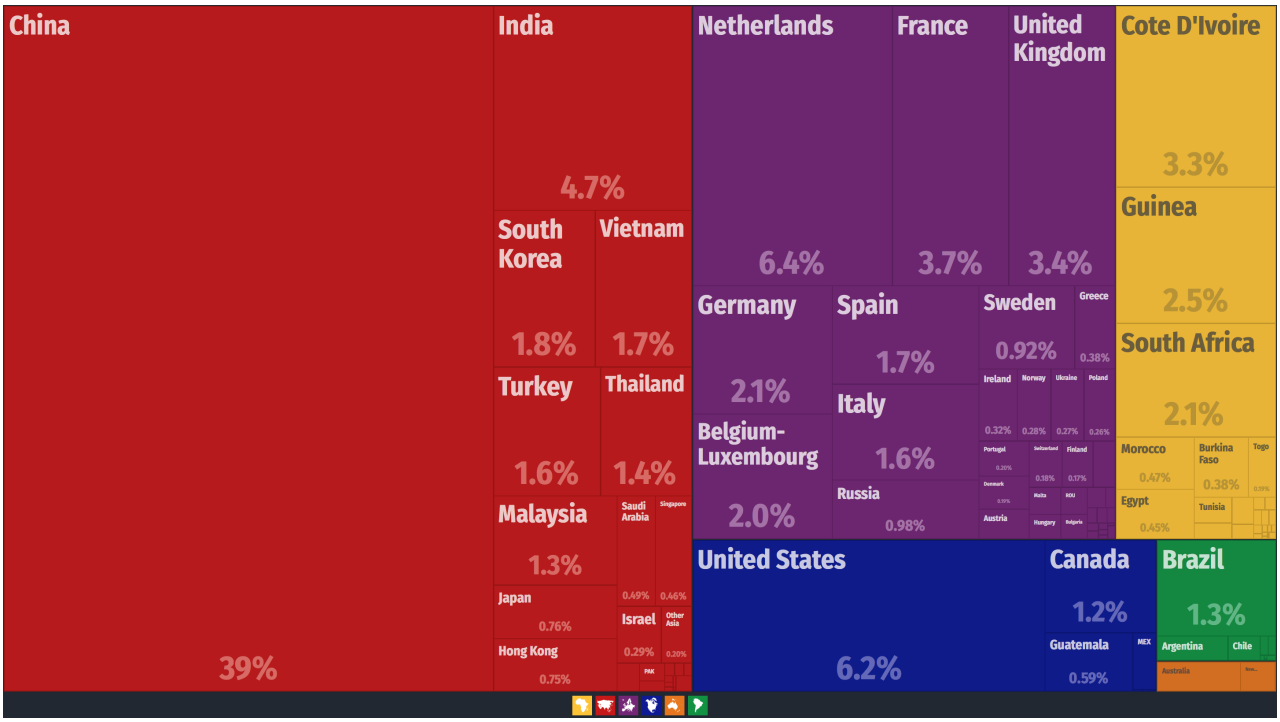


Figure A.15: Ghana: Origin of Imports in 2015 (atlas.media.mit.edu)

