

From “Structural Change” to “Transformative Change”: Rationale and Implications

Authors: S. Nazrul Islam and Kenneth Iversen

ABSTRACT

This paper examines the relationship between “Transformative Change,” advocated by the *2030 Agenda* for sustainable development, and “Structural Change,” which has been a long-standing and important concept in Development Economics. It shows that while structural change is still relevant, growing concerns for social development and environmental protection made it necessary to switch to the more encompassing concept of “Transformative Change” that provides greater space for inclusion and interaction of all three dimensions of sustainable development. The paper notes that, in the era of greater globalization, countries have followed more varied patterns of structural change, all of which are not equally suitable for sustainable development. The paper notes that Transformative Change subsumes structural change, and it discusses the modifications that structural change needs to be more compatible with sustainable development.

JEL Classification: O14; O44; Q0; Q56; Q57; Q58

Keywords: Structural change; Transformative change; 2030 Agenda; Sustainable development

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Typesetter: *Nancy Settecasì*

UNITED NATIONS
Department of Economic and Social Affairs
UN Secretariat, 405 East 42nd Street
New York, N.Y. 10017, USA
e-mail: undes@un.org
<https://www.un.org/development/desa/>

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I Introduction

In September 2015, the world community adopted the *2030 Agenda* for Sustainable Development, formulated in the form of 17 Sustainable Development Goals (SDGs) and 169 targets. This Agenda has been popularly described as “transformative,” aimed at “Transforming the World,” as its title puts it. In other words, the goal is to achieve a *Transformative Change (TC)*.

Meanwhile, the development literature has long been familiar with the concept of *Structural Change (SC)*, which refers to changes in the sectoral composition of the Gross Domestic Product (GDP) of an economy.¹ This concept is, in a sense, as old as the modern discussion of development itself. The 2030 Agenda too uses this concept with regard to particular goals, applicable, in particular, for the Least Developed Countries (LDCs). For example, in its Declaration, the Agenda announces the intention to “strengthen the productive capacities of least developed countries in all sectors, including through *structural transformation* (para 27).”²

How does “transformative change” differ from “structural change”? Is this switch mere terminological or does it signal an important conceptual shift? What are the implications of this shift? How should structural change under the 2030 Agenda for sustainable development differ from structural change as it happened until now? These are some of the questions addressed in this paper.

The paper shows that, while the concept of structural change remains relevant, it was necessary to go beyond and have a *more spacious* and *encompassing* concept that can accommodate all three dimensions of sustainable development and promote structural change that is more compatible with the social development and environmental goals. The paper notes that deepening of globalization in recent decades widened the possibilities regarding patterns of structural change, not all of which are equally conducive to sustainable development. Thus, it is a challenge to achieve the type of structural change that suits the specific conditions of a country and yet conforms to the goal of “transformative change”. This paper tries to delineate the modifications that structural change needs to undergo in order to be more compatible with sustainable development and thus be a part of the transformative change aimed at by the 2030 Agenda.

The paper is organized as follows. Section 2 presents a brief recapitulation of the origin and evolution of the concept of structural change, taking note of the contributions by Kuznets, Lewis, Fei, Ranis, Chenery, Sen and other scholars. Section 3 discusses the impact of globalization on the structural change experience and concept. Section 4 shows how the broader goal of sustainable development made it necessary to go beyond the concept of structural change and switch to a more encompassing concept that provides the necessary space for inclusion and interaction of all three dimensions of sustainable development. Section 5 examines the implications of sustainable development for structural change. Section 6 concludes.

1 In this article, we are treating “structural change” and “structural transformation” interchangeably.

2 Elaborating on the idea, the Agenda declares that “we will adopt policies which increase productive capacities, productivity and productive employment; financial inclusion; sustainable agriculture; pastoralist and fisheries development; sustainable industrial development; universal access to affordable, reliable, sustainable, and modern energy services; sustainable transport systems; and quality and resilient infrastructure (United Nations 2015, para 27).”

II Origin and evolution of the concept of structural change

2.1 The Structural Change paradigm

In Development Economics, the expression “structural change” generally refers to changes in the sectoral composition of GDP. One of the early uses of this term can be found in the writings of Simon Kuznets. This is not surprising, because Kuznets pioneered the concept and measurement of national income. In doing so, he naturally had to take note of the shares of different sectors in the GDP and the changes in these shares over time.³

Over time, however, Structural Change also came to represent a particular paradigm of development. According to this paradigm, countries will undergo a particular pattern of structural change in the development process. Under this pattern, the structure of the economy will be dominated by primary production (mainly agriculture) at the beginning of the development process. At the next stage, manufacturing or, more broadly, industry will become the dominant sector. Finally, the service sector will have the largest share in the GDP. All the while, the aggregate productivity level, commonly measured by per capita income level, will increase. In this paper, we will use the term “Structural Change” (with capitalized S and C) to refer to the above development paradigm, while using “structural change” (with small S and C) to refer to changes in GDP composition *per se*, without implying any pattern in these changes. The “concept” of structural change will be used as a generic expression inclusive of the above both uses of the term.

The Structural Change paradigm, noted above, assumes that there is a *major* difference in labour productivity between the agriculture (primary) and manufacturing (secondary) sectors, so that a shift of labour from the former to the latter raises the aggregate productivity of the economy and thus serves as a major source of economic growth. Since the agriculture sector is often termed as the “traditional” sector—referring to the traditional technologies used in it—while the manufacturing sector as the “modern” sector, the Structural Change above is also equated with “modernization” and is considered to be the essence of development.

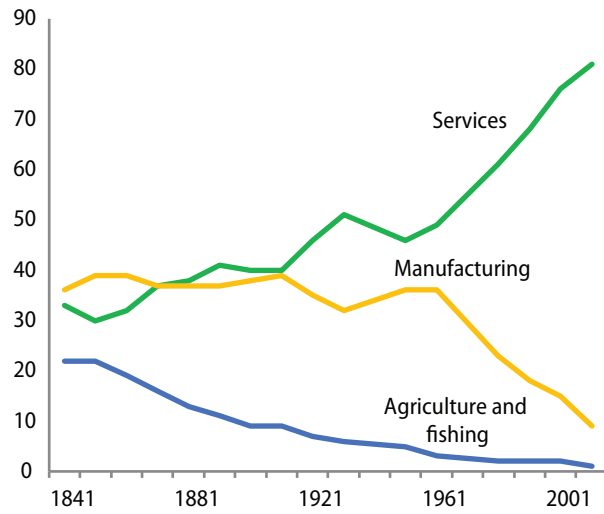
The Structural Change paradigm was, in fact, based on the actual history of “modern economic growth,” which began with the First Industrial Revolution in England. Prior to this Revolution, production depended mainly on the “muscle power” of either humans or animals, and, as a result, productivity was low. The Industrial Revolution ushered in the “machine power,” which raised labour productivity to a new level. Historically, application of machine power began in the manufacturing sector. As a result, a greater share of this sector implied higher productivity of the aggregate economy. Shift of labour from agriculture to manufacturing was thereby considered as the hallmark of economic growth and development.

The share of the manufacturing sector in the economy however cannot increase *ad infinitum*. It was thought that at some point, the share of manufacturing in the economy will stabilize and then decrease, while the share of the service sector will rise and eventually become dominant. These propositions accorded well with the actual experiences of many of the Early Industrializing Countries (EIC), as shown in Figures 1-4 below.

³ See Kuznets (1933, 1937, 1966, 1971). As Kapuria-Foreman and Perlman (1995) explain, “Kuznets defined economic growth as a sustained increase in per capita or per worker product, most often accompanied by an increase in population and usually by sweeping *structural changes*. A major part of Kuznets’s work on growth consisted of an examination and analysis of the characteristics and patterns of modern economic growth with a view to understanding its nature and causes and making it more readily comprehensible and achievable (p. 1536; emphasis added).”

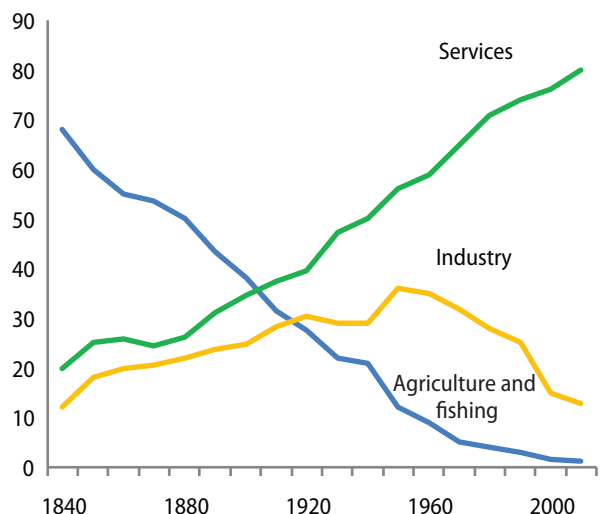
Figure 1-4
Employment by sector as share of total employment⁴

Figure 1
United Kingdom



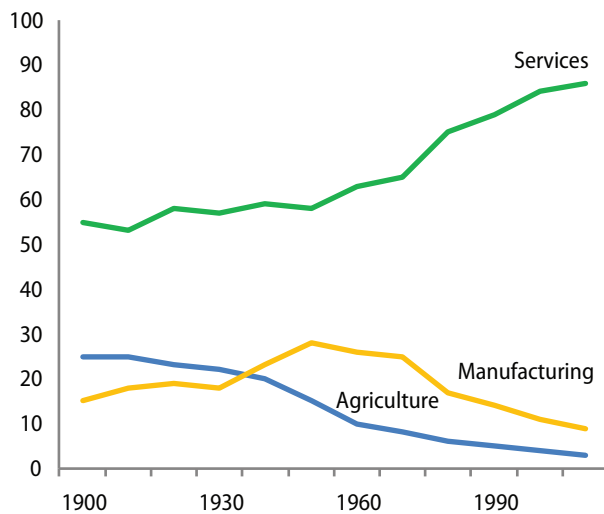
Source: Office of National Statistics (2011)

