Structural Transformation around the World: Patterns and Drivers

Kunal Sen*

The conventional view of structural transformation is informed by three stylized facts of economic development: (i) all economies exhibit declining employment in agriculture, (ii) all economies exhibit a hump-shaped share of employment in industry, and (iii) all economies exhibit an increasing share of employment in services. In this paper, I show that this presumed path of structural transformation may no longer be the route to economic development in low-income economies. Classifying economies as either structurally developed, structurally developing, or structurally underdeveloped, I observe a different path of structural transformation in structurally underdeveloped economies in which workers are moving directly from agriculture to nonbusiness services, which as a sector does not have the same productivity gains as manufacturing. I also show that the mainstream approach is unable to explain the patterns of structural transformation observed in low-income developing economies. This suggests the need to rethink the theoretical premises behind much of the mainstream approach to structural transformation and to identify alternate causal mechanisms to explain the different types of structural transformation underway in the developing world.

I. Introduction

Economists have long searched for patterns that relate successful economic development to structure and policy (Syrquin and Chenery 1989). This comparative approach in development economics was initiated by Simon Kuznets and predicated on "the existence of common, transnational factors and a mechanism of interactions among nations that will produce some systematic order in the way modern economic growth can be expected to spread around the world" (Kuznets 1959, 170). One of the most striking findings of this comparative approach to economic development was the "universal inverse association of income and the share of agriculture in income and employment" (Syrquin and Chenery 1989, 172).

As Kuznets argued, one of the key features of modern economic growth was the movement of workers from agriculture to manufacturing and services (Kuznets 1966). The comparative approach identified the manufacturing sector as the engine of economic growth for most economies and the rate at which industrialization occurred differentiated successful economies from unsuccessful ones (McMillan, Rodrik, and Verduzco-Gallo 2014; Haraguchi, Cheng, and Smeets 2017). However, at a certain stage of economic development, as productivity growth in manufacturing exceeds productivity growth in agriculture and services, and as demand for services expands, the service sector becomes the major provider of employment, and the manufacturing sector lessens in importance in terms of providing employment, though not in terms of output growth (Chenery and Syrquin 1975, Syrquin 1988, Syrquin and Chenery 1989).

The movement of workers from agriculture to manufacturing to services has been the path of structural transformation in all economies that comprise the high-income club as well as the pattern of successful growth in East Asia. This path of structural transformation has received a great deal of attention among economists and underpins most of the theoretical understanding of structural transformation—all the way from scholars in classical economics such as Kuznets, Lewis, Chenery, and Syrquin to more modern approaches that are rooted in the neoclassical tradition (see, for example, Duarte and Restuccia 2010; Dabla-Norris et al. 2013; Herrendorf, Rogerson, and Valentinyi 2014; McMillan, Rodrik, and Verduzco-Gallo 2014; Diao, McMillan, and Rodrik 2017). However, as will be documented, this path of structural transformation may no longer be the route to economic development among low-income economies. Instead, I observe a different path of structural transformation where workers are moving directly from agriculture to nonbusiness services, which as a sector does not have the same productivity gains observed in manufacturing. If this is the path of structural transformation that we are likely to see in the developing world, especially among the poorest economies, what implications does this have for our conventional view of structural transformation? What are the implications of the direct movement of workers from agriculture to nonbusiness services for economic growth? What are the drivers of such an alternate path of structural transformation? How well does the mainstream approach to structural transformation explain recent patterns, especially in low-income economies?

In this paper, I first review the recent theoretical approach to structural transformation in the mainstream literature. I then document the patterns of structural transformation observed in developing and developed economies. I then examine the implications of different paths of structural transformation for economic growth. I next examine the drivers of the alternate paths of structural transformation. Finally, I take a prototype mainstream model of structural transformation—Duarte and Restuccia (2010)—and examine how well the model does in explaining patterns of structural transformation.

II. Theoretical Perspectives on Structural Transformation

In the 1950s, led by economists like Hollis Chenery, Moses Syrquin, and Simon Kuznets, a program of research was developed to understand the features and preconditions of modern economic growth (Lewis 1954, Chenery and Syrquin 1975, Syrquin 1988). Core to this research was the interest in understanding "the interrelated processes of structural change that accompany economic development . . . jointly referred to as structural transformation" (Syrquin 1988, 206). One of the most robust findings from this program of research was that "in the economies where per capita income grew significantly, the proportion of the labour force engaged in agriculture declined and that engaged in nonagriculture increased" (Kuznets 1965, 24). Kuznets also noted that, in more advanced economies, "the shares of mining and manufacturing in the total labour force grew significantly, but the increases have ceased or slowed down in recent decades . . . the shares of trade and other services have grown steadily in recent decades" (Kuznets 1965, 25).

A more recent analysis of the pattern of structural transformation is provided by Duarte and Restuccia (2010), who use sectoral employment data for 29 high- and middle-income economies that are obtained from the EU KLEMS data and the International Labour Organization's LABORSTA database (ILOSTAT). Duarte and Restuccia (2010) find that "all economies in the sample follow a common process of structural transformation. First, all economies exhibit declining shares of hours in agriculture, even the most advanced economies in this process, such as the United Kingdom and the United States (US). Second, economies at an early stage of the process of structural transformation exhibit a hump-shaped share of hours in industry, whereas this share is decreasing for economies at a more advanced stage. Finally, all economies exhibit an increasing share of hours in services" (Duarte and Restuccia 2010, 135). They go on to state: "The processes of structural transformation observed in our sample suggest two additional observations. First, the lag in the structural transformation observed across economies is systematically related to the level of development: poor economies have the largest shares of hours in agriculture, while rich economies have the smallest shares. Second, our data suggest the basic tendency for economies that start the process of structural transformation later to accomplish a given amount of labor reallocation faster than those economies that initiated this process earlier" (Duarte and Restuccia 2010, 135).

A.   The Neoclassical (Mainstream) Approach to Structural Transformation

The workhorse model of economic growth is the Solow–Swan model, which by its very nature, abstracts from sectoral allocation issues in the process of economic development, focusing on the role of capital accumulation and technological change in the aggregate. As Herrendorf, Rogerson, and Valentinyi

(2014) note: "The one-sector growth model has become the workhorse of modern macroeconomics. The popularity of the one-sector growth model is at least partly due to the fact that it captures in a minimalist fashion the essence of modern economic growth, which Kuznets (1973) in his Nobel prize lecture described as the sustained increase in productivity and living standards. By virtue of being a minimalist structure, the one-sector growth model necessarily abstracts from several features of the process of economic growth. One of these is the process of structural transformation, that is, the reallocation of economic activity across the broad sectors agriculture, manufacturing and services" (Herrendorf, Rogerson, and Valentinyi 2014, 855).

For a long time, there was limited interest in the question of structural transformation in the neoclassical school of economics. This changed in the 2000s, with a series of path-breaking papers that developed multisector versions of the one-sector growth model that were consistent with the stylized facts of structural transformation, such as Rogerson (2007); Ngai and Pissarides (2007); Duarte and Restuccia (2010); and Herrendorf, Rogerson, and Valentinyi (2014). Two classes of models were developed: (i) one where the causal explanation was technological in nature and which attributed structural transformation to different rates of sectoral total factor productivity growth, and (ii) a utility-based explanation that required different income elasticities for different goods and could yield structural transformation even with equal total factor productivity growth across all sectors.

Here, we describe a model of structural transformation that combines both of these explanations. The model is drawn from Duarte and Restuccia (2010).

B. A Model of Structural Transformation

In the Duarte and Restuccia (2010) model, there are three sectors—agriculture (a), manufacturing (m), and services (s)—which are produced using constant returns-to-scale production functions. Sector-specific technology is given by A_i, where i is agriculture, manufacturing, and services.

The model assumes a continuum of homogenous firms in each sector that are competitive in goods and factor markets. The representative household is endowed with L units of labor, which is supplied inelastically to the market. The representative household consumes agricultural goods (c_a) and a composite nonagricultural good comprising manufacturing (c_m) and services goods (c_s). The model assumes a closed economy and abstracts from intertemporal optimization (hence, the model is static and the problem of the household is effectively a sequence of static problems).

The per period utility is given by

$$u(c_{a,t}, c_t) = a \log(c_{a,t} - \bar{a}) + (1 - a) \log(c_t), \quad a \in [0, 1] \tag{1}$$

The subsistence level of agricultural goods below which the household cannot survive is given by $\bar{a} > 0$. The composite nonagricultural good (c_t) is given by

$$c_t = [bc_{m,t}^{\rho} + (1 - b)(c_{s,t} + \bar{s})^{\rho}]^{1/\rho} \tag{2}$$

where $\bar{s} > 0$, b is between 0 and 1, and $\rho < 1$. For $\bar{s} > 0$, these preferences imply that the income elasticity of services is greater than 1. Therefore, $\bar{s}$ works as a negative subsistence consumption level: when the income of the household is low, fewer resources are allocated to the production of services, and when the income of the household rises, resources are reallocated to services.

Both product and labor markets clear, so that $L_a + L_m + L_s = L$ and $c_a = Y_a$, $c_m = Y_m$, and $c_s = Y_s$. The first-order conditions for consumption imply that the optimal labor input in agriculture (L_a) is given by

$$L_a = (1 - a)\frac{\bar{a}}{A_a} + a\left(L + \frac{\bar{s}}{A_s}\right) \tag{3}$$

When $a = 0$, the household consumes $\bar{a}$ of agricultural goods each period, and labor allocation in agriculture depends on the level of labor productivity in that sector. As labor productivity in agriculture increases, labor moves away from the agriculture sector.