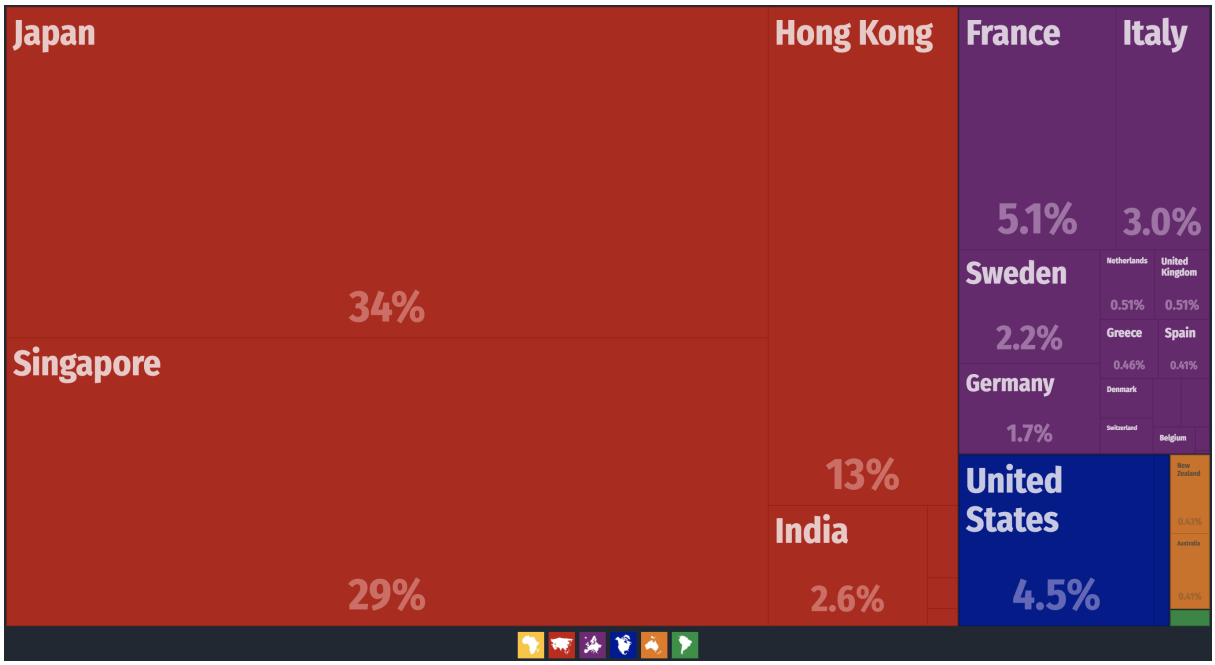


Figure A.16: Viet Nam: Origin of Imports in 1985 (atlas.media.mit.edu)

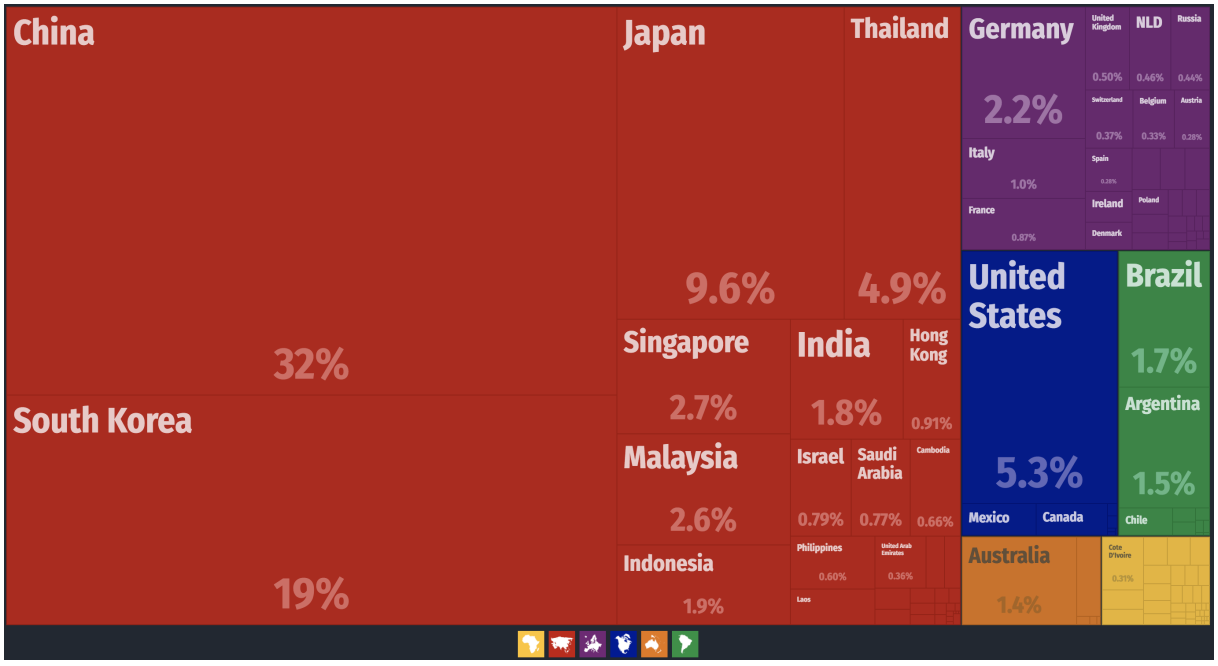


Figure A.17: Viet Nam: Origin of Imports in 2015 (atlas.media.mit.edu)

combined with export and import structure, tell a very different story for the two countries. They confirm an integration into global production networks and supply chains by Viet Nam that is not in evidence for Ghana.