Figure 2
United States of America



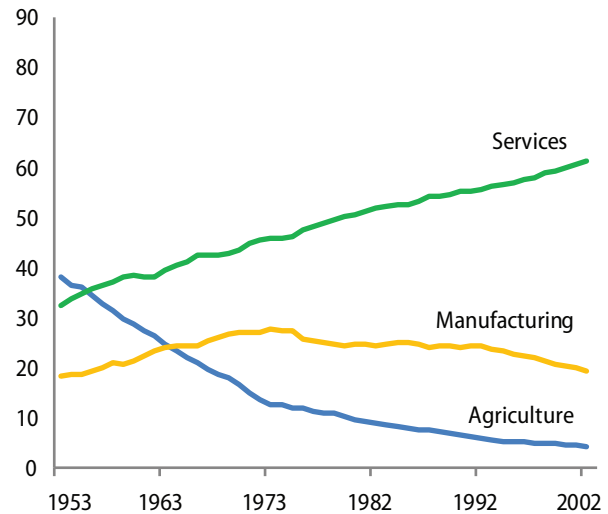
Source: Lebergott (1966) and U.S. Bureau of Labour Statistics (2017)

Figure 3
Australia



Source: Reserve Bank of Australia (2010)

Figure 4
Japan



Source: Statistics Japan (2017)

4 The portrayal of the structural change in Figures 1-4 is in terms of employment share. The pattern is similar in terms of GDP share, though there can be significant differences between them too, because the rate of change in labour productivity across sectors may not be the same. Also, there are issues about whether GDP shares need to be computed in current or constant prices. The choice in this regard can be consequential, because changes in productivity may have significant *price effects*. In particular, higher productivity of the manufacturing sector may cause the relative price of the sector to decrease, thus hiding the more pronounced changes in physical output of this sector.

The pattern of structural change, observed in the EICs, and shown in Figures 1-4, is often referred to as the “classical pattern of structural change,” and it is clear that the Structural Change paradigm is based on this classical pattern.

2.2 Modelling of structural change

Though Kuznets noticed structural change as a *feature* of economic growth, he did not quite formalize the process through which sectoral change can be a *source* of growth. Moreover, the neoclassical conception of the economy does not allow structural change to be an important source of growth, because, in this conception, factors of production are perfectly mobile across sectors of the economy, resulting in equalization of their marginal products and rates of return. In such a scenario, productivity differences across sectors at any point of time are likely to be of *minor* magnitudes, because demand and supply situations are always changing, prompting the economy to adjust to the changes constantly, leaving no scope for large productivity differences across sectors to emerge. As a result, shifts of factors from one sector to another are not likely to cause major changes in the aggregate productivity of the economy. In this view, it is the technological progress that it is the driver of growth.

In view of the above, it is not surprising that the neoclassical growth model does not pay much attention to the sectoral division of the economy and to structural change as a source of growth. Following the models of Harrod (1939) and Domar (1946)—which were one-sector models—the neo-classical growth model developed by Solow (1956), Swan (1956), Cass (1965), and Koopmans (1965) also had one sector only. Though Uzawa (1965), Lucas (1988), and others extended the neoclassical model to allow more than one sector, the purpose for that extension was mostly to allow a source of “technology” or “human capital” that can drive the growth process. Thus, the neoclassical growth model basically ignored the issue of structural change.

It was Arthur Lewis (1954, 1955) who first tried to formalize the process of economic growth achieved through structural change. To do so, he proceeded from the above-mentioned assumption that labour productivity was lower in the “traditional” sector than in the “modern” sector. As a result, the aggregate output increases when labour moves from the former to the latter.

The important question of course is why the same factor of production would have different productivity in different sectors. Lewis did not explain this difference; instead he took it as a *given* aspect of the reality. As noticed above, historically, the use of machines indeed began with the manufacturing sector, creating a big difference in labour productivity between this sector and the traditional agricultural sector. However, the question remains why the historical reality of the 18th century would apply to the contemporary period.

Sen and others strive to address this question. They show that the answer lies basically in *institutions*, both at the micro (household) level, and at the macro level. Sen (1966, 1967), for example, draws the analytical distinction between “marginal product of *labour*” and “marginal product of a *labourer*.” In a household economy, where output is shared, what matters is the total or average output. In such an economy, it is quite rational to apply labour until the marginal product was zero, so that the total and average products of the household were maximized. This behaviour at the household level however requires certain institutional conditions at the macro level, whereby the opportunity cost of labour of the household (in the low productivity sector) is zero or at least less than the marginal product of labour in the high productivity sector. This may happen if there are various types of restrictions on migration of labour from the low to high productivity sector (for example, the *Hukou* system in China, under which only households registered with the city government are supposed to live in that city) or if various restrictive practices of labour and management in the high productivity sector disallow or discourage such migration.

One implication of the Lewis model is the *Turning Point* concept, which refers to the hypothesis that, after a process of transfer of labour from the low to high productivity sectors, the productivity levels equalize across sectors. The economy then conforms to the neoclassical assumption of equal factor returns across sectors, and structural change as a source of growth gets exhausted. Ranis and Fei develop the Lewis model further, but the essential story remains the same.⁵

Following Ranis and Fei, Chenery and his co-researchers also take an agnostic approach towards the institutional underpinnings of the Lewis model.⁶ They rather adopt a *statistical approach* and look for “patterns of economic growth,” based on the variations in the ways GDP sectoral composition changes occurred in different countries. Based on their empirical analysis, Chenery and his colleagues develop a typology of three distinct patterns of structural change, characterizing three different groups of countries, namely the (i) large economy, (ii) small, primary oriented economy, and (iii) small, industry oriented economy. Since scale and resource endowments interact differently in each group, patterns of structural change are best described, in their view, by analysing separately the three groups of countries. In the process, Chenery and his colleagues put forward several additional characteristic features of the development process, such as steady accumulation of physical and human capital, changes in consumer demands, increased urbanization, and demographic transition.

It may be noted that the Lewis model is not a complete general equilibrium model. It provides mostly, what may be called, a “supply side” explanation of structural change, based on some ad hoc assumptions, as noted above. While continuing with this tradition, Chenery and his associates draw attention to some “demand side” explanations of structural change. Important among these is the Engel’s Law, according to which, the share of income spent by a person on food (agricultural products, in general) decreases, as the income level rises, while the share of income spent on manufacturing products increases. It may be noted that for the above process to unfold, it is not necessary for labour to have lower productivity in the agriculture sector than in manufacturing and services sectors. Thus, the demand side factor, represented by Engel’s Law, can explain change in sectoral composition, but not structural change as a source of growth. For the latter to happen, one needs again the assumption of lower labour productivity in food producing sectors as compared to that in non-food producing sectors.⁷

While it is true that, historically, labour productivity in the agriculture sector was lower than in the manufacturing sector, many different possibilities opened up in this regard with time. In order to see these possibilities, it is first necessary to note an important analytical distinction between “manufacturing” and “industry.”

2.3 Manufacturing vs. industry

In understanding the implications of structural change and particularly the diverse outcomes that are now possible in this regard, it is necessary to notice an analytical distinction between “manufacturing” and “industry.” Manufacturing refers to a particular type of economic activity or sector (or sub-sector) of the economy. By contrast, the word “industry” is used in two senses. In one sense, it is considered to be synonymous with

5 See for example, Fei and Ranis (1963, 1964, 1969, 1997), and Ranis and Fei (1961, 1963, 1975).

6 See for example, Chenery (1960 and 1979), Chenery and Taylor (1968), and the papers included in Chenery, Robinson, and Sirquin (1986).

7 Despite these additions to the description and explanation of the process of structural change, many remained dissatisfied with the Chenery-style study of patterns of development, pointing to the lack of attention to the causal connections and to its atheoretical nature, in general.

manufacturing as a sector or what is sometimes referred to as the “secondary” sector.⁸ In another sense, industry refers to a type of technology, namely technologies that rely on “machine” power instead of “muscle” power, as noted earlier. The use of machines allows labour to produce far more than was possible using muscle power by even the most skilled worker. In this sense, “industry” is synonymous with higher productivity.

Though the use of machines began historically with the manufacturing sector, there was no reason why machines could not be used in other sectors too. In fact, the use of machines did spread to other sectors over time, raising labour productivity in them. In other words, other sectors can also undergo “industrialization,” by switching from the use of muscle power to the use of machines, transiting in the process from low productivity to high productivity. Indeed, in all developed countries, traditional (pre-industrial) agriculture has transited to *industrial agriculture*, using machines. In some of these countries, labour productivity in agriculture is not all that different from that in the manufacturing sector. Similarly, the service sector can get industrialized by switching to the use of machines. Many parts of the service sector in developed countries use highly sophisticated machines, yielding high labour productivity.

The discussion above shows that to become a high productivity economy, it is not necessary to switch from agriculture to manufacturing. Instead, a country can industrialize its agriculture or the service sector. (This possibility has important implications for the Structural Change paradigm, as we will see later.) However, achieving the latter goal also requires machines, which are produced by the manufacturing sector. Hence, without some capacity to produce and service machines, i.e. without a certain degree of development of the manufacturing sector, it may be difficult for an economy to industrialize its non-manufacturing sectors. It is not surprising therefore that technological progress achieved in the manufacturing sector is generally found to have positive externalities benefitting the entire economy. In view of the above, it may indeed be argued that developing the manufacturing sector to a certain level should be a priority task for many developing countries, as has been called for in the 2030 Agenda.

III Patterns of structural change during the recent wave of globalization

The range of possibilities with regard to structural change noted above has widened further with deeper globalization since the 1980s. The Structural Change paradigm, developed in the 1950s and 1960s, generally assumed a *closed* economy. Though this assumption was not always explicit, external flows did not have an important role in these discussions. A corollary of the above was that structural change would have a similar pattern in all countries (at least in all countries belonging to particular groups, as in the case of Chenery’s classification). This closed-economy assumption ignored the fact that the First Industrial Revolution of England depended greatly on the colonies both as source of capital and raw materials and as captive markets. In that sense, England actually was the first example of “export-led” growth.⁹

However, since the 1980s, globalization reached a higher level. The introduction of “container-shipping” and revolution in information and communication technology created a new situation where “offshoring” (export of production processes overseas in order to import back a significant part of the output) became profitable. Offshoring also created opportunities for developing countries to expand their manufacturing sector and

⁸ “Secondary” sector is sometimes defined as to comprise manufacturing, construction, and mining.