The first-order conditions for consumption of manufacturing and service goods imply that

$$L_m = \frac{(L - L_a) + \bar{s}/A_s}{1 + x}, \tag{4}$$

where

$$x \equiv \left(\frac{b}{1 - b}\right)^{1/(\rho-1)}\left(\frac{A_m}{A_s}\right)^{\rho/(\rho-1)}$$

This equation reflects the two forces that drive labor reallocation between manufacturing and services in the model. The technological explanation will stress the role of differential productivity growth in explaining structural transformation. This is evident if we assume homothetic preferences (that is, $\bar{s} = 0$). In this case, $L_m/L_s = 1/x$ and differential productivity growth in manufacturing relative to services is the only source of labor reallocation between these sectors as long as ρ is not equal to 0. In particular, when $\bar{s} = 0$, the model can be consistent with the observed reallocation of labor from manufacturing to services as labor productivity grows in manufacturing relative to services and as long as the elasticity of substitution between manufacturing and services is low. The second explanation is the utility-based explanation, which is evident if $\bar{s} > 0$ (that is, preferences are nonhomothetic) and labor productivity grows at the same rate in manufacturing and

services, or $\rho = 0$, so that x is constant. Here, for a given L_a there is a reallocation of labor from manufacturing to services as the latter is more income elastic than the former, per the so-called Engel effects (see, for example, Clark 1940).

III. Paths of Structural Transformation

A. Data

The data on structural transformation come from the Groningen Growth and Development Centre (GGDC) database of the University of Groningen (Timmer, de Vries, and de Vries 2015). The GGDC data are widely used in the recent literature on structural transformation (see, for example, Diao, McMillan, and Rodrik 2017; Comin, Lashkari, and Mestieri 2018). There are 41 economies in the database, which includes annual disaggregated data on real value added and employment by sector from 1960 to 2012. For the purpose of this paper, the GGDC data provide information on manufacturing and nonmanufacturing industries (construction, mining, and utilities) separately, as well as disaggregated data on services by type of sector (business services, government services, trade, and hotels and restaurants, among others). Table A1 in the Appendix provides details on the 10 sectors in the GGDC data. Employment is defined as "all persons employed," including all paid employees, as well as self-employed and family workers.

The GGDC dataset includes 12 African economies (including North Africa), 9 Latin American economies, 11 Asian economies (including Japan), and the US, with the rest coming from Europe. A key strength of the employment data is that the source for each economy is the population census, which ensures full coverage of the working population as well as a precise sectoral breakdown. The population census, which tends to be quinquennial or decennial in most economies, is supplemented by the labor force surveys and the business surveys to derive annual trends. The use of the population census also ensures that informal employment, which is important in many low- and middle-income economies, is captured in the GGDC data. Another feature of the data is the careful attention paid to intertemporal, international, and internal consistency (Timmer and de Vries 2009; Diao, McMillan, and Rodrik 2017). This differentiates the quality of the data from other sources of employment data, such as ILOSTAT, which compiles data directly obtained from economy sources without the consistency checks undertaken by GGDC.[1] The GGDC data has two limitations: (i) limited coverage of low-income economies; and (ii) Egypt and Morocco do not report disaggregated employment

---

[1]An alternate source of employment data are the labor force surveys (e.g., ILOSTAT). Though labor force surveys are conducted more frequently than the population census, the data are often not representative in many developing economies and are sometimes restricted to particular areas, such as urban areas. See Baymul and Sen (2019) for a discussion of the limitations of ILOSTAT.

data for community, social, and personal services. I exclude these two economies from the sample, leaving 39 economies.[2]

I categorize economies by the different stage of structural transformation that they are in. The first set of economies are those where agriculture is still the largest sector in terms of the share of employment in the most recent period available. In our sample, these economies are Ethiopia, India, Kenya, Malawi, Nigeria, Senegal, Tanzania, and Zambia. These economies are almost all in sub-Saharan Africa, with India the only exception. These economies are considered structurally underdeveloped. The next set of economies are those where more people are employed in the service sector than in agriculture, with agriculture being the second-largest sector. These economies—Bolivia, Botswana, Brazil, Colombia, Costa Rica, Ghana, Indonesia, the People's Republic of China, Peru, the Philippines, South Africa, and Thailand—are called structurally developing economies. These economies span Africa, Asia, and Latin America. The final set of economies are those with more people employed in the manufacturing sector than in agriculture. The economies in the sample from Africa, East Asia, and Latin America include Argentina; Chile; Hong Kong, China; Malaysia; Mauritius; Mexico; the Republic of Korea; Singapore; Taipei,China; and Venezuela. This set also includes advanced market economies from Europe—Denmark, France, Italy, Japan, the Netherlands, Spain, Sweden, and the United Kingdom—as well as the US. These economies are known as structurally developed. Table 1 provides a list of economies by stage of structural transformation.[3]

B. Paths of Structural Transformation

Figure 1 plots the share of employment in each major sector—agriculture, manufacturing, nonmanufacturing industry, business services, and nonbusiness services—in total employment over time for all 39 economies. As expected, the share of employment in agriculture falls steadily over time. The share of manufacturing employment exhibits an inverted U-shaped behavior, again as expected. The share of employment in nonbusiness services shows a steady increase. There is virtually no change in the share of employment in nonmanufacturing industry. The share of employment in business services shows a sharp increase after the 1990s.

---

[2]An additional limitation of the dataset is that it does not differentiate between informal and formal employment in the manufacturing and service sectors.

[3]I experimented with an alternate approach to classifying economies by stages of structural transformation by using the share of employment in agriculture in the last period available as the sorting criteria. Using this criteria, economies are classified as structurally developed if their share of employment in agriculture is below 10%, structurally developing if their share of employment in agriculture is between 10% and 50%, and structurally underdeveloped if their share of employment in agriculture is above 50%. I did not find any difference in the findings using this criteria of classifying economies in different stages of structural transformation. Note that using the share of employment in manufacturing instead of agriculture as a way to classify economies is misleading, as manufacturing employment shares had peaked in many economies by the beginning of the review period.

Table 1. **Stages of Structural Transformation—Economy Classification**

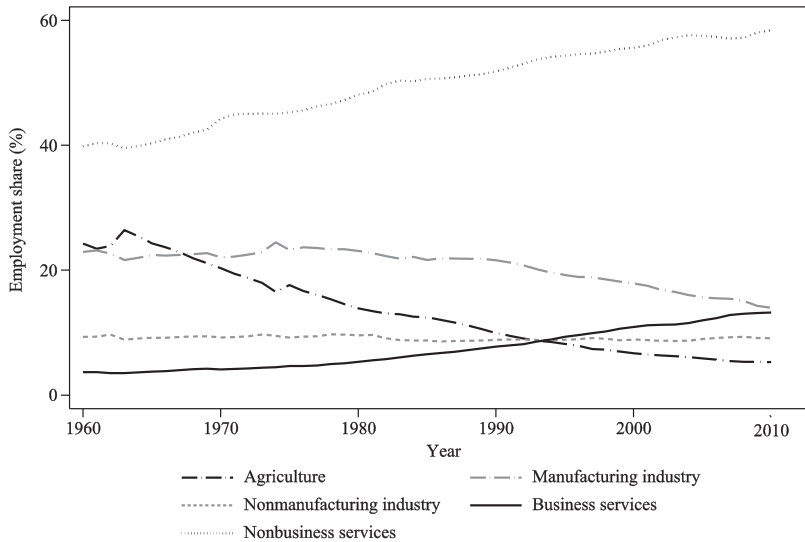| Structurally Underdeveloped (8)	Structurally Developing (12)	Structurally Developed (19)
Ethiopia	Bolivia	Argentina
India	Botswana	Chile
Kenya	Brazil	Denmark
Malawi	Colombia	France
Nigeria	Costa Rica	Hong Kong, China
Senegal	Ghana	Italy
Tanzania	Indonesia	Japan
Zambia	People's Republic of China	Malaysia
	Peru	Mauritius
	Philippines	Mexico
	South Africa	Netherlands
	Thailand	Republic of Korea
		Singapore
		Spain
		Sweden
		Taipei,China
		United Kingdom
		United States
		Venezuela

Source: Author's compilation.

Figure 1. **Share of Employment by Major Sector, All Economies**
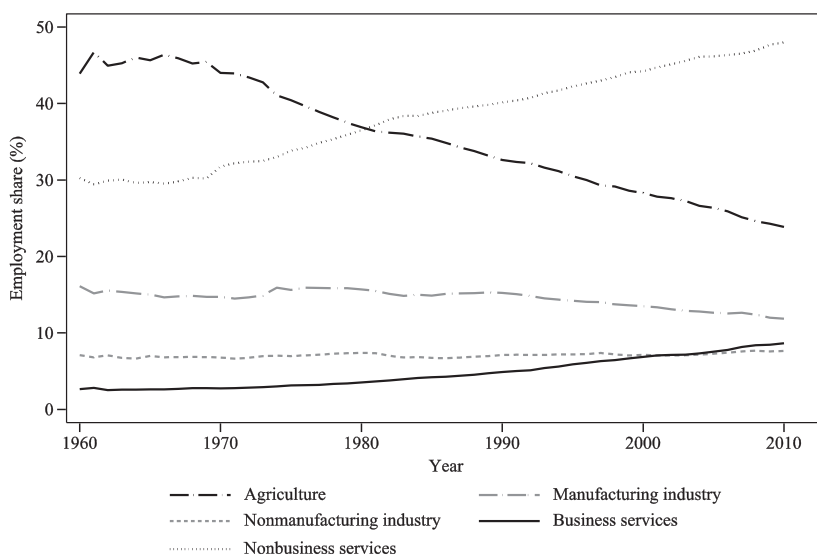
Note: Share of employment by sector in total employment.
Source: Author's calculations based on GGDC data.