A.2 Case Studies on Premature Deindustrialization

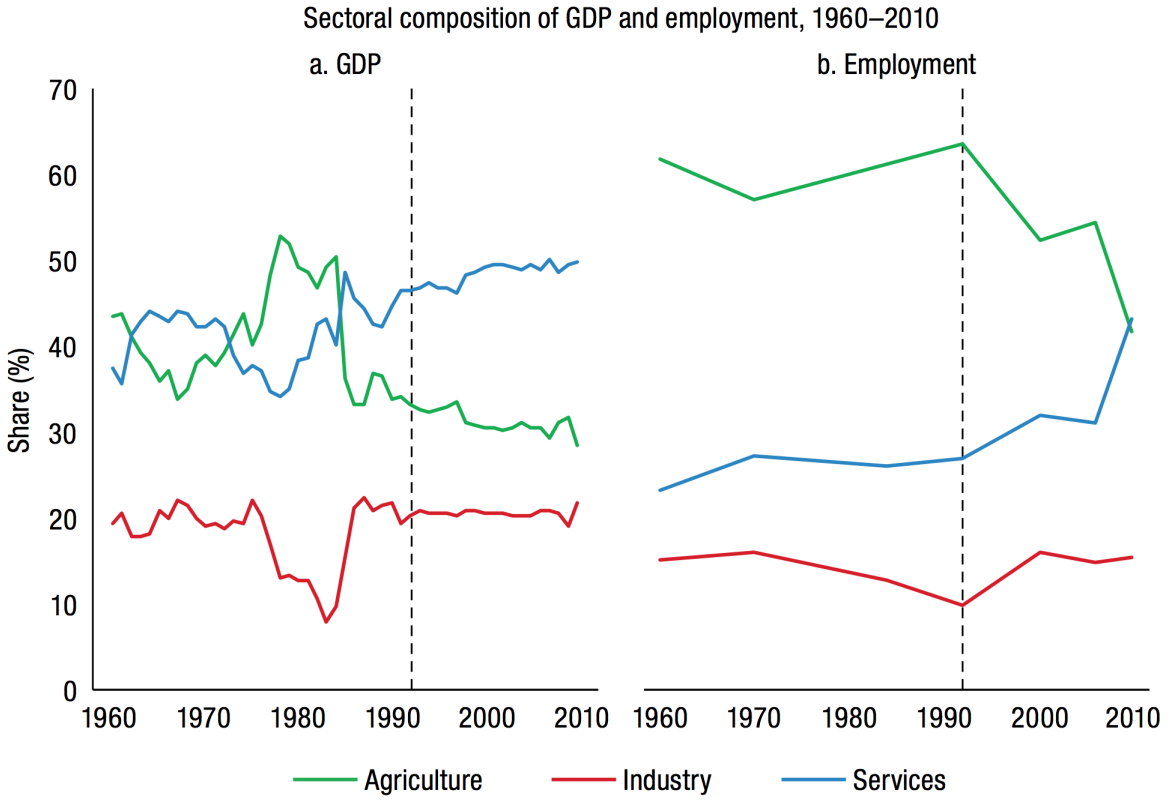
A.2.1 Premature Deindustrialization in Ghana

Economic development and structural transformation in Ghana has occurred "without a green revolution, an industrial revolution, or a service revolution of the types seen, for example, in Asia." (See Osei and Jedwab, 2017.) It has maintained an annual growth rate of about 5% over 2001-2010. Figure A.18 presents the evolution of the sectoral composition of GDP and employment in Ghana for 1960-2010 which shows a distinct break in structural transformation beginning in 1992, preceded by a phase of structural reforms starting in 1983, including a reversal of its initial ISI strategy. In particular, it shows a movement of labor from agriculture to services that has further intensified in the 2000s. This employment decline in agriculture was also accompanied by a sharp reduction in manufacturing activity (see Figure A.19). The manufacturing share fell further recently to a low of 5.14% in 2014 with a slight recovery to 5.33% in 2015. The movement into services, however, is not really a "service revolution" as seen from Figure A.20. Almost all of the labor that moved into services was employed in low- and average-productivity services, with a productivity of one-tenth and one-half of that of high-productivity services. This experience of Ghana is not atypical.

A.2.2 Premature Deindustrialization in Nigeria

The Nigerian economy shows patterns very similar to that of Ghana. It has grown at a rate of 6.8% over the last decade (Ajakaiye et al., 2016). Like Ghana, Nigeria is a resource-rich economy with its oil sector accounting for 20%-30% of its GDP, 70% of government revenues, and 85% of its exports. As Ajakaiye et al. (2016) further note, the Nigerian economy is "transforming from an agrarian economy to a tertiary service economy without undergoing the intermediate stage of industrialization... ...so-called 'tertiarization' that has so far failed to deliver quality jobs." This trend towards tertiarization is clearly evident from Figure A.21 which shows the share of services rising from 18% in 1970 to 44% in 2014. Wholesale and retail is the second major sector, behind agriculture, contributing to "20% of nonpetroleum GDP (or about 15% of total GDP)" (Adeyinka et al., 2017). In contrast, the share of manufacturing has fallen from 12% to 6% over the same period confirming the