⁹ For more on this, see Islam (2011).

sustain its high share in GDP for a longer period, postponing the downturn implied by the hunch-back shaped pattern of the classical Structural Change paradigm. On the other hand, globalization created greater possibilities of disruption and decline of the local manufacturing sector through ill-timed, ill-conceived, and ill-implemented liberalization policies. Globalization also made it easier for a country to meet its demand for non-food items through import, so that the Engel’s Law mechanism pushing for higher share of manufacturing in the domestic economy lost some of its force.

The era of globalization thereby unleashed forces working in different and sometimes opposite directions, and the outcome regarding structural change depended on the concrete situation of a country and the concrete policies it adopted and implemented. Also, many other processes unfolded during this period, so that the observed deviations from the classical Structural Change paradigm cannot be attributed to globalization alone. Nevertheless, it cannot be denied that globalization had an important bearing on changes in GDP composition observed during this period and thereby *contributed* to the observed deviations from the classical Structural Change paradigm. These deviations may be categorized into the following types or effects of globalization:

- a. Manufacturing-enhancing effect
- b. Agriculture-enhancing effect
- c. Service sector-enhancing effect
- d. Stalled industrialization effect
- e. Premature de-industrialization effect, and
- f. Manufacture hollowing-out effect

The first five of the above (effects) apply primarily to developing countries, while the last—“manufacturing hollowing out” effect—is largely applicable for developed countries.

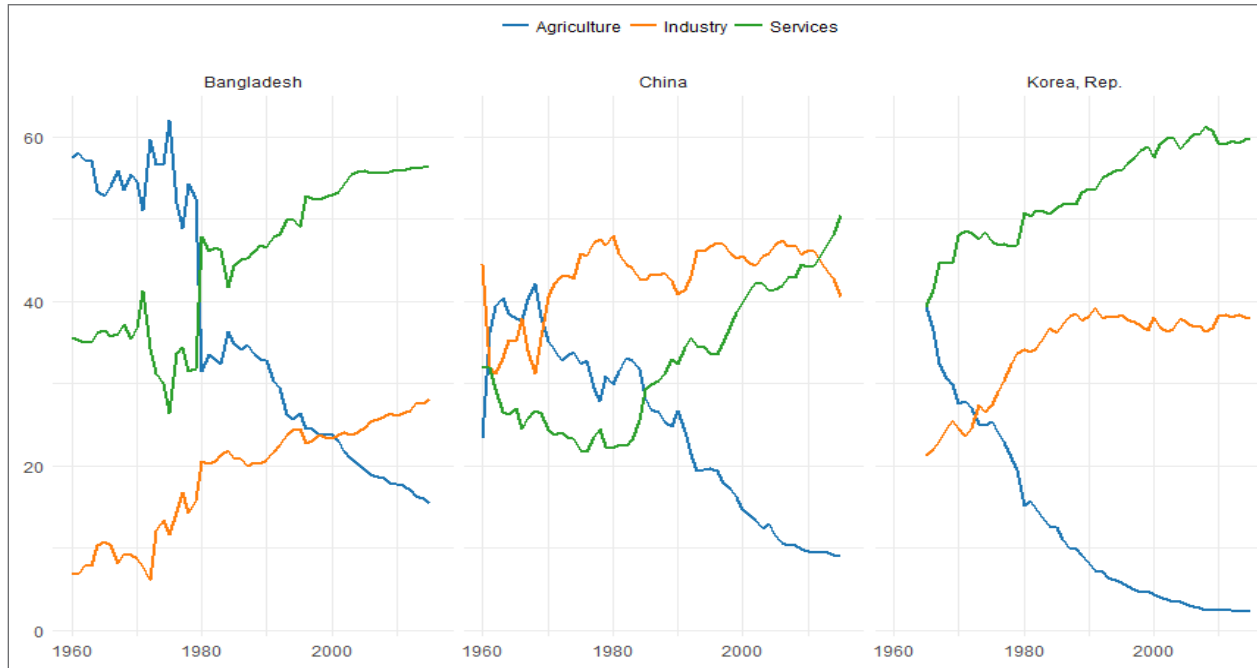
The evidence of the above effects is not difficult to find. For example, the experience of countries such as the People’s Republic of China, Republic of Korea, and Bangladesh shows evidence of the manufacturing-enhancing effect of globalization (Figure 5). These countries have been able to raise the share of the manufacturing sector in their GDP and also to avoid its decline (the hump) so far. (China’s manufacturing share curve shows a downward turn in recent years. However, it still remains to be seen whether this is a durable trend.)

The experience of countries such as Mauritius, Costa Rica, and India shows evidence of service sector-enhancing effect of globalization (Figure 6). These countries witnessed marked increase in the share of the service sector in their GDP. On the other hand, the experience of Thailand, Uruguay, and Vietnam shows evidence of agriculture-enhancing effect (Figure 7). These countries experienced a drop in the share agricultural sector in the 1970s and 1980s. However, they have since been able to raise or keep stable the share of the agriculture sector, while at the same time increasing the share of industry.

The experience of some of these countries illustrates the intertwined character of different effects of globalization. For example, India has been able to raise the service sector’s share in its GDP while at the same time increasing the share of the industry sector. Similarly, Thailand has been able to raise the share of the agriculture sector while at the same time raising the share of the industry in its GDP.