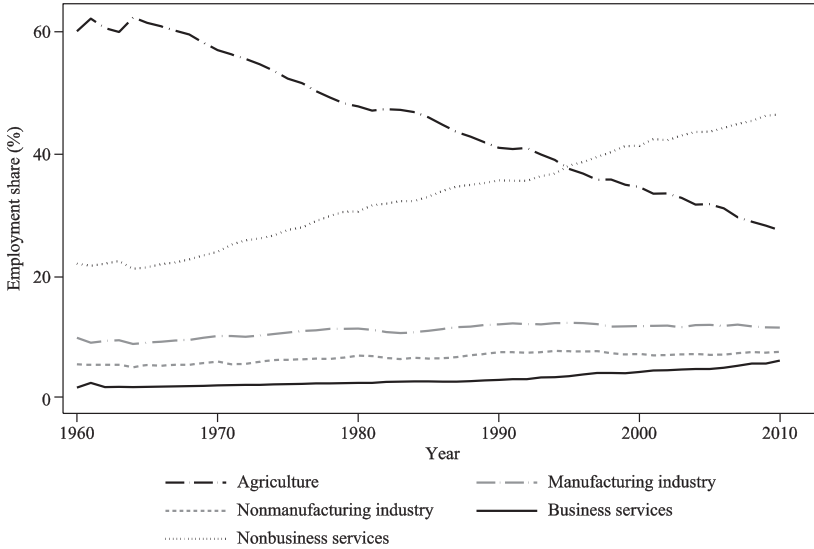Figure 2. **Share of Employment by Major Sector, Structurally Developed Economies**

Note: Share of employment by sector in total employment.
Source: Author's calculations based on GGDC data.

Figure 2 shows the pattern of structural transformation for structurally developed economies. The share of employment in agriculture was low to start with at the beginning of the review period and falls below 10% by the end of the period. The share of employment in nonbusiness services increases from around 40% to around 60% of total employment. The manufacturing employment share, which had already peaked for most of these economies prior to 1960, shows a steady decline. Strikingly, the share of employment in business services rises steadily to the point where it has almost reached the level of the share of manufacturing employment by the end of the review period. The share of employment in nonmanufacturing industry shows no clear trend in the period under consideration.

Figure 3 shows the pattern of structural transformation for structurally developing economies. There is a remarkable fall in the share of employment in agriculture from around 60% in 1960 to around 30% in 2010. This is matched by a corresponding increase in employment in nonbusiness services from just over 20% to over 40% of total employment. The manufacturing employment share shows a gradual increase, and the share of employment in business services increases beginning in the 1990s. There is no perceptible change in the share of employment in nonmanufacturing industry.

Finally, Figure 4 shows the pattern of structural transformation for structurally underdeveloped economies. A remarkable feature of structural transformation in these economies is the very slow movement of workers out of

Figure 3.   **Share of Employment by Major Sector, Structurally Developing Economies**

Note: Share of employment by sector in total employment.
Source: Author's calculations based on GGDC data.

Figure 4.   **Share of Employment by Major Sector, Structurally Underdeveloped Economies**
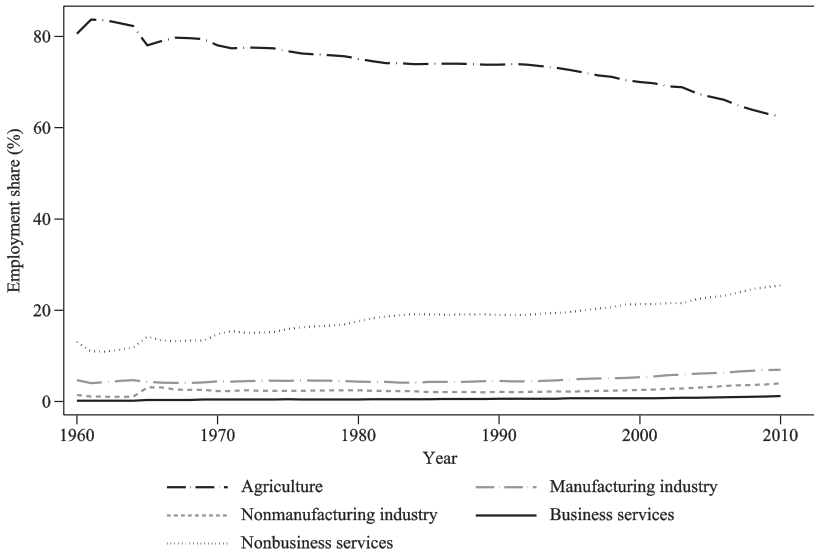
Note: Share of employment by sector in total employment.
Source: Author's calculations based on GGDC data.

Table 2. **Patterns of Structural Transformation: Employment Shares by Sector (%)**

Economy Group	Period	Agriculture	Manufacturing Industry	Non-manufacturing Industry	Business Services	Non-business Services
Underdeveloped	1960–1979	78.2	4.4	2.3	0.4	14.6
	1980–1999	73.3	4.5	2.2	0.6	19.3
	2000–2012	66.4	6.2	3.2	1.0	23.1
Developing	1960–1979	56.3	10.3	6.0	2.3	25.1
	1980–1999	42.0	11.9	7.3	3.4	35.5
	2000–2012	31.1	12.0	7.5	5.3	44.1
Developed	1960–1979	20.1	22.8	9.4	4.2	43.4
	1980–1999	10.4	20.9	8.9	7.8	52.1
	2000–2012	5.9	15.8	9.0	12.1	57.2

Note: Unweighted averages as percentages of total employment.
Source: Author's calculations based on GGDC data.

agriculture. These workers mostly go to the nonbusiness service sector and not to manufacturing, which shows no clear increase in employment share. The share of employment in business services is very low as well. The share of employment in nonmanufacturing industry shows no clear trend in the period under consideration.

Table 2 summarizes the information provided in Figures 1–4. It shows the very slow movement of workers away from the agriculture sector in structurally underdeveloped economies: from a 78% employment share in 1960–1979 to 66% in 2000–2012. These economies also saw a very slow increase in the share of employment in manufacturing from 4% in 1960–1979 to 6% in 2000–2012. In the case of structurally developing economies, the average share of employment in services overtakes employment in agriculture only in the period 2000–2012. Nevertheless, these economies experience a rapid decline in the share of employment in agriculture from 56% in 1960–1979 to 31% in 2000–2012, as well as an increase in the share of employment in manufacturing from 10% in 1970–1979 to 12% in 2000–2012. For structurally developed economies, the share of employment in agriculture was low to start with at 20% in 1960–1979. By the period 2000–2012, more workers are employed in nonmanufacturing industry in these economies than in agriculture, while services provide the largest employment share by far at 69%. Here, we observe a fall in the share of employment in manufacturing over time.

The share of employment in the five subsectors that make up the service sector—business, transport, trade, government, and personal—also differ between economy groups as well over time. All services except business services are classified as nonbusiness services.[4] There are three reasons to make a distinction between business and nonbusiness services. Firstly, as we will show later in the paper, the productivity of the business service sector far exceeds that of the nonbusiness service sector, and is comparable to the productivity of the

---

[4]More disaggregated data are available in Baymul and Sen (2019).

manufacturing sector. Secondly, the business service sector includes the more
tradable parts of the service sector (e.g., information technology), while the
nonbusiness sector broadly corresponds to the nontradable service sector. Thirdly,
most of the activity that occurs in the business service sector is in enterprises
that are in the formal sector (e.g., information technology firms and banks), while
a large part of the activity in the nonbusiness service sector is in the informal
sector—including self-employed or household enterprises in trade, hotels and
restaurants, and personal services (e.g., fruit and vegetable street vendors).[5] For
structurally underdeveloped economies, most of the growth of employment in the
service sector occurs in nonbusiness services rather than business services. This is
very different from what is experienced in structurally developing and developed
economies, where the most rapid increase in employment for any particular sector
is observed in the business service sector; for structurally developing economies,
it rises from 2% of total employment in 1960–1979 to 5% in 2000–2012, and for
developed economies, it rises from 4% to 12% during the same period (Table 2). In
contrast, the business service subsector remains a paltry 1% of total employment in
structurally underdeveloped economies during 2000–2012.

To ascertain whether or not the shares of employment in manufacturing,
business services, and nonbusiness services follow a clear trend, I regress the
share of employment in manufacturing on a time trend, averaging the data over
5-year periods. I also add the square of the time trend to account for the fact that
the manufacturing employment share peaks at some point along a country's path
of economic development. I do the same for business services and nonbusiness
services, except that here I do not add a time trend as there is no clear turning point
in these shares in the data. I first run the regressions for all economies and then
by structural economy groups. I estimate these equations using random effects and
report the results in Table 3.

For all economies, manufacturing employment exhibits an inverse U-shaped
behavior with time—the coefficient on the time trend is positive and significant,
while the coefficient on the square of the time trend is negative and significant,
both at the 1% level. Both business services and nonbusiness services' shares of
total employment show a clear increase over time for all economies. However,
the trend analysis by structural economy group shows clear differences in the rate
of change of the shares of employment in manufacturing, business services, and
nonbusiness services over time across the three economy groups (columns 1, 2, and
3). As expected, manufacturing employment's share of structurally underdeveloped
economies does not exhibit an inverted U-shaped behavior over time—when both
the time trend and its square are included in the regression, both are insignificant
(column 10). When only the time trend is included, it is positive and statistically

---

[5]The only exception here is the government sector where workers are usually in permanent jobs that are
reasonably well paying.