FIGURE 4.4 **Bypassing industry and into services**

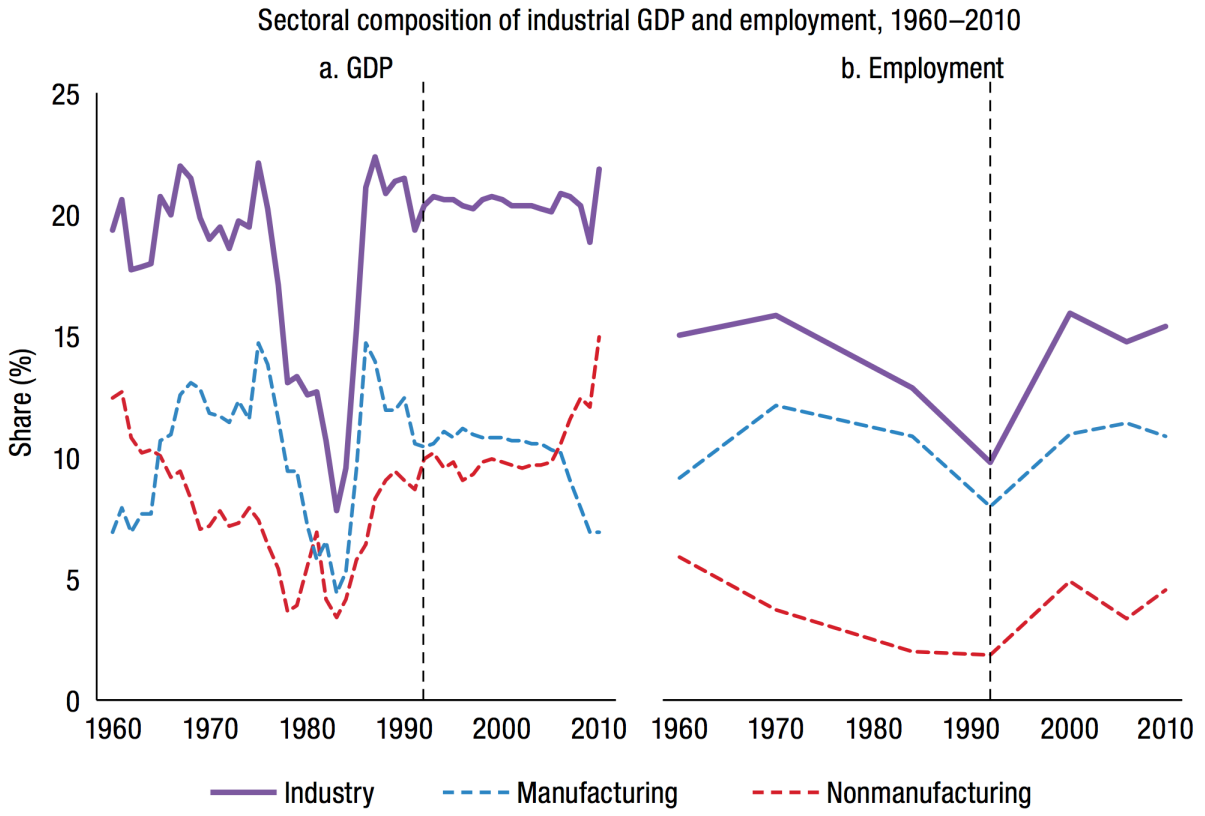


Source: Economic Surveys of Ghana (CBS 1961–1982); Population and Housing Censuses 1960, 1970, 1984, 2000, and 2010 (GSS various years); Ghana Living Standards Surveys 1991–1992 and 2005–2006 (GSS 1995, 2008); Singal and Nartey (1971); Androe (1981); Ewusi (1986); GSS (2010); and World Bank (2010).

Note: This figure plots the sectoral composition of GDP and employment, using the same three sectors. Data for both figures are available for the following years: 1960, 1970, 1984, 1992, 2000, 2006, and 2010. The vertical dashed line in both figures is for 1992, the year when the nature of structural change was modified in Ghana.

Figure A.18: Ghana: Structural Transformation 1960-2010
Source: Oesi and Jedwab, "Structural Change in a Poor African Country: New Historical Evidence from Ghana," Chapter 4 in *Structural Change, Fundamentals, and Growth: A Framework and Case Studies*: 2017