Figure 5
Manufacturing enhancing effect

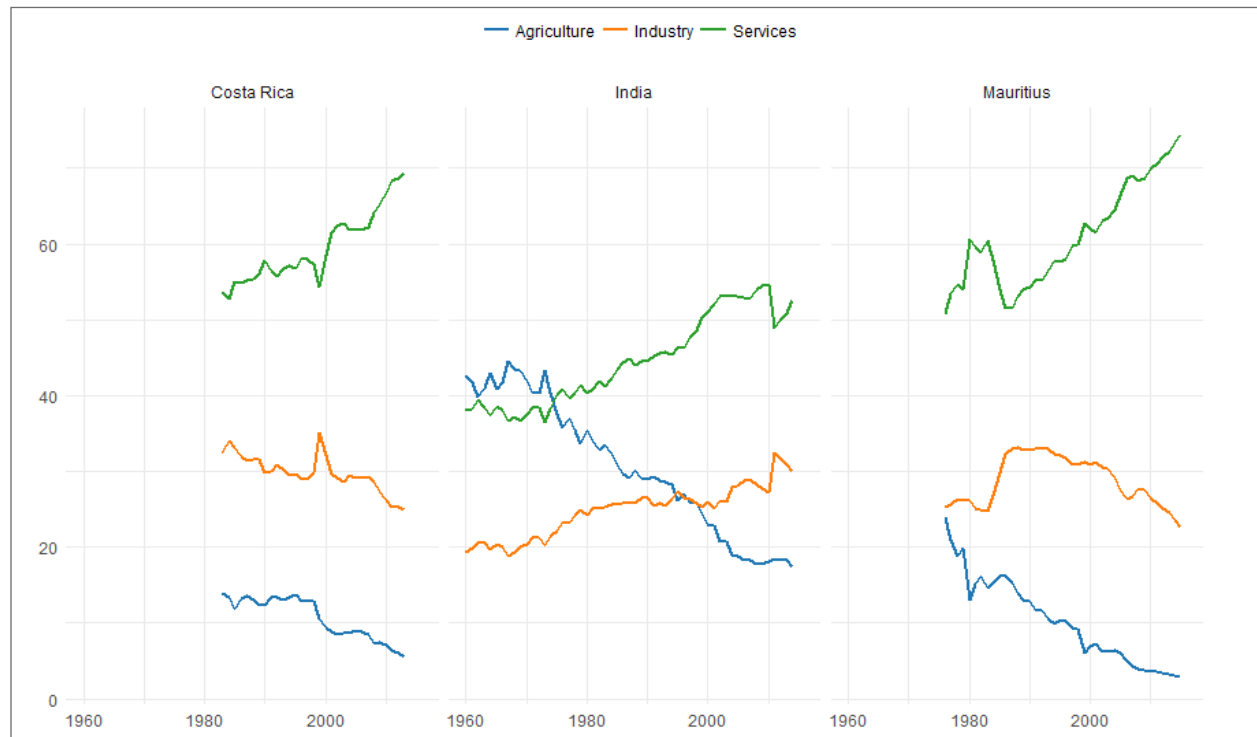
Value added, percent of GDP



Source: World Bank World Development Indicators

Figure 6
Service sector enhancing effect

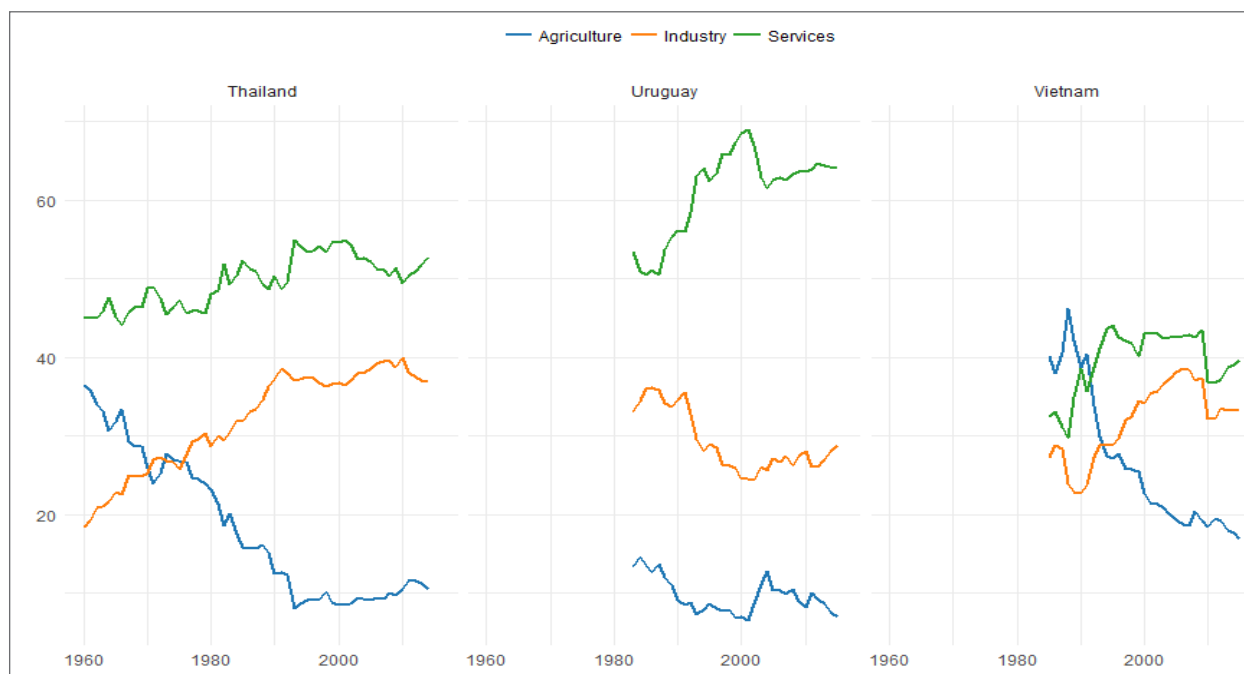
Value added, percent of GDP



Source: World Bank World Development Indicators

Figure 7
Agriculture enhancing effect

Value added, percent of GDP



Source: World Bank World Development Indicators

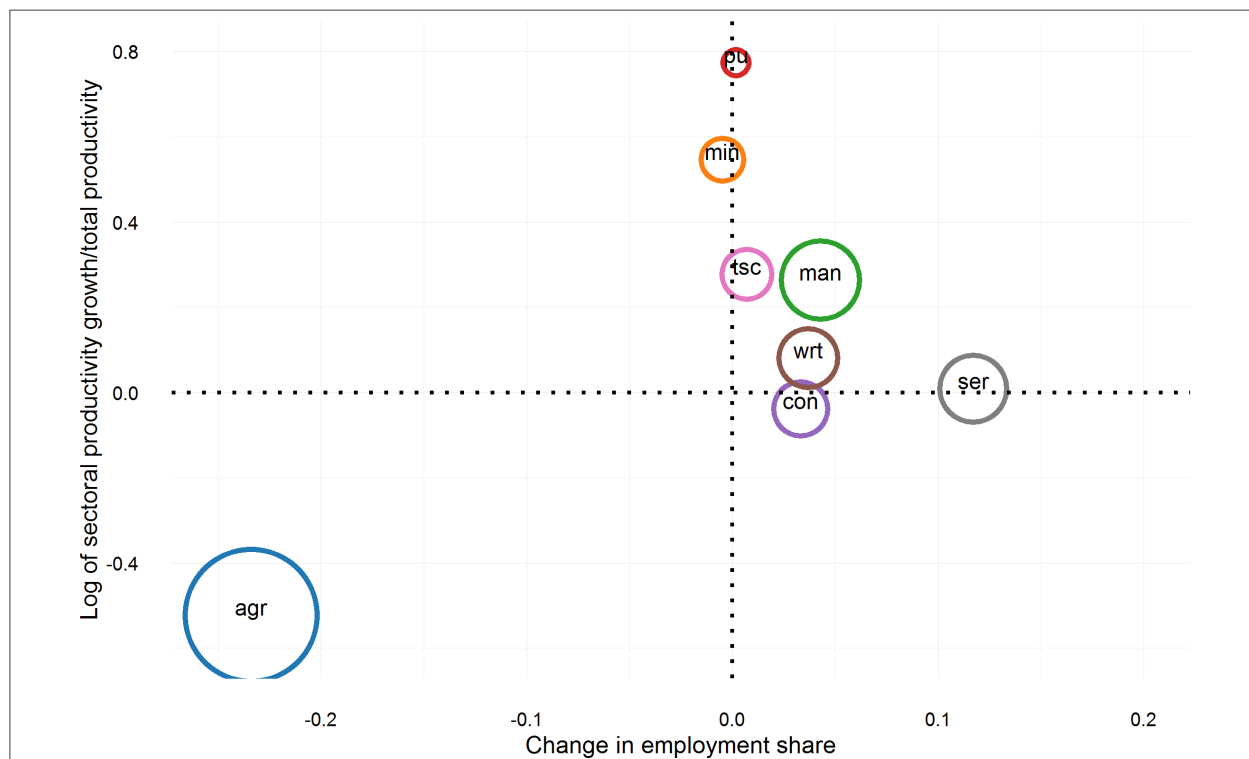
The complicated nature of structural change is also illustrated by the fact that growth-enhancing structural change with increased labour productivity can be the outcome of very different underlying processes. A comparison of the experiences of the People’s Republic of China and of China, Hong Kong SAR may illustrate the point (Figures 8 and 9).

Figure 8 shows that the People’s Republic of China witnessed significant increase in the share of manufacturing in total employment. Much of that increased employment was achieved through transfer of labour from the agriculture sector, which—conforming to the classical pattern of structural change—had a lower productivity of labour than in the manufacturing sector. As a result, *expansion* of the manufacturing sector in mainland China led to an increase in aggregate productivity and growth-enhancing structural change.

On the other hand, Figure 9 shows that Hong Kong SAR of China witnessed significant employment decline in the manufacturing sector, with most of the displaced labour absorbed by the service sector. The general perception is that labour productivity is lower in the service sector than in manufacturing. This was however not the case in Hong Kong SAR of China. As a result, the *decline* in manufacturing led to an increase in aggregate productivity in Hong Kong SAR of China.

Thus, both the economies witnessed increases in aggregate productivity and growth-enhancing structural change. However, while in the People’s Republic of China it was caused by an *increase* in the share of manufacturing in the GDP, it was caused in Hong Kong SAR of China by a *decrease* in the share of the manufacturing sector.

Figure 8
Sectoral productivity and change in employment share in People's Republic of China, 1990-2010



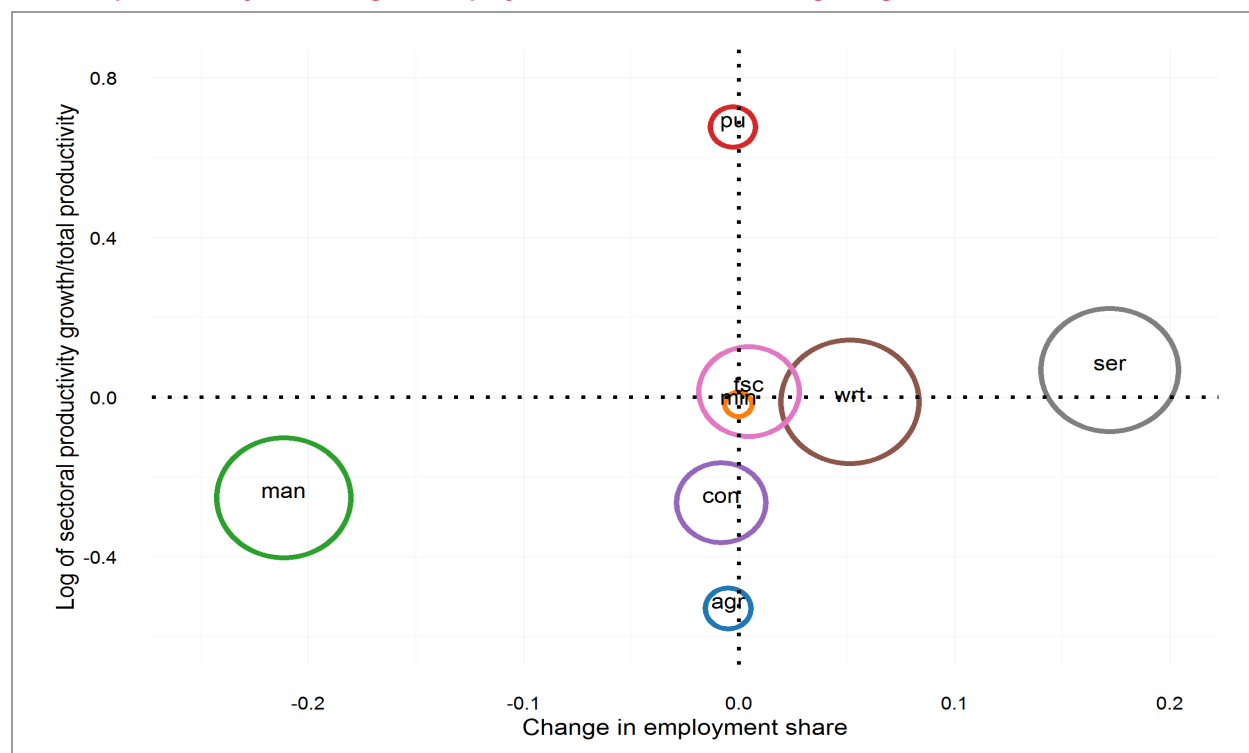
Notes: Abbreviations are as follows: agr = agriculture; min = mining; man = manufacturing; pu = public utilities; con = construction; wrt = trade, restaurants and hotels; tsc = transport, storage and communication; ser = other services (including finance, insurance, real estate and business services, government services, and community, social and personal services). Size of circles represents employment share in 1990.

Source: Authors' calculations with data from Timmer, M. P., de Vries, G. J., & de Vries, K. (2015)

As noted above, during the period of accelerated globalization, many developing countries experienced structural changes that were not conducive to raising their aggregate productivity. Stalled industrialization and premature de-industrialization resulting in stagnant or declining aggregate productivity are two manifestations of this type of structural change. These phenomena have been particularly true for many countries of Africa and Latin America, and the Commonwealth of Independent States (CIS) and East European countries. Thus, the phenomenon of stalled industrialization can be seen in such countries as Kenya, Burundi, and Burkina Faso (Figure 10). The share of industry in GDP of these countries remained limited to about 20 percent throughout this period.