Table 3. **Trend Analysis of Paths of Structural Transformation**

	All			**Structurally Developed**			
	Manufacturing Employment	Business Services Employment	Nonbusiness Services Employment	Manufacturing Employment		Business Services Employment	Nonbusiness Services Employment
	(1)	(2)	(3)	(4)		(5)	(6)
Time trend	0.007*** (2.67)	0.007*** (21.15)	0.021*** (33.36)	0.008* (1.69)	—	0.011*** (30.13)	0.020*** (26.88)
Square of time trend	−0.0008*** (−3.83)	—	—	−0.001*** (−3.80)	—	—	—
Wald Chi-square	35.07***	447.17***	1106.05***	87.88***	—	907.52***	722.66***
No. of economies	39	39	39	19	—	19	19
No. of observations	408	408	408	198	—	198	198

	Structurally Developing			**Structurally Underdeveloped**			
	Manufacturing Employment	Business Services Employment	Nonbusiness Services Employment	Manufacturing Employment (1)	Manufacturing Employment (2)	Business Services Employment	Nonbusiness Services Employment
	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Time trend	0.011*** (4.13)	0.004*** (8.68)	0.026*** (31.24)	0.001 (0.60)	0.002*** (21.15)	0.0008*** (6.63)	0.011*** (7.02)
Square of time trend	−0.0008*** (−2.90)	—	—	0.0001 (0.39)	—	—	—
Wald Chi-square	40.52***	75.36***	976.14***	17.92***	18.01***	43.92***	49.21***
No. of economies	12	12	12	8	8	8	8
No. of observations	128	128	128	82	82	82	82

Notes: *** indicates level of significance at the 1% level. t statistics are in brackets. Employment shares as dependent variables range from 0 to 1.
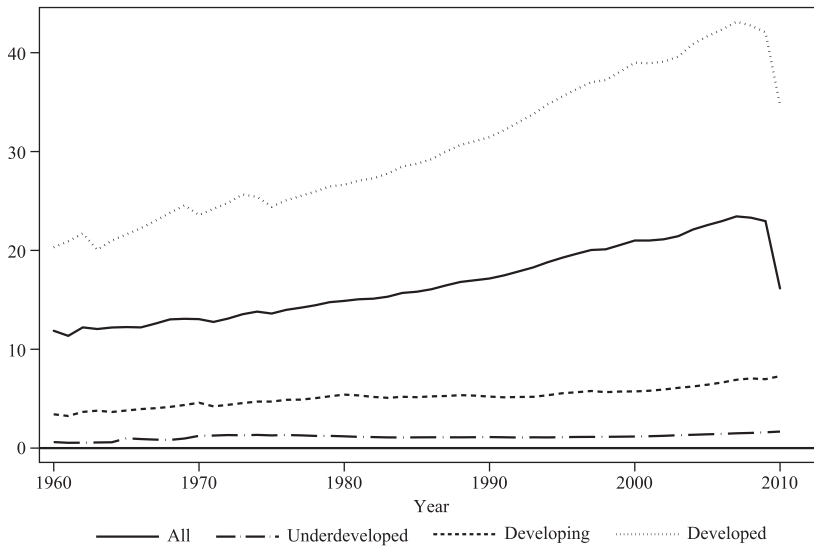Source: Author's calculations based on GGDC data.

significant, suggesting that there is movement into manufacturing for structurally underdeveloped economies over time (column 11). However, as indicated by the magnitude of the coefficients on the time trend variable, the movement into manufacturing is the weakest among all three economy groups, confirming what had been observed in Figures 1–4 (columns 4, 7, and 11). I also obtain a similar finding for the shares of employment of business services and nonbusiness services, where the rate of increase for structurally developing economies is far lower than that for structurally developed and underdeveloped economies (columns 5, 6, 8, 9, 12, and 13). Further, for structurally underdeveloped economies, the rates of increase of the manufacturing employment and business employment shares are significantly lower than that for the nonbusiness services employment share (columns 11, 12, and 13). In contrast, for structurally developing economies, the rate of increase in the manufacturing employment share is higher than that for the business services employment share.[6]

To sum up, different paths of structural transformation are observed in the historical employment data for 39 high-, middle-, and low-income economies. The high- and middle-income economies—which comprise the structurally developed and structurally developing set of economies, respectively—have mostly followed the conventional path of structural transformation in which workers move from agriculture to manufacturing and services first, and then out of manufacturing and into services. In contrast, the low-income economies, which are the structurally underdeveloped economies, exhibit the slow movement of workers out of agriculture; where this movement has occurred, it has mostly been to nonbusiness services rather than to manufacturing. I also observe a clear difference across the economy groups in terms of within-sector movement into services. While there has been a distinct movement of workers in structurally developed economies into business services along with nonbusiness services (and to a lesser extent in structurally developing economies), there is very little movement of workers into business services for structurally underdeveloped economies, with most of the movement to nonbusiness services. I will show later why this difference in the movement of workers into business versus nonbusiness services is important for understanding the long-term drivers of structural transformation and economic development.

IV. Drivers of Structural Transformation

The discussion of the theoretical perspectives on structural transformation indicated that one of the key drivers of structural transformation has been differential productivity growth across sectors. To what extent can we attribute

---

[6]The findings on the different paths of structural transformation in the developing world have also been observed in other studies such as ADB (2013).

Figure 5. **Aggregate Productivity**

Source: Author's calculations based on GGDC data.

the patterns of structural transformation observed in section III to differential productivity growth across sectors? To address this question, I first look at the behavior of sectoral productivity for all economies and then by economy group. Beginning with a plot of aggregate labor productivity for the three economy groups in Figure 5, it is not surprising to see that the aggregate labor productivity of structurally developed economies is much higher than that for structurally developing economies, which itself is higher than that for structurally underdeveloped economies. Furthermore, while aggregate labor productivity increased steadily for structurally developed economies from the beginning of the review period until the dip in 2008 due to the global financial crisis (and also, to a lesser extent, for structurally developing economies), there is no sign of an increase in aggregate productivity for structurally underdeveloped economies.

Figures 6–9 examine the behavior of sectoral productivity first for all economies and then by economy group. For all economies, sectoral productivity is the highest in nonmanufacturing industry, manufacturing industry, and business services. This is followed by nonbusiness services and then agriculture. Interestingly, real labor productivity in manufacturing industry shows a distinct behavior of catch-up with nonmanufacturing industry and business services (Figure 6).

For structurally developed economies, there is a similar pattern with respect to sectoral productivity, except that the productivity of nonbusiness services is not very different from that of nonmanufacturing industry, manufacturing industry, and

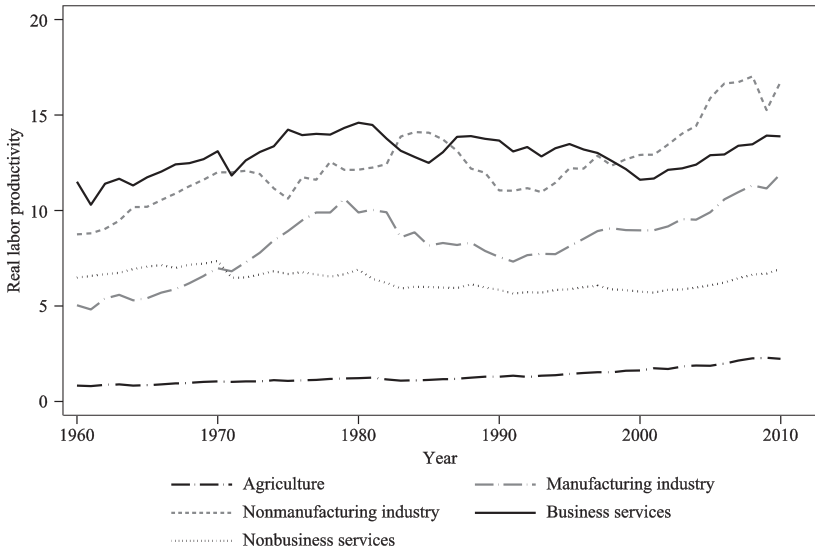Figure 6. **Sectoral Productivity, All Economies**
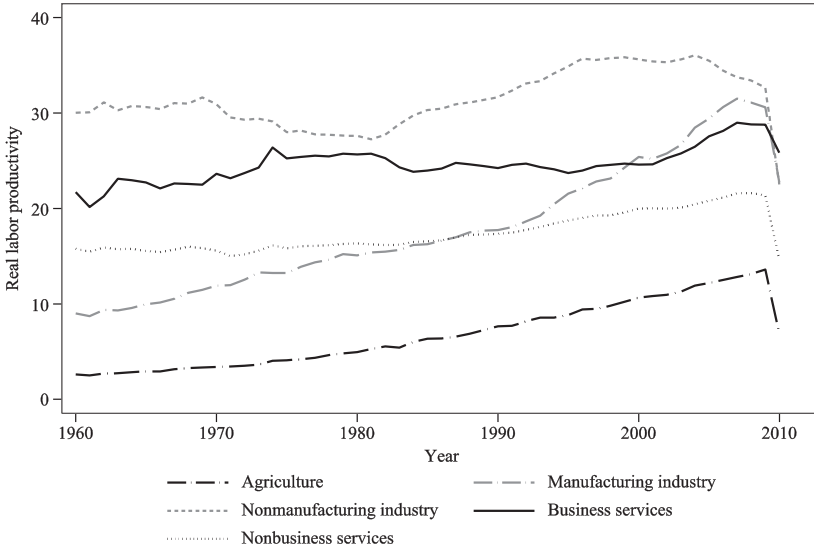
Note: Productivity calculated as real value added per worker (unweighted averages).
Source: Author's calculations based on GGDC data.

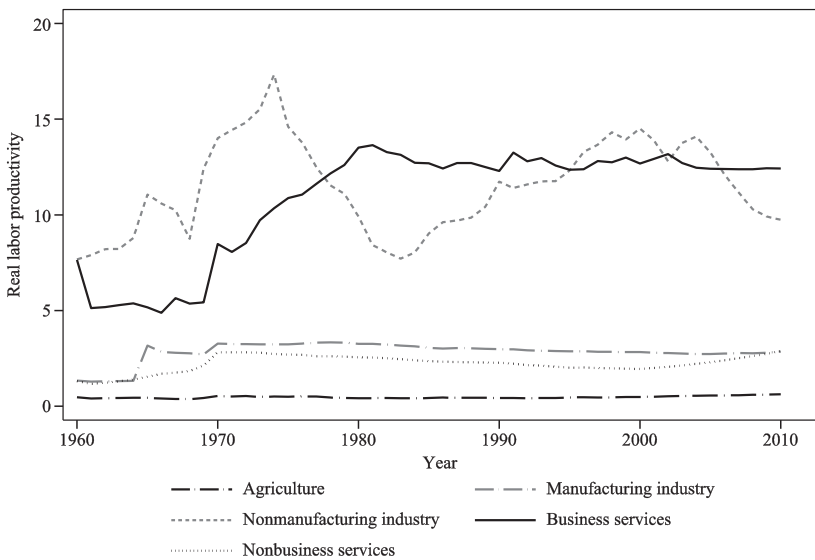Figure 7. **Sectoral Productivity, Structurally Developed**
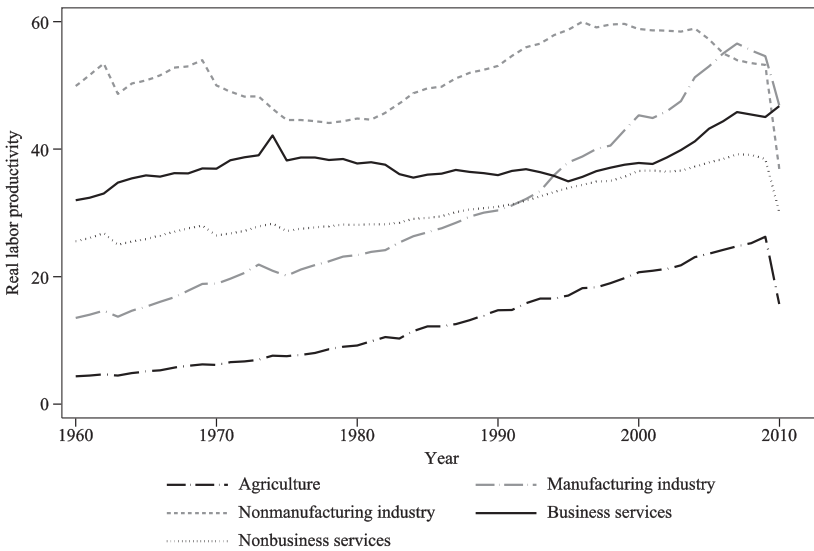
Note: Productivity calculated as real value added per worker (unweighted averages).
Source: Author's calculations based on GGDC data.