FIGURE 4.6 No big move into manufacturing

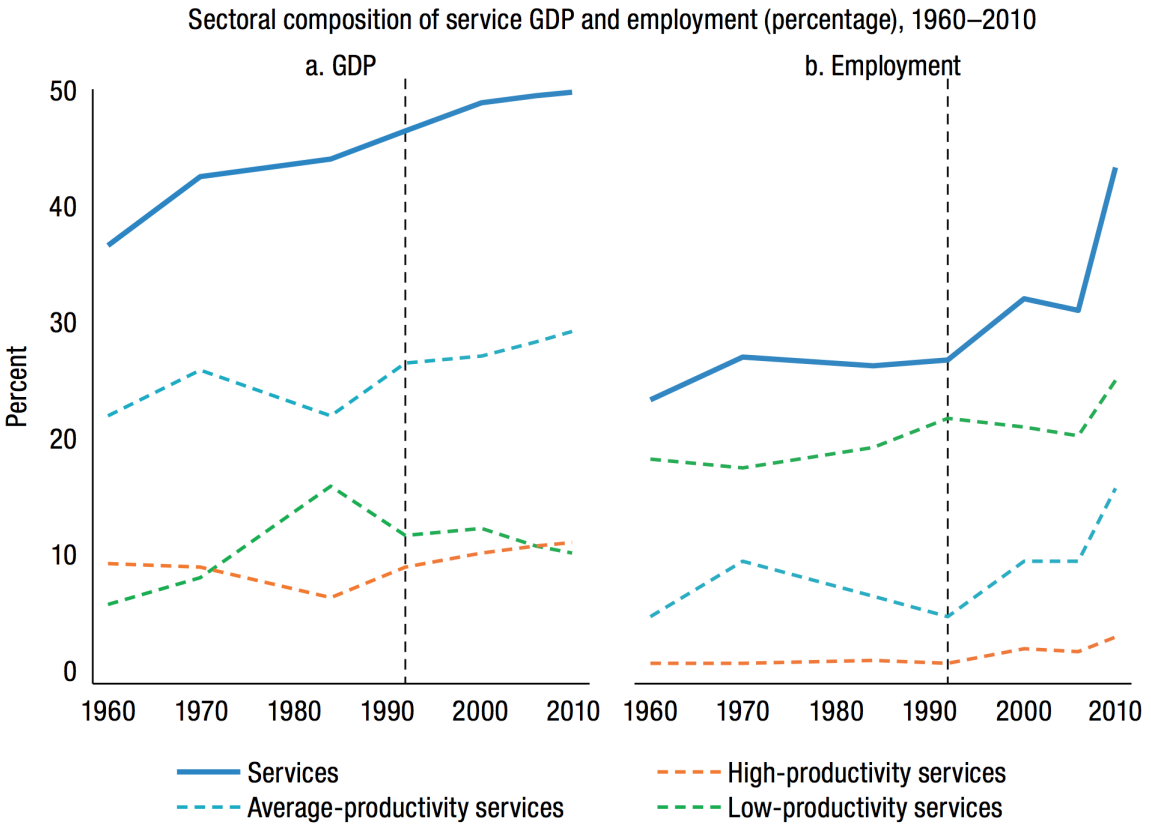


Source: Economic Survey of Ghana (CBS 1961–1982); Population and Housing Censuses 1960, 1970, 1984, 2000, and 2010 (GSS various years); Ghana Living Standards Surveys 1991–1992 and 2005–2006 (GSS 1995, 2008); Singal and Nartey (1971); Androe (1981), Ewusi (1986); GSS (2010); and World Bank (2010).

Note: Panel (a) plots the sectoral composition of industrial gross domestic product (GDP), when distinguishing manufacturing from other industrial subsectors ("mining," "construction," and "public utilities"). Panel (b) plots the sectoral composition of industrial employment, using the same subsectors. Employment data are available for the following years: 1960, 1970, 1984, 1992, 2000, 2006, and 2010. The vertical dashed line is for the year 1992, the year in which the nature of structural change was modified in Ghana.

Figure A.19: Ghana: Sectoral Decomposition of industrial GDP and employment 1960-2010
Source: Oesi and Jedwab, "Structural Change in a Poor African Country: New Historical Evidence from Ghana," Chapter 4 in *Structural Change, Fundamentals, and Growth: A Framework and Case Studies*: 2017

FIGURE 4.8 Not really a "service revolution"



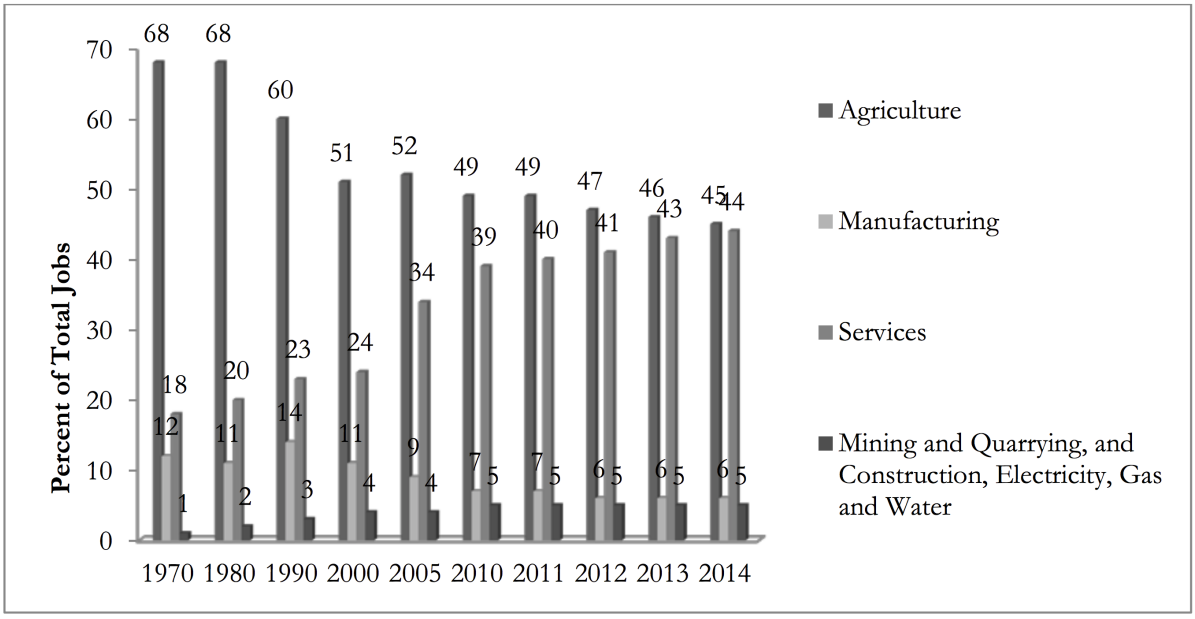
Source: Economic Survey of Ghana (CBS 1961–1982); Population and Housing Censuses 1960, 1970, 1984, 2000, and 2010; Ghana Living Standards Surveys 1991–1992 and 2005–2006 (GSS 1995, 2008); Singal and Nartey (1971); Androe (1981); Ewusi (1986); GSS (2010); and World Bank (2010).