The phenomenon of premature de-industrialization is more prominent in Latin America and the Caribbean countries (Figure 11). While East Asia and the Pacific Region have been able to hold the share of the manufacturing in GDP at around 30 percent, in Latin America and the Caribbean, it plummeted from around 27 percent in the 1980s to around 17 percent in the late 1990s and then to below 15 percent since 2012. Similarly, the share of industry in the GDP reached high levels in 1970 in Argentina, Brazil, and South Africa. However, instead of being sustained at these high levels—as has generally been the case and expected under

Figure 9
Sectoral productivity and change in employment share in China, Hong Kong SAR, 1990-2010



Notes: Abbreviations are as follows: agr = agriculture; min = mining; man = manufacturing; pu = public utilities; con = construction; wrt = trade, restaurants and hotels; tsc = transport, storage and communication; ser = other services (including finance, insurance, real estate and business services, government services, and community, social and personal services). Size of circles represents employment share in 1990.

Source: Authors' calculations with data from Timmer, M. P., de Vries, G. J., & de Vries, K. (2015)

the Structural Change paradigm—this share started to plummet in the 1980s and has continued to decline (Figure 12).¹⁰

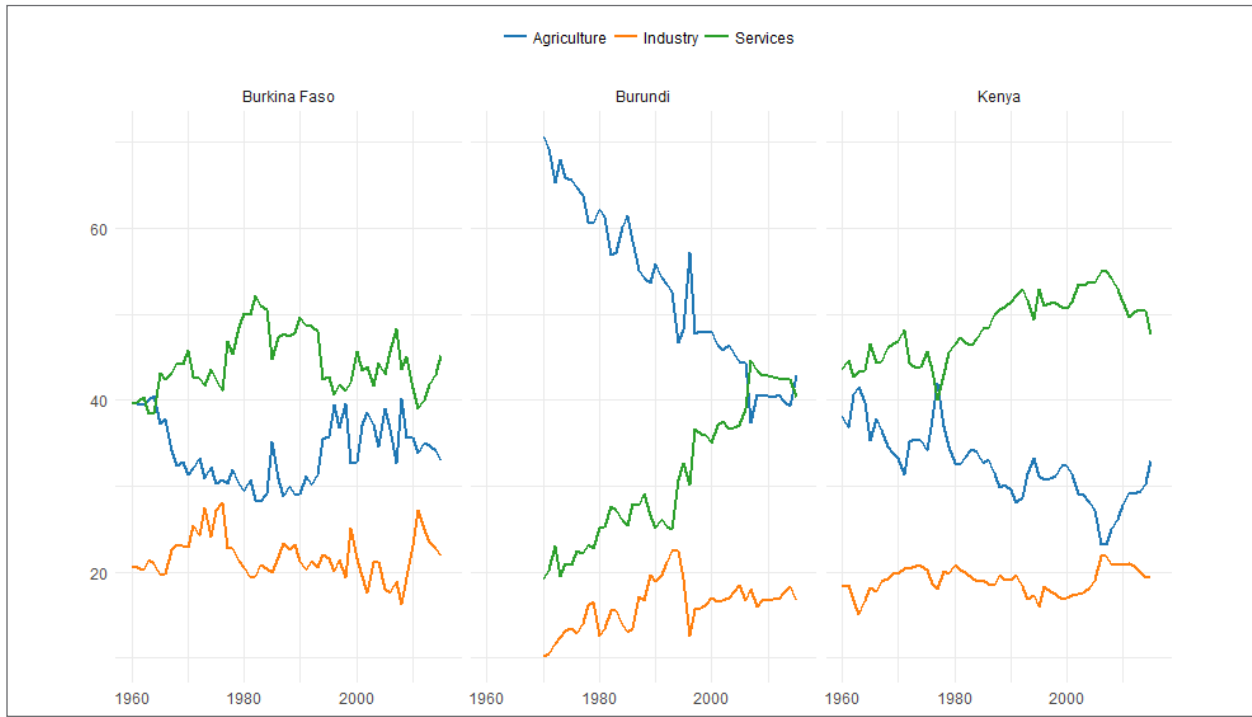
Finally, it may be noted that the process of offshoring that facilitated the “manufacturing-enhancing effect” of globalization has its counterpart in “manufacturing hollowing-out effect” for many developed countries. Figure 13 presents evidence of this process of mature de-industrialization of many developed economies. As we can see, there has been a precipitous decline in the share of industry in total employment in France, Germany, Japan, the United Kingdom, and the United States. There has been a similar decline in industry’s share in total output, though the pace of decline of this share seems to have slowed down in recent years (since 2010), most likely due to faster increase in labour productivity in this sector.

Overall, the evidence shows that the recent period of greater globalization created both opportunities and challenges for developing countries regarding structural change. On the one hand, it created the opportunity

¹⁰ The above shows that developing countries witnessed many different types of experiences with regard to structural change during the recent period of deeper globalisation. Of course, proving that the distinct patterns seen above are indeed the result of globalization will require presentation of counterfactuals (showing what would have happened to these countries if there were no globalization), which are difficult to obtain. However, circumstantial evidence indeed suggests that effects of globalisation, interacting with the local conditions, played an important role in producing these outcomes.