Figure 8.   **Sectoral Productivity, Structurally Developing**

Note: Productivity calculated as real value added per worker (unweighted averages).
Source: Author's calculations based on GGDC data.

Figure 9.   **Sectoral Productivity, Structurally Underdeveloped**

Note: Productivity calculated as real value added per worker (unweighted averages).
Source: Author's calculations based on GGDC data.

business services (Figure 7). For structurally developing economies, there is not a similar pattern of behavior with nonbusiness services, which is a less productive sector than nonmanufacturing industry, manufacturing industry, and business services among this economy group (Figure 8). For structurally underdeveloped economies, quite remarkably, we see that manufacturing industry productivity is not very different than agricultural productivity and, in fact, seems to be converging to the latter over time. We also see that the levels of productivity in manufacturing industry and nonbusiness services are almost identical, a surprising finding given that a large proportion of nonbusiness services are neither tradable nor produced in competitive markets as in the case of manufacturing industry (Figure 9).

What do these findings on sectoral productivity imply for the Duarte and Restuccia model of structural transformation that was discussed in section II? Examining the implications of the findings for the theoretical modeling of structural transformation, while differential productivity growth across sectors provides an adequate explanation of structural transformation in structurally developed and developing economies, it does not do so for structurally underdeveloped economies. For structurally developed and developing economies, the higher rate of productivity growth in manufacturing industry compared with nonbusiness services can explain why there has been a reallocation of workers from manufacturing to services over time. However, for structurally underdeveloped economies, we have already observed that the rate of productivity growth in manufacturing industry is not very different from that of nonbusiness services, or for that matter, agriculture. This suggests that the mainstream approaches to structural transformation that are prevalent in the literature are not particularly useful in understanding contemporary structural transformation. This point was also made by Rodrik (2016), who shows via a simple open economy, two-sector model of structural transformation that differential total factor productivity growth in manufacturing cannot be the culprit for the "premature deindustrialization" that Rodrik observes for many low-income economies. In Rodrik's formulation, the causal factor for the deindustrialization in developing economies is globalization, whereby developing economies "imported" deindustrialization from developed economies. The evidence for this claim is not weak. As Sen (2019) shows, globalization has had both a positive and negative effect on employment in manufacturing—the first by the scale effect and the second by the labor intensity effect.[7]

What about the utility-based explanation of structural transformation? For structurally developed and developing economies, which have seen very high rates of economic growth, the high income elasticity of services, and business services in particular, can explain why employment in these sectors increased with

---

[7]Sen (2019) uses disaggregated industry data for 92 developing and transition economies for the period 1970–2010 to show that the impact of globalization on manufacturing employment is positive through the scale and composition effects, and it is negative through the labor intensity effect.

economic growth. However, for structurally underdeveloped economies, which have not seen sustained economic growth and are mostly low-income economies, it is difficult to argue that Engel effects can explain why there has been so much movement of workers into nonbusiness services right from the start of the process of economic development. What this suggests is that there needs to be a rethinking of the theoretical premises behind much of the mainstream approach to structural transformation and the identification of alternate causal mechanisms that can explain the varieties of structural transformation observed in the developing world.

V.   How Well Does the Mainstream Approach Explain Structural Transformation?

I now evaluate the explanatory power of the mainstream approach to structural transformation by taking a prototype mainstream model—the Duarte and Restuccia model—to the data. Recall that the model has the following parameters: a, $\bar{a}$, $\bar{s}$, b, and ρ. In addition, to generate the values for labor allocation in agriculture, manufacturing, and services requires the actual productivity levels from 1960 to 2010 in agriculture, manufacturing, and services.

Duarte and Restuccia (2010) first calibrate their model to US data for the period 1956–2004. Their calibration strategy involves selecting parameter values so that the equilibrium of the model matches the salient features of structural transformation for the US economy from 1956 to 2004. The parameter a is the share of employment in agriculture in the initial year, the parameter $\bar{a}$ is the share of employment in agriculture in the terminal year, the parameter $\bar{s}$ is the share of employment in manufacturing in the terminal year, and b is the average share of employment in manufacturing for the period under consideration; all of these parameters are for the US. Duarte and Restuccia (2010) then use this parameter model to simulate shares of employment in agriculture, manufacturing, and services for individual economies using actual sectoral productivity data for these economies. They find that their model "reproduces the salient features of structural transformation and aggregate productivity across economies" (Duarte and Restuccia 2010, 150). The model replicates basic trends in the agricultural employment share for all economies, though it underpredicts the share of employment in services and overpredicts the share of employment in manufacturing in less developed economies.

A limitation of Duarte and Restuccia's (2010) analysis is that their sample does not include any low-income economies, with the economies in their sample being either high- or middle- income economies. Moreover, they do not differentiate between business and nonbusiness services, when, as has been argued in this paper, these two subsectors have very different profiles of productivity.

I now simulate the Duarte and Restuccia model with the sample of 39 economies for the period 1960–2010. I do it by economy group to see how

Table 4. **Simulation Scenarios**

Scenario	1	2	3	4
Parameters	Baseline as in Duarte and Restuccia (2010); services = business services + nonbusiness services	Baseline as in Duarte and Restuccia (2010); services = nonbusiness services; manufacturing + business services as one sector	Using actual data for initial year and final year; services = business services + nonbusiness services	Using actual data for initial year; services = nonbusiness services; manufacturing + business services added together
a	0.01	0.01	Share of agricultural employment in 2010	Share of agricultural employment in 2010
$\bar{a}$	0.11	0.11	Share of agricultural employment in 1960	Share of agricultural employment in 1960
$\bar{s}$	0.89	0.89	Share of nonbusiness and business services employment in 1960	Share of nonbusiness services employment in 1960
b	0.04	0.04	Share of manufacturing employment during the period 1960–2010	Share of manufacturing + business services employment during the period 1960–2010
ρ	−1.5	−1.5	−1.5	−1.5

Source: Modified from Duarte, Margarida, and Diego Restuccia. 2010. "The Role of Structural Transformation in Aggregate Productivity." *The Quarterly Journal of Economics* 125 (1): 129–73.

well the Duarte and Restuccia model does in explaining the paths of structural transformation that were observed in section III. Table 4 shows four simulations for each economy group. In the first scenario, I use the same parameter values as in the Duarte and Restuccia (2010) calibration exercise and include business and nonbusiness services in one all-inclusive service sector. In the second scenario, I group business services with manufacturing as one sector; as has been noted, the business service sector has a similar productivity profile as the manufacturing sector, and parts of business services also have similar properties as manufacturing in terms of externalities and tradability, among others (see, for example, Amirapu and Subramanian 2015). The third and fourth scenarios relax the stringent assumption in Duarte and Restuccia (2010) of the US being the benchmark economy for the calibrations. This is important as several economies are quite far from the US in terms of their structural features. Our third and fourth scenarios use parameter values that correspond to the average in a particular economy group for the initial and terminal years. The difference between the two scenarios is that Scenario 3 groups business and nonbusiness services as one service sector,

Figure 10. **Scenario 1, Structurally Developed Economies**
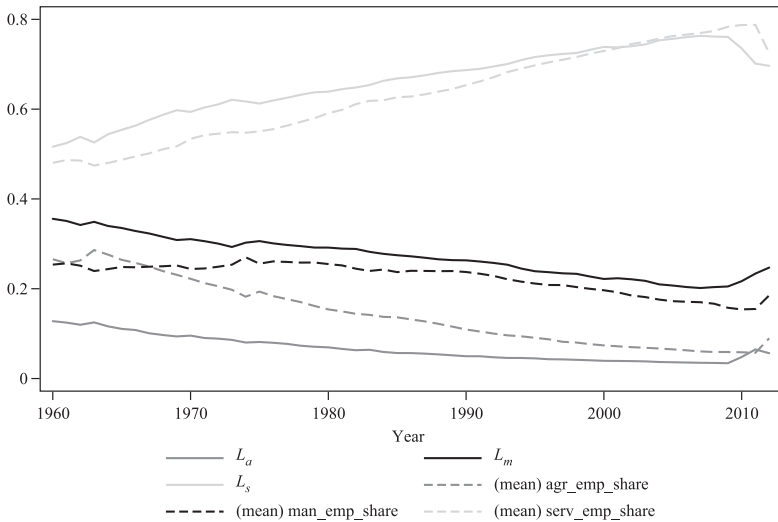
L_a = agricultural employment share, simulation results; L_m = manufacturing employment share, simulation results; L_s = services employment share, simulation results; (mean) man_agr_share = actual agricultural employment share; (mean) man_emp_share = actual manufacturing employment share; (mean) serv_emp_share = actual services employment share.
Source: Author's calculations based on GGDC data.

while Scenario 4 groups manufacturing and business services as one sector and nonbusiness services as another sector.[8]

Figures 10, 11, and 12 provide the simulations and actual shares of agriculture, manufacturing, and services for structurally developed, developing, and underdeveloped economies for Scenario 1, respectively. Figures 13, 14, and 15 provide the simulations and actual shares of agriculture, manufacturing, and services for structurally developed, developing, and underdeveloped economies for Scenario 2, respectively. Figures 16, 17, and 18 provide the simulations and actual shares of agriculture, manufacturing, and services for structurally developed, developing, and underdeveloped economies for Scenario 3, respectively. Figures 19, 20, and 21 provide the simulations and actual shares of agriculture, manufacturing, and services for structurally developed, developing, and underdeveloped economies for Scenario 4, respectively.