Note: Panel (a) plots the sectoral composition of service gross domestic product (GDP), when distinguishing the low-productivity service subsectors (wholesale and retail trade, and community, social, and personal services); the average productivity service subsectors (government services, transport and storage, and hotels and restaurants); and the high-productivity service subsectors (communications, and finance, insurance, real estate, and business services). Panel (b) plots the sectoral composition of service employment, using the same subsectors. GDP and employment data are available for the following years: 1960, 1970, 1984, 1992, 2000, 2006, and 2010.

Figure A.20: Ghana: Sectoral Decomposition of industrial GDP and employment 1960-2010
Source: Oesi and Jedwab, "Structural Change in a Poor African Country: New Historical Evidence from Ghana," Chapter 4 in *Structural Change, Fundamentals, and Growth: A Framework and Case Studies*: 2017

pattern of premature deindustrialization (Ajakaiye et al., 2016).

Figure 2: Trends of employment by economic activity (shares), 1970–2014



Source: Authors' computation from underlying data obtained from NISER (2015).

Figure A.21: Nigeria: Sectoral Decomposition of Employment 1970-2014
Source: Ajakaiye, Jerome, Nabena, and Alaba, "Understanding the Relationship between Growth and Employment in Nigeria," *Brookings Institution Working Paper*: May, 2016

A.2.3 Failed Industrialization in Botswana

We conclude this section with a discussion of Botswana. Like Ghana and Nigeria, Botswana is a resource rich country with exports dominated by diamonds that were discovered soon after its independence. Over the period from 1960 to 1990, its GDP grew at a dramatic rate of 12 percent per year and, in 2005, it joined the ranks of upper-middle-income countries (McCaig and Pavcnik, 2017). Yet, it has performed worse than both Ghana and Nigeria in terms of manufacturing, becoming more a case of failed industrialization rather than premature deindustrialization. The share of manufacturing in GDP has risen very slowly from 1.4% in 1960 to 6.6% in 2010. In contrast, its share of services has risen from 8.5% to 50.6% of GDP over the same period, with the share of wholesale and retail trade in GDP rising by a whopping 18.2 percentage points. This particularly disappointing performance of Bostwana is a result of several factors: its geographic disadvantage (being a landlocked

country); its close economic integration with a much more developed country, namely, South Africa; and finally, the trade liberalization initiated by the Southern African Customs Union (SACU), of which it has been a member since 1994, following the collapse of apartheid in South Africa.

A.3 The Middle Income Trap: Latin America

Brazil and Mexico, having reached middle-income status, have since experienced a slowdown in productivity. A contributor to this slowdown in productivity was their reliance on import substitution in the development of manufacturing. While such policies can encourage structural change by recruiting cheap labor from agriculture to work in relatively low human capital intensive manufacturing jobs, there are limits to the productivity enhancements of this strategy. The choices of which goods to produce largely involves imitation of existing goods and production processes, which can lead to domestically produced goods that are inferior in quality to those traded in international markets. Once the limits of domestic demand for these goods is exhausted, with the depletion of cheap labor moving into the urban areas, there is little room for additional expansion of output. A strategy that focuses on developing the economic fundamentals to promote the export of tradable goods is needed to escape the middle-income malaise into which these economies have entered.

Not everyone agrees with the middle-income trap scenario. Han and Wei (2016) provide evidence that *on average* LICs take longer to emerge into middle-income status than do middle-income economies in attaining high-income status, and that there doesn't appear to be any slowdown evident in these data. However, they emphasize the fact that there is a great deal of heterogeneity among the countries and the growth experiences differ widely, suggesting that some middle-income countries, if not falling into a *development trap*, are at least experiencing an *economic malaise*.

While the existence of an insidious development trap that has befallen a large number of middle-income economies is debatable, there is clear evidence that many middle-income economies have experienced a slowdown in total factor productivity (TFP) that has retarded growth. Figure A.22 illustrates the drag on economic growth estimated to have come from TFP in the decade of 1980-1990 for the larger Latin American economies of Brazil, Argentina, Peru, and Mexico. For Brazil and Mexico, this phenomenon is a particularly striking reversal from TFP's earlier positive contribution to growth from 1970-1980, which was a time of rapid industrialization.