Figure 10
Stalled industrialization

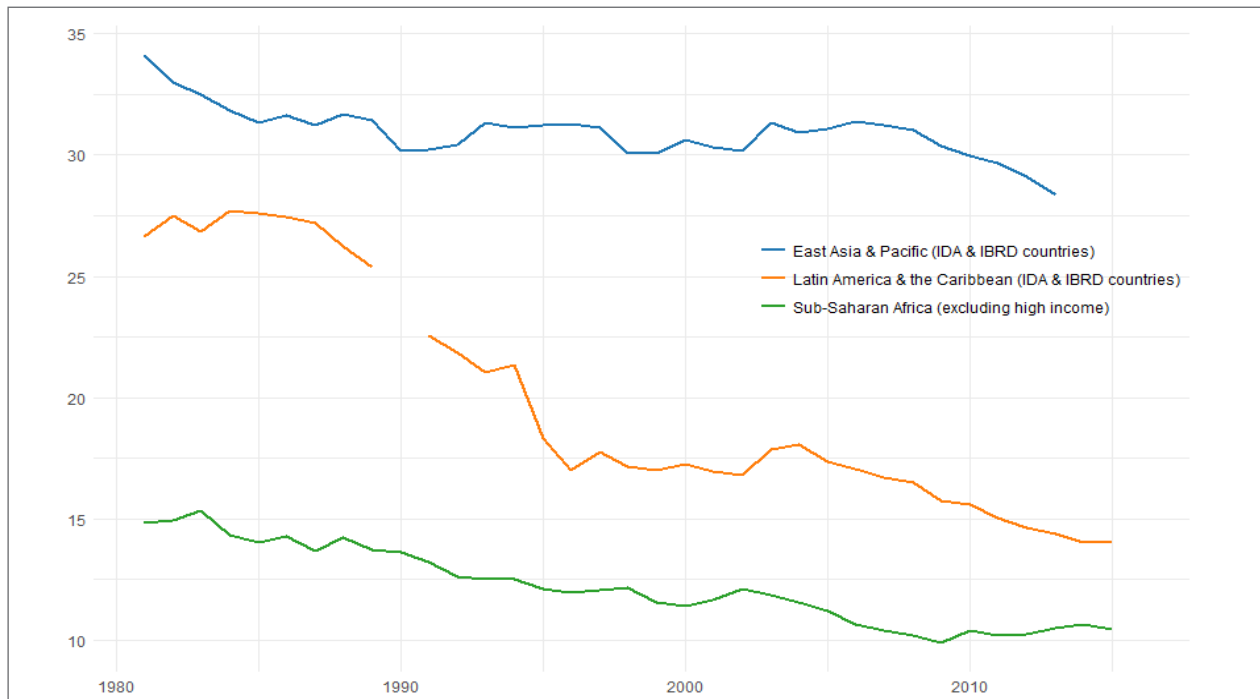
Value added, percent of GDP



Source: World Bank World Development Indicators

Figure 11
Regional variation in the share of manufacturing value added in GDP

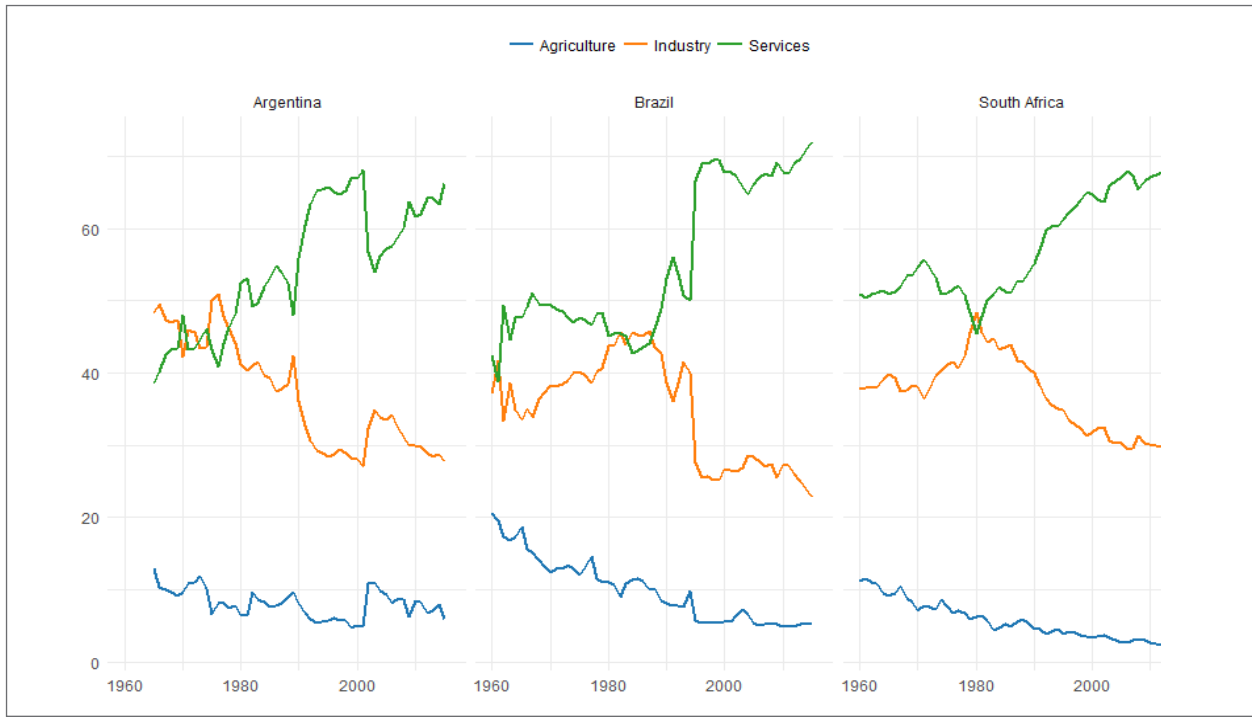
Value added, percent of GDP



Source: World Bank World Development Indicators

Figure 12
Premature de-industrialization

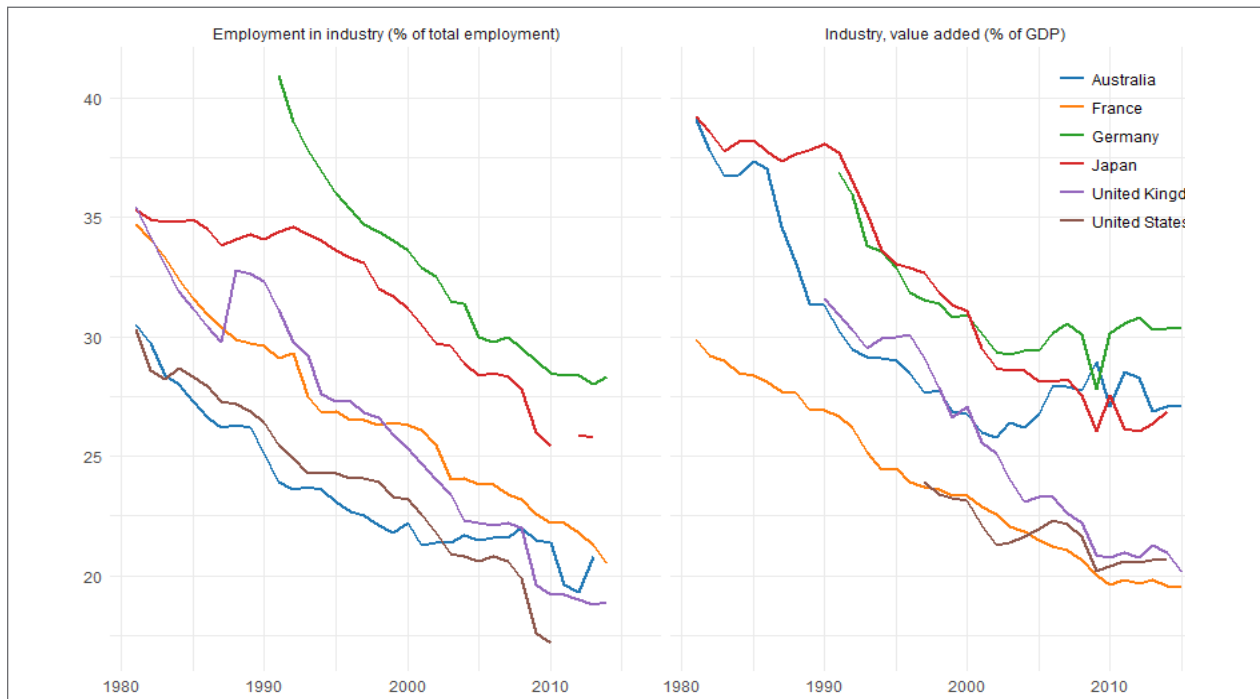
Value added, percent of GDP



Source: World Bank World Development Indicators

Figure 13
De-industrialization in developed countries

Industry share of total employment and industry value added, percent of GDP



Source: World Bank World Development Indicators

for these countries to achieve a higher share of manufacturing and sustain it for a longer period. It also allowed some economies to reach higher aggregate productivity levels without having to conform to the classical pattern of structural change. On the other hand, during this same period of globalization, many countries found it harder to follow the classical pattern of structural change.

It is largely in view of the latter effects of globalization that the 2030 Agenda took a proactive stance with regard to structural change, particularly for the Least Developed Countries, by recommending significant increase in the share of the manufacturing sector in their GDP. However, it is also clear that the recommended structural change has to conform to sustainable development. Already, through MDGs, the United Nations member countries displayed their intention to focus on the social goals, instead of limiting to economic growth. Through Rio+20, they have showed their commitment to environmental goals. Accordingly, the 2030 Agenda could not just focus on the Structural Change paradigm, but had to put forward the overarching goal of “Transformative Change” to accommodate all three dimensions of sustainable development and their interlinkages.

IV From Structural Change to Transformative Change

4.1 The quest for Transformative Change towards sustainable development

The quest for a transformative change to ensure sustainable development has been going on for quite some time. In a sense, it started in the 1970s when it became apparent that the aggregate effects of human activities were hitting the “planetary boundaries.” The idea was related to the concept of “carrying capacity” suggesting that there are limits to the earth’s capacity to provide ecological resources that human societies need and to absorb the waste they generate through the use of these resources. Both “planetary boundaries” and “carrying capacity” basically bring to fore the issue of *scale*. In other words, the aggregate scale of human activities at the global level cannot exceed certain limits.

The 1972 (June 5-16) United Nations Conference on the Human Environment (Stockholm conference) was a milestone in this regard. It adopted a Declaration with 26 principles and an Action Plan with 109 recommendations. The Conference also coincided with the formation (on June 5, 1972) of the United Nations Environmental Programme (UNEP) with the mandate to promote activities aimed at environmental protection.

The basic idea that there are limits to the planet’s capacity gradually gained more ground. Publications by the Club of Rome helped to draw attention to the planetary boundaries. Initially these publications were focused on the limited character of the supply (availability) of natural resources (Meadows et al. 1972). Later, the focus was extended to the limited capacity of the planet to absorb the waste, in particular, the waste in the form of the Greenhouse Gas (GHG) emissions (Meadows, Randers, and Meadows 2002).

The influential volume, *Toward a Steady State Economy*, edited by Herman Daly came out in 1973 (Daly, 1973). The authors of this volume showed that the human (economic) system was a sub-system of the planetary bio-physical system. The latter is limited, and, hence the human system has also to be limited. Thus, economic growth, in the sense of increase in the aggregate global level of material consumption, cannot increase ad infinitum. Transformation of the human system, including transformation of production and consumption pattern is therefore necessary in order to conform to the bio-physical limits of the planet. Instead of unlimited

growth, it is necessary to strive toward a steady state economy, meaning an economy that is compatible with the bio-physical limits of the earth.

Nicholas Georgescu-Roegen however came out with a stricter view. In his classic work, *The Entropy Law and the Economic Process*, he put forward the contention that even a steady state is not possible, because material resources continuously get degraded (Georgescu-Roegen 1971). Questions were raised about the Georgescu-Roegen’s application of the second law of thermodynamics to material resources. However, he stuck to his pessimistic view regarding growth and became one of the inspirations for the current *de-growth* movement. According to the latter, the global scale of economic activities not only need to stop from growing any further; it needs to be reduced in order to ensure that human societies can remain viable for a longer period.

With time, the general concept of planetary boundaries became more concrete. For example, scientists associated with the Potsdam Institute for Climate Impact Research (PIK) identified nine planetary boundaries. These are (i) climate change; (ii) change in biosphere integrity (bio-diversity); (iii) stratospheric ozone depletion; (iv) ocean acidification; (v) biogeochemical flows (phosphorus and nitrogen cycles); (vi) land-system change; (vii) freshwater use; (viii) atmospheric aerosol loading; (ix) introduction of novel entities. According to them, “these nine processes and systems regulate the stability and resilience of the Earth System—the interactions of land, ocean, atmosphere and life that together provide conditions upon which our societies depend” (Rockstrom et al. 2009). Emphasis on the ecology as the fundamental base of human societies and the necessity of its protection led to the founding of the new journal, *Ecological Economics*, in 1989, with Georgescu-Roegen and Costanza as the Co-editors.

The scientists’ concerns regarding the resource and absorption capacity limits and general environmental deterioration and their implications for development gradually moved the governments to action. The United Nations established the World Commission on Environment and Development (WCED) in 1983. Popularly known as the Brundtland Commission, WCED, in its 1987 report, *Our Common Future*, formalized the concept of sustainable development, defining it as development that “meets the needs of the present without compromising the ability of future generations to meet their own needs (WCED 1987).”¹¹

The quest for more socially meaningful and environmentally sensitive economic growth became stronger by the 1990s. The end of the Cold War and the possibility of the Peace Dividend created a lot of enthusiasm, and the advent of a new millennium prompted long-term thinking. Responding to this new environment, the 1992 UN Conference on Environment and Development (Rio Earth Summit) adopted the wide-ranging *Agenda 21*. A series of global conferences were held in the 1990s putting forward quantitative goals regarding different social development objectives. The process culminated in the adoption of the Millennium Declaration, followed by the adoption of the Millennium Development Goals (MDGs), in which the focus was directly on various social development goals.

The implementation of *Agenda 21* thus bifurcated into two tracks, which were not closely tied together (Islam 2014). One track was represented by the Millennium Development Goals (MDGs), striving to cover parts of the *Agenda 21* that are related to poverty, education, and health. Environmental issues were largely left out of their scope. The other track was represented by such processes as the UN Framework Convention on Climate Change (UNFCCC), UN Convention on Biodiversity, and the UN Convention on Desertification. Clearly, this track focused on environmental issues, without however connecting them with socio-economic issues directly.

¹¹ The proponents of steady state growth and de-growth are however not very enthusiastic about the concept of sustainable development, because it does not rule out further increase in the global scale of economic activities.

Ultimately, this bifurcation did not always produce desired results. For example, the economic processes through which poverty reduction was achieved also led to further widening of the breaches in the planetary boundaries. According to the 2015 report by Potsdam Institute scientists, of the nine planetary boundaries mentioned above, four have already been breached. These are: climate change, biosphere integrity, land system change, and biogeochemical cycles. Of these, two—namely climate change and biosphere integrity—are thought to be “core boundaries,” gross violations of which would “drive Earth system into a new state.” (Steffen et al. 2015)

Thus, MDG successes left many less than satisfied. Many governments and other sections of the international community felt the need to place environmental concerns more at the center of the global development goals. The formulation and adoption of 2030 Agenda with 17 SDGs reflected this need.