Across all four scenarios, the Duarte and Restuccia model predicts actual employment shares in agriculture, manufacturing, and services in structurally

---

[8]While Duarte and Restuccia (2010) include nonmanufacturing industry with manufacturing as one sector, I take the level of employment in nonmanufacturing industry as exogenously given in my simulations. This is done for two reasons: (i) the share of employment in mining, which is one important subsector in nonmanufacturing industry, is not a function of productivity or income elasticities, and depends on whether the economy has mining resources; and (ii) both utilities and construction, the other subsectors in nonmanufacturing industry, are very different in their properties from the manufacturing sector.
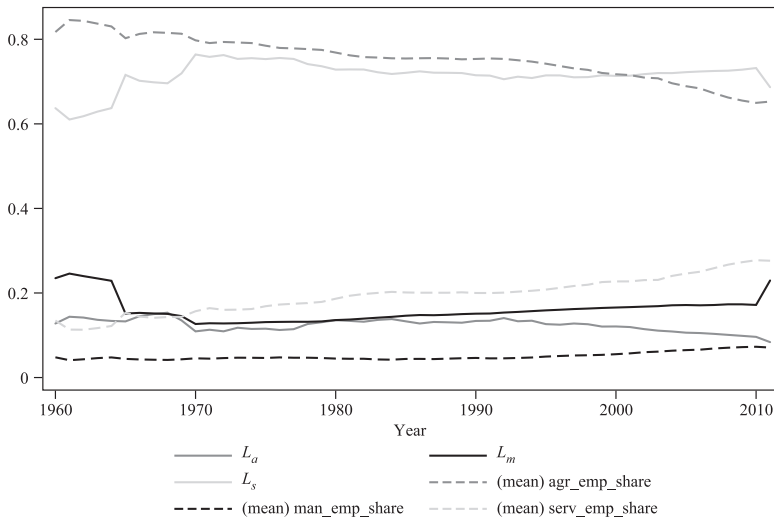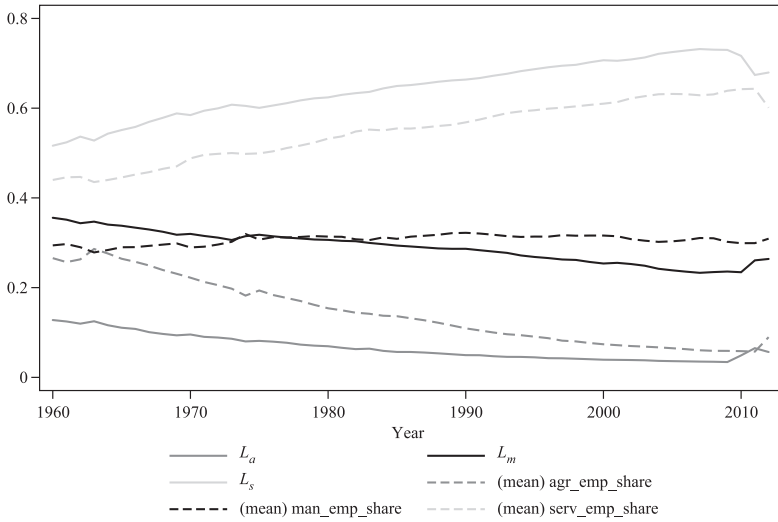
Figure 11. **Scenario 1, Structurally Developing Economies**
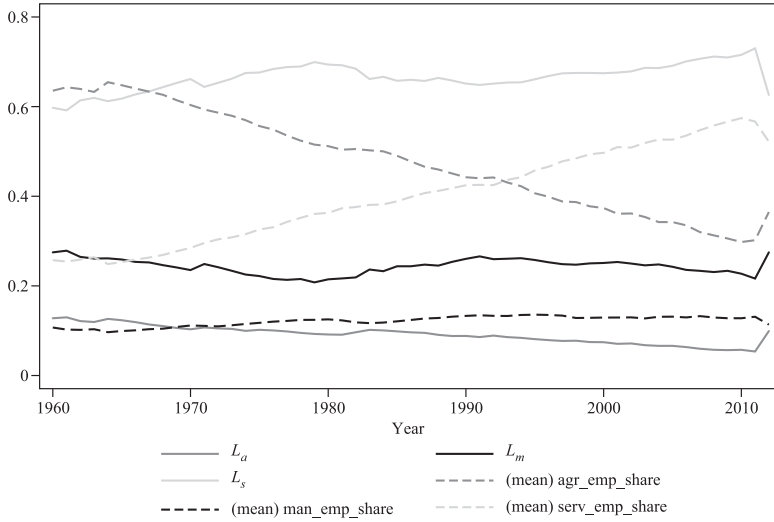
L_a = agricultural employment share, simulation results; L_m = manufacturing employment share, simulation results; L_s = services employment share, simulation results; (mean) man_agr_share = actual agricultural employment share; (mean) man_emp_share = actual manufacturing employment share; (mean) serv_emp_share = actual services employment share.
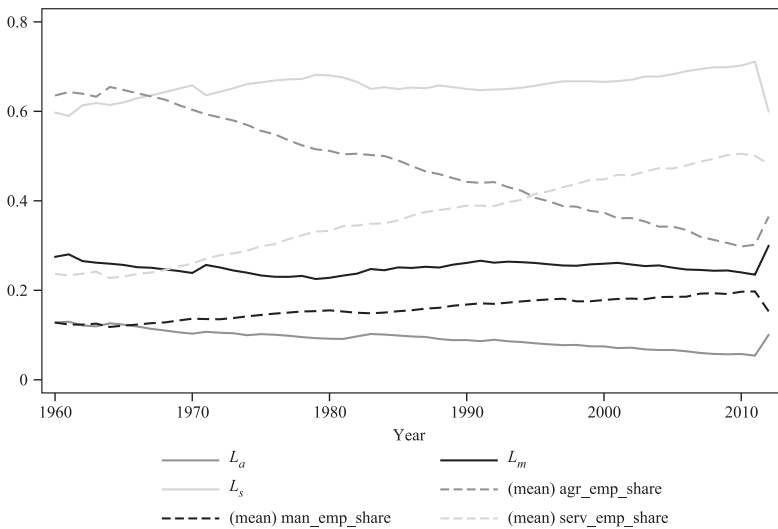Source: Author's calculations based on GGDC data.

Figure 12. **Scenario 1, Structurally Underdeveloped Economies**

L_a = agricultural employment share, simulation results; L_m = manufacturing employment share, simulation results; L_s = services employment share, simulation results; (mean) man_agr_share = actual agricultural employment share; (mean) man_emp_share = actual manufacturing employment share; (mean) serv_emp_share = actual services employment share.
Source: Author's calculations based on GGDC data.

Figure 13.   **Scenario 2, Structurally Developed Economies**

L_a = agricultural employment share, simulation results; L_m = manufacturing employment share, simulation results; L_s = services employment share, simulation results; (mean) man_agr_share = actual agricultural employment share; (mean) man_emp_share = actual manufacturing employment share; (mean) serv_emp_share = actual services employment share.
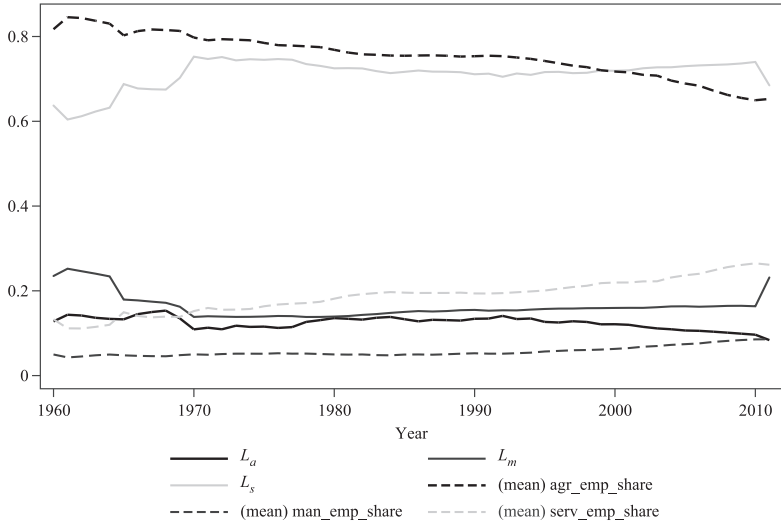Source: Author's calculations based on GGDC data.