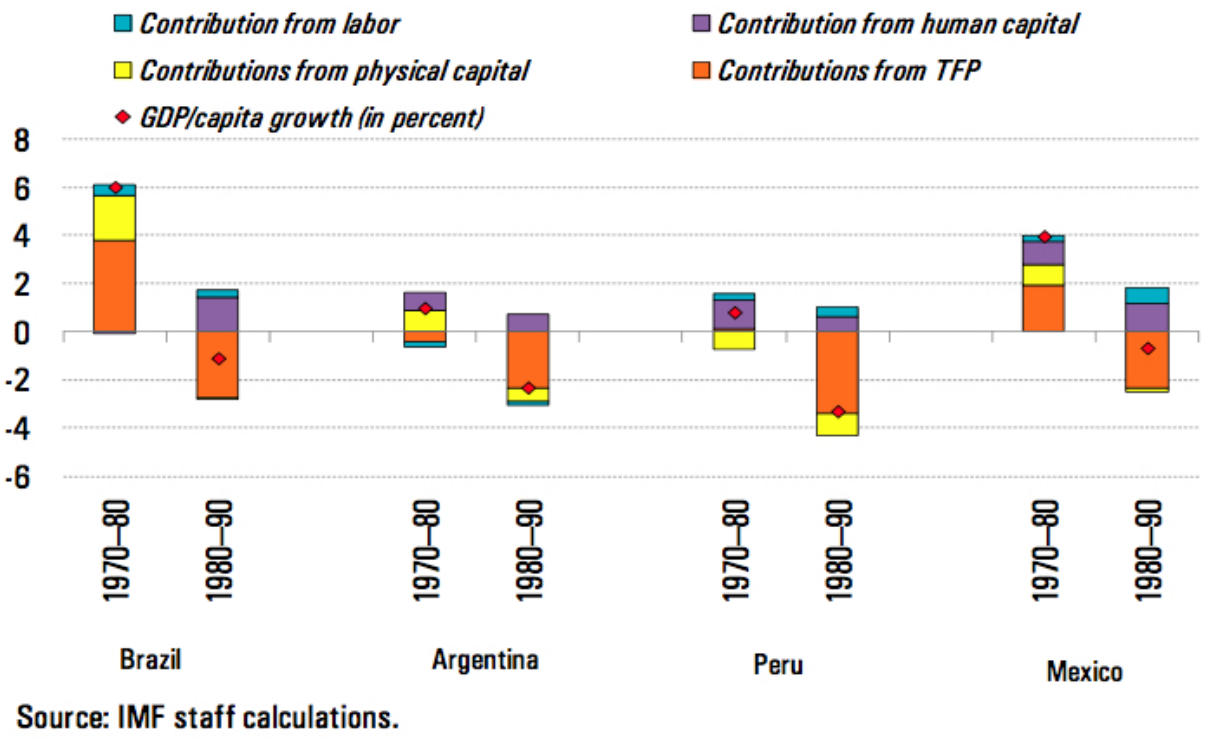


Figure A.22: Growth Trajectories for Middle-Income Countries
Source: Aiyar, Duval, Puy, Wu, and Zhang, "Growth Slowdowns and the Middle-Income Trap," *IMF Working Paper*: March, 2013

A.4 Role of High-Productivity (Tradable) Services: The Indian Experience

In the 1950s and 1960s, India entered into a period of rapid industrialization emphasizing import substitution to promote growth. However, this ISI strategy with lack of focus on the export market resulted in concentrating manufacturing on lower quality goods for which the demand relied on domestic consumption. As a result, India's structural transformation has not relied on a movement of labor from agriculture to manufacturing but rather from agriculture to services (see Figure A.22). From the 1960s to the early 2000s, the share of manufacturing in employment has barely increased from 9.8% to 12.4%, with a similar, marginal increase in its manufacturing's share in value added GDP (see Ahsan and Mitra, 2017). In contrast, the share of wholesale and retail trade increased from 4.88% to 8.27%, whereas that of transport and storage rose from 2.06% to 3.32% over the same period.

The share of high-productivity services (finance, insurance, real estate, and business

FIGURE 1.1a Agriculture accounts for about half of India's workers . . .