4.2 More encompassing nature of Transformative Change

Aggravation of the environmental crises therefore provided one side of the background of the United Nations Conference on Sustainable Development (UNCSD)—popularly known as the Rio+20 conference—held in 2012. Another side was provided by the problem of arrested industrialization, pre-mature de-industrialization, lack of adequate growth and infrastructure development in many low-income countries, as noted in Section 3. The latter outcomes were traced in part to the emphasis on social goals in the MDGs, which did not contain any explicit goal or target regarding economic growth, industrialization, and infrastructure development.¹² UNCSD wanted to address this lacking, while at the same time emphasising the environmental goals. *The Future We Want*, the outcome document of UNCSD, therefore called for formulation of a set of “sustainable development goals” that “incorporate in a balanced way all three dimensions of sustainable development and their interlinkages (p. 63).”¹³ To formulate such goals, it resolved to establish “an inclusive and transparent intergovernmental process... that is open to all stakeholders.” The 2030 Agenda, with 17 SDGs and 169 targets was the outcome of this process that unfolded over the next three years.¹⁴

In view of the above, it is not surprising that the 2030 Agenda is more encompassing. It could not be an agenda of just Structural Change, which, as noticed above, did not have much to say regarding either social development or environmental protection. The 2030 Agenda needed a wider concept that had the space to accommodate all three dimensions of sustainable development and their interlinkages. It needed a concept that included structural change and yet superseded it. “Transformational Change” provides that concept.

Of the 17 SDGs, four—namely SDG-12 (sustainable consumption and production), SDG-13 (climate change), SDG-14 (oceans, seas, and marine resources), and SDG-15 (terrestrial eco-systems, biodiversity, etc.)—address environmental issues *directly*. However, environmental concerns are integrated in the formulation of almost all the other SDGs. Agenda 2030 is more encompassing with respect to social goals too. A most prominent manifestation of the latter is SDG-10, calling for reduction of inequality within and among countries. The concern for inequality is integrated in the formulation of other goals too.

¹² Absence of explicit goals did not mean that the importance of economic growth was denied, because achieving social goals generally requires economic growth. Also, the very distinction between economic and social goals has often been an artificial and tenuous one. For example, development of human capital through better education and healthcare can hardly be separated from economic goals when human capital is the most critical input of production.

¹³ This process was different from the more closed-door deliberations on which the MDGs were based.

¹⁴ It declared that “poverty eradication, changing unsustainable and promoting sustainable patterns of consumption and production and protecting and managing the natural resource base of economic and social development are the overarching objectives of and essential requirements for sustainable development (United Nations 2012, p. 1).” It called for a “green economy in the context of sustainable development and poverty eradication, and the institutional framework for sustainable development (p. 2).”

4.3 Universality of Transformational Change

The emphasis on environmental and broader social goals also means that the concept of “Transformational Change” is *universal*. This again contrasts with the Structural Change paradigm, which applies mainly to developing countries whose economies are still dominated by the primary sector. It was believed that the economic structure of developed countries has already undergone the necessary change and has become mature and stable, so that no further significant structural change of their economies was expected. The research by Ranis, Fei, Chenery, and other scholars therefore focused on developing countries to find out whether these were succeeding in carrying out the structural change (implied by the historical experience of currently developed countries) and what could be done to facilitate this change.¹⁵

The universality feature of the SDGs makes them sharply different from the MDGs, which were primarily meant for developing countries, with the role of developed countries limited mainly to providing financial assistance (to developing countries to achieve the MDGs).¹⁶

The universality feature of the SDGs, in a sense, signifies a return to the universality of development agenda during the pre-MDG period. Recall that the agendas of the Development Decades during 1960-1990 were universal, with goals set for both developing and developed countries (though differentiated at the level of quantitative targets). These goals however were focused on GDP growth.

The universality of Transformational Change is not surprising. SDGs cover all the three dimensions of sustainable development.¹⁷ In fact, so far as environmental protection is concerned, it is clear that, in many respects, developed countries have to play the leading role. For example, the 2030 Agenda urges to “*decouple* economic growth from environmental degradation in accordance with the 10-year Framework of Programmes on Sustainable Consumption and Production (8.4).” In this regard, it makes it explicit that this decoupling is to be achieved “with developed countries taking the lead (8.4).” In other places, the leading role of developed countries is implied. For example, the 2030 Agenda calls for “increased resource efficiency and greater adoption of clean and environmentally sound technologies and industrial processes (9.4).” Clearly, developed countries are expected to play the leading role in these areas too. Similarly, developed countries are expected to play a leading role in climate change mitigation and adaptation.

The universality of 2030 Agenda is not limited to its environmental dimension. Instead, it applies to all the SDGs. For example, as noticed earlier, poverty reduction under SDG applies to developed countries too, because poverty related goal is not specified using the international measure (of extreme poverty) only, but also

¹⁵ However, as noticed in the previous section, interestingly and contradicting the earlier researchers’ expectations, the deepening of globalization since the 1980s caused and continues to cause significant structural changes in the economies of developed countries too. Figure 13 documents the dramatic “manufacturing hollowing-out” effect that many developed countries have witnessed during the recent period of deeper globalization. These countries have differed in dealing with the social consequences of manufacturing hollowing out. See Milberg and Winkler (2009) for a discussion of the varied responses of developed countries to the manufacturing hollowing and other effects of globalization. In some countries, these consequences have been severe, leading to backlashes to the process of globalization and to efforts at reviving the manufacturing sector. Thus, the issue of structural change has become relevant for developed countries too.

¹⁶ It is true that in reporting on MDGs, the *Millennium Development Goals* Report of the United Nations provided information regarding developed countries too (see, e.g. United Nations 2015b), in addition to information regarding developing countries, thus striving to provide a global picture. However, this “global” reporting did not negate the fact that the focus of MDGs was on developing countries.

¹⁷ As noted earlier, some of the environmental goals—such as the goal regarding sustainable consumption and production—are more pertinent for developed than developing countries. Similarly, many of the social goals—such the goal reduction of inequality—are particularly relevant for many developed countries.

using national measures of poverty. According to the latter, many developed countries suffer from significant poverty problems. Similarly, SDG 10 regarding inequality is clearly a universal goal, because inequality is a problem that applies to both developing and developed countries.

4.4 Transformative Change subsumes Structural Change

Transformative Change, as already mentioned, subsumes structural change. As noted earlier, the Declaration of the 2030 Agenda calls to “strengthen the productive capacities of least developed countries in all sectors, including through *structural transformation* (para 27, emphasis added).”

In fact, 2030 Agenda appears to endorse the Structural Change paradigm. For example, SDG-9 calls to “significantly raise *industry’s share* of employment and gross domestic product, in line with national circumstances, and *double its share* in least developed countries (9.2, emphasis added).” Similarly, after calling for achieving “at least 7 percent gross domestic product growth per annum in the least developed countries,” SDG-8 calls for “achieving higher levels of economic productivity through *diversification*, technological upgrading and innovation, including through a focus on high-value added and labour-intensive sectors (8.1, emphasis added).” Elsewhere, the 2030 Agenda calls for “*industrial diversification* and value addition to commodities (9.b, emphasis added).” The emphasis on raising the share of industry in the economy may appear to contradict the possibility of diverse patterns of structural change through which a country can reach high levels of aggregate productivity, as noticed during the recent period of globalization. However, we noticed that even to industrialize its agriculture and services sector, an economy requires a certain level of manufacturing capability. In that sense, 2030 Agenda’s emphasis on raising “industry’s share” may not be viewed as rejection of alternative patterns of structural change as a way to development.

It is therefore clear that structural change—both classical and non-classical—is very much a part of the Transformational Change that the 2030 Agenda envisages. The question is how the structural change under the 2030 Agenda can be in conformity with the goal of sustainable development.¹⁸

V Structural change under the 2030 Agenda for Sustainable Development

The implications of the 2030 Agenda for structural change can be discussed by considering each of the three dimensions of sustainable development, namely economic growth, social development, and environmental protection.

5.1 Structural change and economic growth

It may appear that, since the classical concept of structural change focused on economic growth, there are not many additional implications of sustainable development for it. However, that is not the case.

¹⁸ The primary motivation for offshoring has been utilization of cheap labour of developing countries. However, to the extent that manufacturing is often more polluting, developed countries have also *exported pollution* to developing countries. Thus the manufacturing-enhancing route—the classical version of structural change—is also more problematic from the viewpoint of environmental protection. It will be necessary to keep the above in mind while implementing SDG-9.

For example, there has been a heightened realization in recent years that for sustainable development, economic growth has to be *sustained*, instead of being characterized by a boom-bust pattern.¹⁹ Experience has shown that adverse social effects of economic downturns persist much longer than the downturns themselves. In many cases, these downturns cause permanent damages from which many sections of the population can never fully recover. For example, families may never recoup the loss of capital assets that they had to liquidate to tide over the crises. These damages may persist even through several generations because of setbacks in education and health that the affected families’ children suffer, diminishing their job and earning prospects in the future.

One way to mitigate the swings of economic cycle is *diversification*, not only across sectors but also within sectors. The classical structural change concept was mostly focused on the change of GDP composition in terms of such broad sectors as agriculture, manufacturing, and services. While diversification across broad sectors is certainly helpful, diversification within sectors plays a crucial role in making an economy more resilient to trade cycles. For example, some developing countries have been successful in raising the share of manufacturing in their GDP through concentration on one or two subsectors (such as production of ready-made garments, RMG). Such a narrow focus creates a situation that is similar to that faced by the so-called “mono-crop” countries, which rely on one or two agricultural crops for their export earnings and economic well-being. Thus, a country may remain as vulnerable to economic swings as mono-crop based agricultural countries even though it has raised the share of manufacturing in its economy and by that measure succeeded in achieving structural change.

Another important requirement to sustain economic growth in the long run is to pay attention to dynamic comparative advantage.²⁰ The traditional trade theory is static and focuses on comparative advantage at a particular point of time, based on existing factor proportions. The experience has however shown that comparative advantage evolves over time, depending on the changes in the education and skill composition of the labour force, technological level, and product composition—all of which can be influenced through policies. Thus, the success of an economy based on the current comparative advantage may not last long unless it continuously upgrades its comparative advantage through appropriate policies directed toward its labour, capital, product composition, and technology. Conscious efforts need to be made to move from low-tech and low value-added products to high value-added and technologically sophisticated products.