Figure 14.   **Scenario 2, Structurally Developing Economies**

L_a = agricultural employment share, simulation results; L_m = manufacturing employment share, simulation results; L_s = services employment share, simulation results; (mean) man_agr_share = actual agricultural employment share; (mean) man_emp_share = actual manufacturing employment share; (mean) serv_emp_share = actual services employment share.
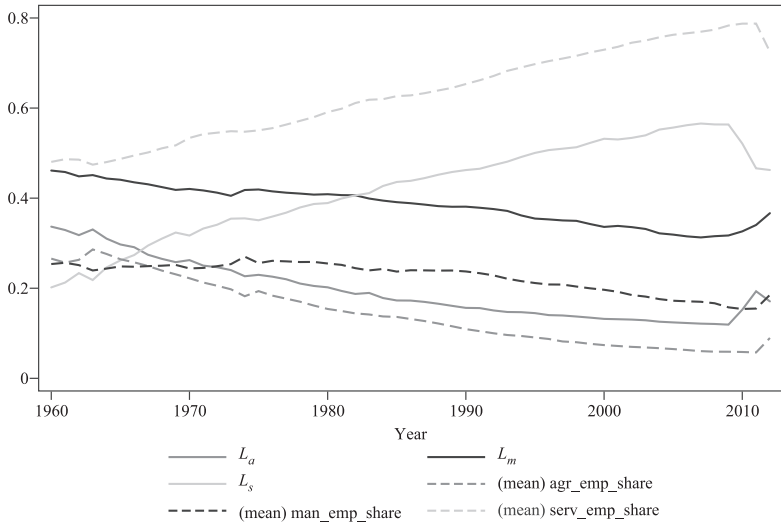Source: Author's calculations based on GGDC data.

Figure 15.   **Scenario 2, Structurally Underdeveloped Economies**

L_a = agricultural employment share, simulation results; L_m = manufacturing employment share, simulation results; L_s = services employment share, simulation results; (mean) man_agr_share = actual agricultural employment share; (mean) man_emp_share = actual manufacturing employment share; (mean) serv_emp_share = actual services employment share.
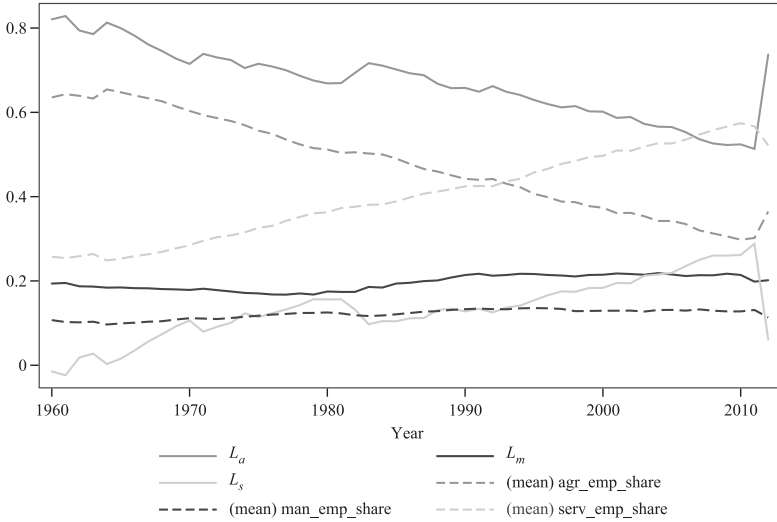Source: Author's calculations based on GGDC data.

Figure 16.   **Scenario 3, Structurally Developed Economies**

L_a = agricultural employment share, simulation results; L_m = manufacturing employment share, simulation results; L_s = services employment share, simulation results; (mean) man_agr_share = actual agricultural employment share; (mean) man_emp_share = actual manufacturing employment share; (mean) serv_emp_share = actual services employment share.
Source: Author's calculations based on GGDC data.

Figure 17.   **Scenario 3, Structurally Developing Economies**

L_a = agricultural employment share, simulation results; L_m = manufacturing employment share, simulation results; L_s = services employment share, simulation results; (mean) man_agr_share = actual agricultural employment share; (mean) man_emp_share = actual manufacturing employment share; (mean) serv_emp_share = actual services employment share.
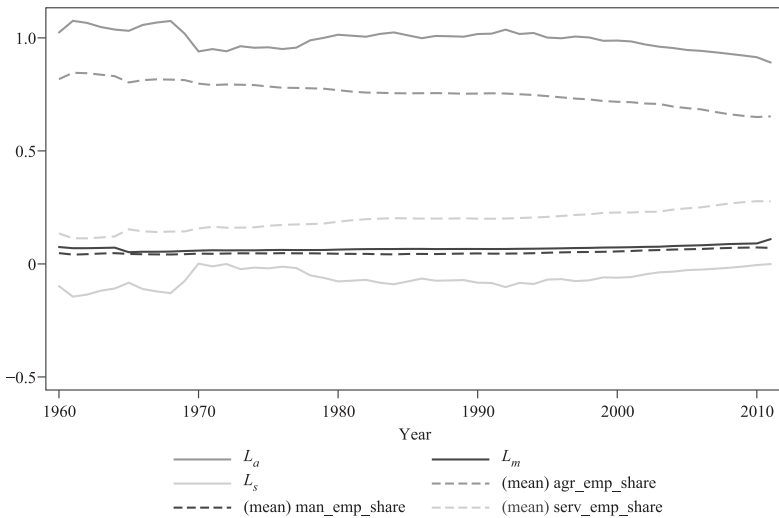Source: Author's calculations based on GGDC data.

Figure 18.   **Scenario 3, Structurally Underdeveloped Economies**

L_a = agricultural employment share, simulation results; L_m = manufacturing employment share, simulation results; L_s = services employment share, simulation results; (mean) man_agr_share = actual agricultural employment share; (mean) man_emp_share = actual manufacturing employment share; (mean) serv_emp_share = actual services employment share.
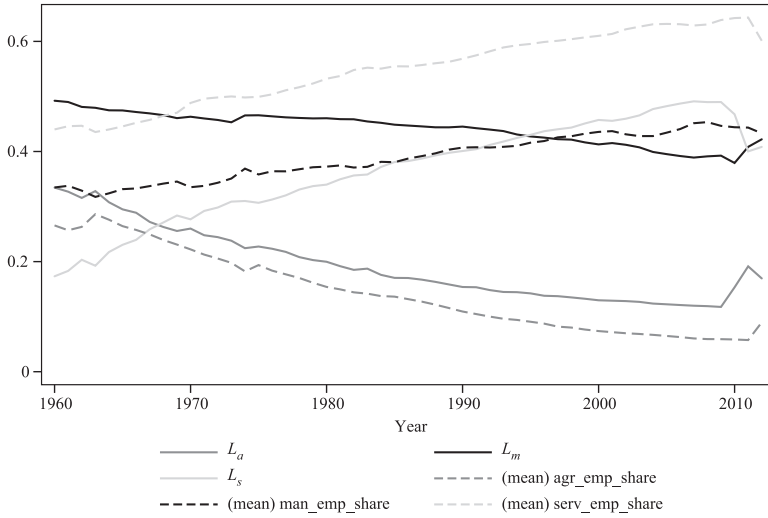Source: Author's calculations based on GGDC data.

Figure 19. **Scenario 4, Structurally Developed Economies**

L_a = agricultural employment share, simulation results; L_m = manufacturing employment share, simulation results; L_s = services employment share, simulation results; (mean) man_agr_share = actual agricultural employment share; (mean) man_emp_share = actual manufacturing employment share; (mean) serv_emp_share = actual services employment share.
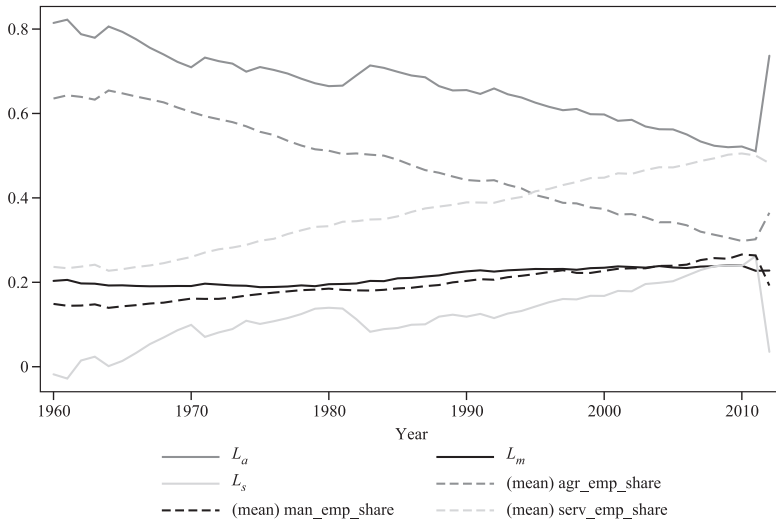
Source: Author's calculations based on GGDC data.

Figure 20. **Scenario 4, Structurally Developing Economies**

L_a = agricultural employment share, simulation results; L_m = manufacturing employment share, simulation results; L_s = services employment share, simulation results; (mean) man_agr_share = actual agricultural employment share; (mean) man_emp_share = actual manufacturing employment share; (mean) serv_emp_share = actual services employment share.

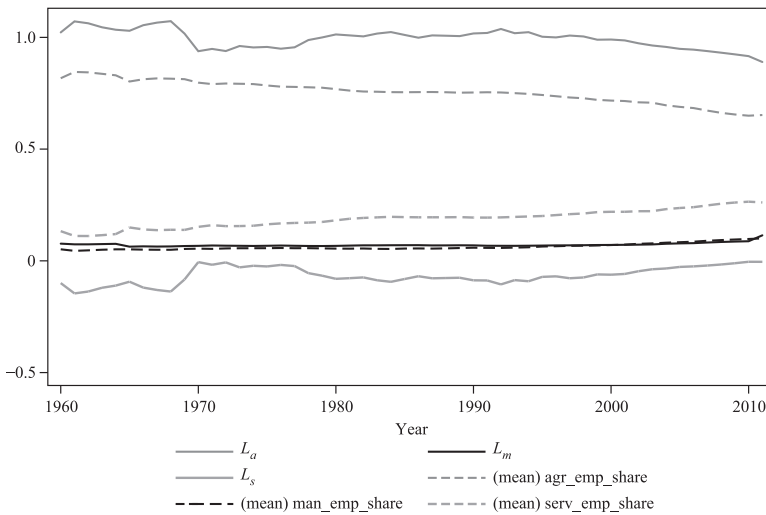Source: Author's calculations based on GGDC data.