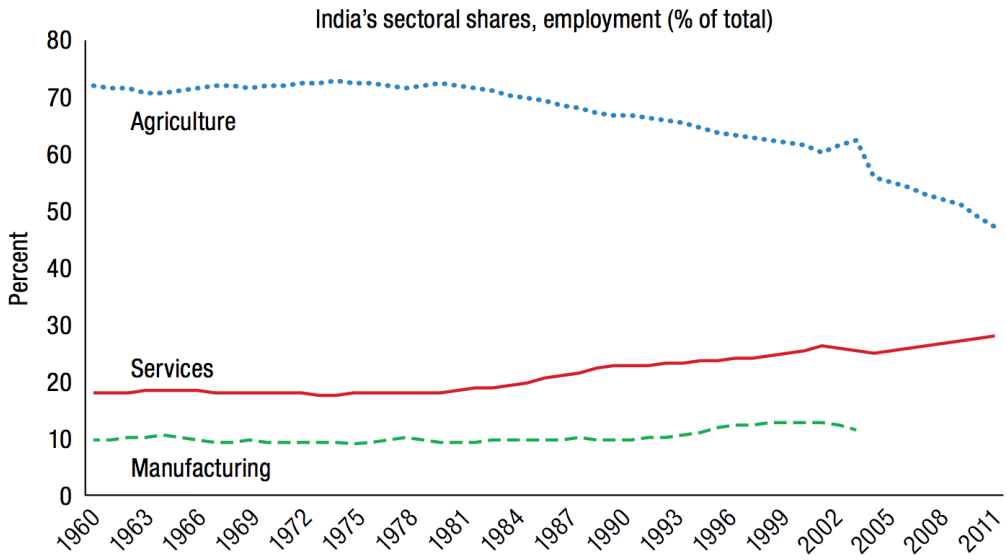
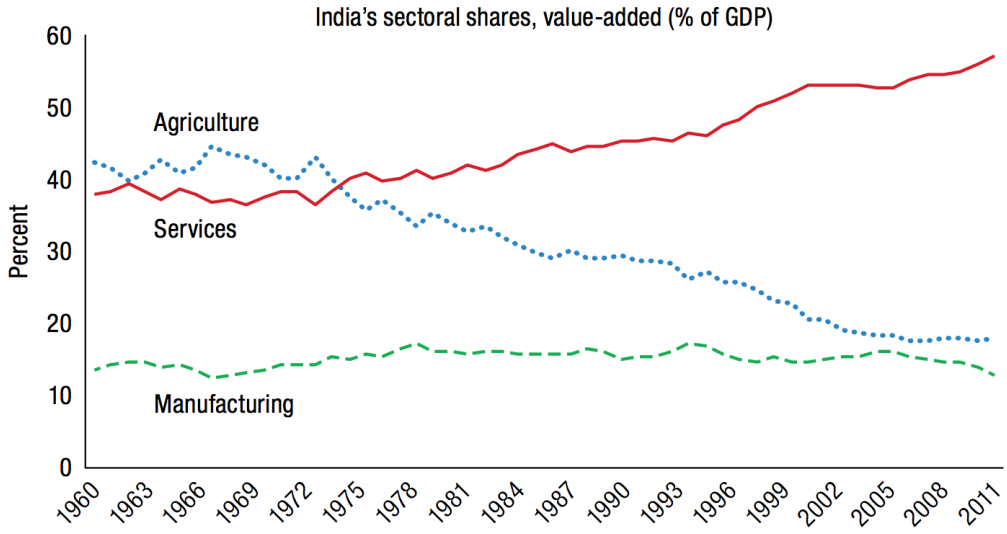


FIGURE 1.1b . . . but the growth in gross domestic product is coming from services



Source: Groningen Growth and Development Centre database, extended from 2004 to 2012, using the World Bank's World Development Indicators database (along with interpolations).

Note: The manufacturing employment share is only available for the period 1960–2004.

Figure A.23: India: Structural Transformation 1960-2010
Source: Ahsan and Mitra, "Can the Whole Actually be Greater than the Sum of Its Parts? Lessons from India's Growing Economy and Its Evolving Structure," Chapter 1 in *Structural Change, Fundamentals, and Growth: A Framework and Case Studies*: 2017

services) increased five-fold from 0.32% to 1.68%. Notably, this increase occurred mainly since 1990, as over the earlier decade (1980-1989), it still stood at 0.40%. As a result of this increase, India has been able to mitigate the adverse effects of a lack of continued industrialization and maintain a secular increase in per capita GDP over a period of 40 years (see Figure A.1) since it first attained the level of GDP per capita of $800 U.S. (in 2000 dollars). Furthermore, from 1990 to 2015, per capita GDP grew at a historically faster rate of 4.81%, with further acceleration to 5.63% since 2000.

High-productivity services, thus, have been a significant source of economic growth in the post-reform period beginning in 1991. India's successful services-led path of economic growth has been an outcome of the confluence of a number of disparate, some purely accidental, historical and contemporary, factors impinging on its private and public fundamentals. As a result of an emphasis on the development of scientific and technical knowledge and manpower since independence in 1947, India had access to technology and a large pool of technically proficient workers, which, due to the historical accident of British rule, was also fluent in English. There was also a large Indian diaspora in world centers of information technology (particularly, the United States) due to the brain drain of past decades. This network of professionals provided a strong tailwind to the rise of India's services exports and resultant economic growth due to the fear arising out of the Y2K bug during the late 1990s. These positive private fundamentals and idiosyncratic factors were aided by liberalization of the information and communications sectors by government beginning in the mid-1980s. Most importantly, the development of the IT sector was free from the shackling effect of the hitherto extant License-Permit Raj on the traditional industrial sector. Finally, the IT revolution could also bypass other dimensions of the inferior physical infrastructure, which the industrial sector could not.

Notwithstanding the strong economic growth generated by the high-productivity IT services sector, from an important perspective of structural transformation, namely, the pattern of sectoral reallocation of labor, the growth experience has been lackluster at best. The employment in high-productivity services has risen a measly 1.28 percentage points compared to a 4.91 percentage points increase in employment in other services (construction, wholesale and retail, and transport and storage, and excluding community and social services), where the productivity is one-third to one-fifth of that of their high-productivity (communication and IT) counterpart.

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