Figure 21. **Scenario 4, Structurally Underdeveloped Economies**

L_a = agricultural employment share, simulation results; L_m = manufacturing employment share, simulation results; L_s = services employment share, simulation results; (mean) man_agr_share = actual agricultural employment share; (mean) man_emp_share = actual manufacturing employment share; (mean) serv_emp_share = actual services employment share.
Source: Author's calculations based on GGDC data.

developed economies well, as may be expected. However, there are systematic errors in prediction across all four scenarios for structurally developing and underdeveloped economies. The Duarte and Restuccia model overpredicts the share of employment in services and underpredicts the share of employment in agriculture, particularly for structurally underdeveloped economies. For example, the percentage difference between the actual employment share in services and its predicted share is 76% for structurally developing economies and 286% for structurally underdeveloped economies. In contrast, the difference is a paltry 5% for structurally developed economies.

Across all four scenarios, there are clear differences in how the model does in explaining actual employment shares, especially for structurally developing and underdeveloped economies. For structurally underdeveloped economies, the model overpredicts the services employment share by 286% and 295% for Scenarios 1 and 2, respectively. For Scenarios 3 and 4, the model underpredicts the services employment share by 139% and 136%, respectively, and generates a negative employment share for services. This suggests that the Duarte and Restuccia model can provide a realistic explanation of structural transformation for rich economies but not for poor economies. While more realistic versions of the model may be able to generate simulations that are closer to the actual employment shares, an important reason behind the model's inability to capture structural transformation in

low-income economies is that relative productivity changes are not as key a determinant of labor reallocation in poor economies as they are for rich economies. Therefore, it is necessary to rethink mainstream approaches to structural transformation that put a great deal of weight on sectoral productivity growth and income effects.[9]

VI. Conclusions and Policy Implications

The conventional view of structural transformation is informed by three stylized facts of economic development: (i) all economies exhibit declining employment in agriculture; (ii) economies at an early stage of the process of structural transformation exhibit a hump-shaped share of employment in industry, whereas this share is decreasing for economies at a more advanced stage; and (iii) all economies exhibit an increasing share of employment in services. In this paper, I show that this presumed path of structural transformation may no longer be the route to economic development for low-income economies. Classifying economies as either structurally developed, developing, or underdeveloped, I observe a different path of structural transformation in structurally underdeveloped economies, where workers are moving directly from agriculture to nonbusiness services, which as a sector does not have the same productivity gains as manufacturing. I also find that a prototype mainstream model does a poor job of replicating the patterns of structural transformation observed in low-income economies. This suggests that there needs to be a rethinking of the theoretical premises behind much of the mainstream approach to structural transformation and the identification of alternate causal mechanisms to explain the different types of structural transformation observed in the developing world.

What implications do these results have for policy? Clearly, for many of the middle-income economies in the sample, several of which are in Asia, productivity growth in manufacturing relative to nonbusiness services remains the key driver for the reallocation of workers from manufacturing to services. Further, for these economies, the Engel effects become important as per capita income increases, leading to an increase in the employment share of the highly productive business service sector over time. In contrast, for structurally underdeveloped economies, the

---

[9]An alternate mainstream approach that emphasizes income effects instead of relative productivity differentials as the key explanatory variable for structural transformation is provided by Comin, Lashkari, and Mestieri (2018). This approach assumes nonhomothetic preferences and shows that income effects account for 75% of the observed patterns of structural change. However, a limitation of this approach is that it essentially sees structural transformation as a consequence of economic development rather than a cause. While income effects have a role to play in explaining the hump-shaped nature of the manufacturing employment share, and the rapid growth in the services employment share in middle- and high-income economies, it cannot in itself explain why low-income economies have not been able to follow the path of structural transformation observed in middle- and high-income economies, where the movement of workers into manufacturing was the primary driver of growth at the early and middle stages of economic development.

low productivity of the manufacturing sector provides a more challenging setting for both economic growth and structural transformation. For these low-income economies, whatever limited possibilities that may exist for manufacturing-driven structural transformation must be focused on policies that can increase the productivity of the manufacturing sector, as well as on exploring options for growth that are based on the nonbusiness service sector, which remains the major sector of employment outside agriculture for structurally underdeveloped economies.

References

Amirapu, Amit, and Arvind Subramanian. 2015. "Manufacturing or Services? The Indian Illustration of a Development Dilemma." Centre for Global Development Working Paper No. 409.

Asian Development Bank (ADB). 2013. "Asia's Economic Transformation." *Key Indicators for Asia and the Pacific* 2013. https://www.adb.org/sites/default/files/publication/30358/ki2013-special-chapter.pdf.

Baymul, Cinar, and Kunal Sen. 2019. "What Do We Know about the Relationship between Structural Transformation and Inequality?" *Asian Development Review* 36 (1): 136–67.

Chenery, Hollis, and Moshe Syrquin. 1975. *Patterns of Development, 1950–1970*. Delhi: Oxford University Press.

Clark, Colin. 1940. *Conditions of Economic Progress*. London: Macmillan.

Comin, Diego, Danial Lashkari, and Marti Mestieri. 2018. "Structural Change with Long Run Income and Price Effects." Mimeo.

Dabla-Norris, Era, Alun Thomas, Rodrigo Al Garcia-Verdu, and Yingyuan Chen. 2013. "Benchmarking Structural Transformation across the World." IMF Working Paper No. 13/176.

Diao, Xinshen, Margaret McMillan, and Dani Rodrik. 2017. "The Recent Growth Boom in Developing Economies: A Structural Change Perspective." NBER Working Paper No. w23132.

Duarte, Margarida, and Diego Restuccia. 2010. "The Role of Structural Transformation in Aggregate Productivity." *The Quarterly Journal of Economics* 125 (1): 129–73.

Haraguchi, Nobuya, Charles Cheng, and Eveline Smeets. 2017. "The Importance of Manufacturing in Economic Development: Has This Changed?" *World Development* 93: 293–315.

Herrendorf, Bertel, Richard Rogerson, and Akos Valentinyi. 2014. "Growth and Structural Transformation." *Handbook of Economic Growth* 2: 855–941.

Kuznets, Simon. 1959. "On the Comparative Structure of Economic Structure and the Growth of Nations." In *The Comparative Study of Economic Growth and Structure*, edited by Raymond Goldsmith, 162–76. Washington, DC: NBER.

_____. 1965. *Economic Growth and Structure: Selected Essays*. New York: Norton.

_____. 1966. *Modern Economic Growth: Rate, Structure, and Spread (Vol. 2)*. New Haven: Yale University Press.

_____. 1973. "Modern Economic Growth: Findings and Reflections." *American Economic Review* 63 (3): 247–58.

Lewis, Arthur. 1954. "Economic Development with Unlimited Supplies of Labour." *The Manchester School* 22 (2): 139–91.

McMillan, Margaret, Dani Rodrik, and Inigo Verduzco-Gallo. 2014. "Globalization, Structural Change, and Productivity Growth, with an Update on Africa." *World Development* 63 (1): 11–32.

Ngai, Rachel, and Christopher Pissarides. 2007. "Structural Change in a Multisector Model of Growth." *American Economic Review* 97 (1): 429–43.

Rodrik, Dani. 2016. "Premature Deindustrialization." *Journal of Economic Growth* 21 (1): 1–33.

Rogerson, Richard. 2007. "Structural Transformation and the Deterioration of European Labour Market Outcomes." NBER Working Paper No. 12889.

Sen, Kunal. 2019. "What Explains the Job Creating Potential of Industrialisation in the Developing World?" *Journal of Development Studies* 55 (7): 1565–83.

Syrquin, Moshe. 1988. "Patterns of Structural Change." In *Handbook of Development Economics, Vol. 1*, edited by Hollis Chenery and T.N. Srinivasan, 203–73. Amsterdam: Elsevier.

Syrquin, Moshe, and Hollis Chenery. 1989. "Three Decades of Industrialization." *World Bank Economic Review* 3 (2): 145–81.

Timmer, Marcel, and Gaaitzen de Vries. 2009. "Structural Change and Growth Accelerations in Asia and Latin America: A New Sectoral Data Set." *Cliometrica* 3 (2): 165–90.

Timmer, Marcel, Gaaitzen de Vries, and Klaas de Vries. 2015. "Patterns of Structural Change in Developing Countries." In *Routledge Handbook of Industry and Development*, edited by John Weiss and Michael Tribe, 65–83. London: Routledge.

Appendix

The Groningen Growth and Development Centre's database provides annual employment data for 10 different sectors in 41 economies. The time spans for available data vary between economies; however, most economies in the database have observations from 1960 to 2012. Table A1 lists the 10 sectors with their respective ISIC Revision 3.1 codes and definitions.

Table A1. **Description of Sectors**

ISIC 3.1 Code	Sector Name	Description
A+B	Agriculture	Agriculture, hunting and forestry, and fishing
C	Mining	Mining and quarrying
D	Manufacturing	Manufacturing
E	Utilities	Electricity, gas, and water supply
F	Construction	Construction
G+H	Trade services	Wholesale and retail trade; repair of motor vehicles, motorcycles, and personal and household goods; hotels and restaurants
I	Transport services	Transport, storage, and communications
J+K	Business services	Financial intermediation, renting, and business activities (excluding owner-occupied rents)
L, M, N	Government services	Public administration and defense, education, health, and social work
O, P	Personal services	Other community, social and personal service activities, and activities of private households

ISIC = International Standard Industrial Classification of All Economic Activities.
Source: Timmer, Marcel, Gaaitzen de Vries, and Klaas de Vries. 2015. "Patterns of Structural Change in Developing Countries." In *Routledge Handbook of Industry and Development*, edited by John Weiss and Michael Tribe, 65–83. London: Routledge.

Agriculture is the primary sector. The secondary industry sector can be divided into two groups—manufacturing industry and nonmanufacturing industry; the latter comprises mining, utilities, and construction. The tertiary service sector consists of trade, transport, business, government, and personal services. The ISIC classification of manufacturing includes primary processed products. Employment in each category is defined as all persons engaged in labor, and hence encompasses self-employed and family workers both in the formal and informal sectors.