It is in view of the realization above that the 2030 Agenda lays considerable emphasis on diversification *within* the industrial sector, technological upgrading and innovation, and a focus on high-value added products. Thus, even remaining within the domain of economic growth, structural change under the 2030 Agenda needs different focus and emphasis than what were implied by the classical concept of structural change.

5.2 Structural change and social development

Social goals, as noted above, were not prominent in the discussion of structural change. The implicit assumption has been that once per capita income rises (as a result of GDP growth, attained through structural change), the social goals will also be achieved. However, as noted above, experience has shown that increases

¹⁹ See WESS 2014/2015 for discussion of the necessity of sustained economic growth for sustainable development.

²⁰ See for example OECD (2011a) for a discussion of the importance of building and using dynamic comparative advantage for success in growth and development in a globalized economy.

in aggregate or per capita income do not always ensure achieving the social development goals.²¹ Much depends in this regard on the distribution of income. Unless the distribution of the incremental income is favourable for people belonging to the low-income groups of the population, a higher aggregate or per capita income may not have the desired effect on social development. Other proactive policies directed toward access and voice are also necessary to achieve the social goals. The question therefore is whether there are structural changes that are more favourable to social development than others. In particular, are there structural changes that lead to more equitable distribution of income than others?

One way in which structural change can improve income distribution is by raising the share of the labour in the national income. Therefore, structural changes that make greater use of labour in labour “surplus” developing countries should be helpful in raising the wages and better distribution of income. By contrast, adoption of capital intensive technologies leaving large pools of labour unemployed is likely to worsen income distribution.

In the context of the Heckscher-Ohlin model of trade (Heckscher (1919) and Ohlin (1933)), the Rybczynski theorem indeed predicts greater use of the more abundant factor of production, once the countries open up to trade (Rybczynski (1955)). The Stolper-Samuelson theorem traces this effect further by predicting a rise of the rate of return of the abundant factor and decrease of the rate of return of the scarce factor (Stolper and Samuelson (1941)). For a labour-surplus developing economy, these predictions raised the hope of a more equitable distribution of income resulting from structural changes that opening up would cause. Unfortunately, the real world is so far apart from the simplistic construct of the Heckscher-Ohlin model that globalization has resulted in an increase in income inequality in most countries—both developing and developed (Milanovic, 2016).

Thus, it is difficult to rely on the spontaneous forces of trade and the structural changes they bring about for achieving the social goals of development.²² Instead, conscious efforts will have to be made so that the structural change leads to increases in the share of labour in national income. In doing so, attention however needs to be given to the necessity of creating and making use of dynamic comparative advantage, noted above, so that the economy does not get stuck with labour-intensive low value-added products that cannot sustain growth of labour income in the future.

Furthermore, attention needs to be paid to *intra*-labour income differences. Much of the inequality increase in recent years in many countries has been traced to increased inequality between incomes of different groups and types of labour.²³ Thus focusing attention on structural change that increases labour income share only in the aggregate may not be effective in achieving such social goals as eradication of poverty and hunger. In addition to influencing the nature of structural change, it will also be necessary to adopt other distributive policies in order to achieve the social goals.

²¹ There is also the broader critique by Amartya Sen levelled against per capita GDP as an indicator of well-being. Sen defines development as “freedom” and recommends to focus on the “functionings” that an individual wants to perform and his or her “capability” to actually do so, as the main indicator and goal of development. See Sen (1985 and 1989). We are not getting into those deeper issues here.

²² The validity of the Heckscher–Ohlin model has been questioned since the classical Leontief paradox. Indeed, Feenstra (2004) called the Heckscher–Ohlin model “hopelessly inadequate as an explanation for historical and modern trade patterns”. As for the Stolper–Samuelson theorem itself, Davis and Mishra (2006) recently stated, “It is time to declare Stolper–Samuelson dead”. They argue that the Stolper–Samuelson theorem is “dead” because following trade liberalization in some developing countries (particularly in Latin America), wage inequality rose, and, under the assumption that these countries are labor-abundant, the Stolper-Samuelson theorem predicts that wage inequality should have fallen.

²³ See for example ILO (2015) and OECD (2011b) for a discussion of the impact of wages and labour market dynamics on inequality.

Thus, structural change under the 2030 Agenda has to be different from the structural change of the spontaneous type. This will however require considerable concrete research and careful policy formulation in the light of the concrete circumstances of an individual country.

5.3 Structural change and environmental protection

The classical concept of structural change did not have much to say with regard to environmental protection. To a great extent this was a limitation imposed by the time. During the heyday of the structural change discussion—i.e. during 1960s—environmental problems had not yet become acute. Currently however, environmental problems, in general, and climate change, in particular, are overshadowing other problems. Structural change now therefore has to pay much attention to its environmental impact.

Environmental impact however is a wide-ranging concept, and it is beyond the scope of this paper to consider all its elements. However, there are some aggregate measures of the state of environment that can be used for our purpose. One such measure is Greenhouse Gas (GHG) emissions that reflect the level and nature of a variety of economic and ecological processes. Another, more recent, measure is “Ecological Footprint” that refers to the biological space—measured in hectares of terrestrial space—required to produce the natural resources that an average person consumes and to absorb the waste he or she generates. There are advantages and disadvantages of both these measures.²⁴ In the discussion below, we use GHG as the overall measure of environmental quality.

We noticed in Section 3 that globalization can have different effects on structural change. It is important to note that these effects are not neutral with regard to their environmental impact. The previous sections identified countries that experienced “agricultural-enhancing” (Thailand, Uruguay, and Vietnam), “manufacturing-enhancing” (Bangladesh, People’s Republic of China and Republic of Korea) and “service-enhancing” (Costa Rica, India and Mauritius) effects of globalization. Figure 14 shows GHG emissions, excluding land-use change and forestry, per million US dollar of GDP for these countries—an index often referred to as emissions intensity of GDP.

Overall, all nine countries have experienced decrease in emissions intensity, and it is not the case that countries witnessing “manufacturing-enhancing” effect of globalization found it difficult to reduce emissions intensity. In fact, Mauritius, the country experiencing the service-enhancing effect, had the lowest reduction in emission intensity. Similarly, Thailand and Vietnam, countries that experienced the “agriculture-enhancing effect” of globalization, had a slower rate of emission intensity reduction than had Korea, Bangladesh, and China, countries that experienced manufacturing-enhancing effect of globalization. This may not be surprising, because agriculture now is heavily dependent on chemical fertilizer and pesticides and mechanized irrigation, which cause emissions to increase. Also, agriculture sector often emits a lot of methane, which is a more potent GHG than even carbon dioxide, and expansion of agriculture often occurs at the expense of forests through land-use changes. If land-use change and forestry had been included in the measure of GHG emissions, the countries experiencing the “agriculture-enhancing” effect would probably show greater emission intensity than seen in Figure 14. On the other hand, India, a country that experienced rapid increase in the service sector’s share

²⁴ See WESS (2013) for more discussion on the relative merits and demerits of GHG and EF as an overall measure of environmental quality. Though theoretically more comprehensive, the concept of EF however has some definitional issues. Also, accurate data on EF are not easy to get. By contrast, GHG is less ambiguous and reliable data on it are more readily and widely available. However, GHG may not be as comprehensive as EF in terms of coverage of the various dimensions of the environment.

in its GDP, saw a faster decrease in emission intensity of GDP than both manufacturing-enhancing and agriculture-enhancing countries included in Figure 14, except China.

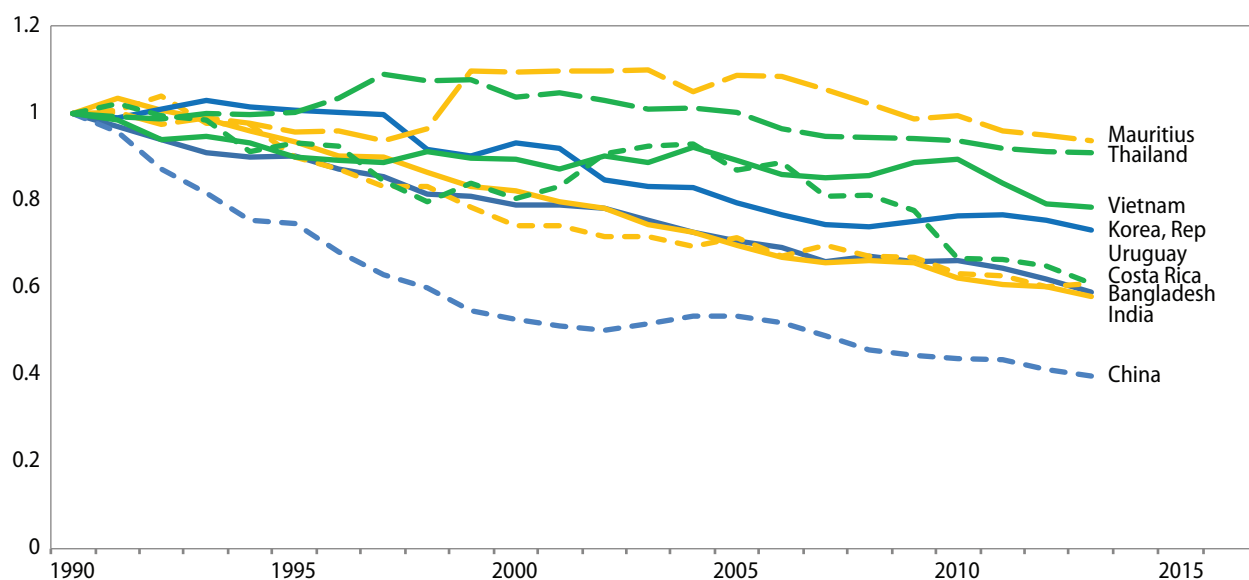
To see whether there are systematic differences across “manufacturing-enhancing,” “agriculture-enhancing” and “services-enhancing” effects of globalization on structural change regarding GHG emissions, one would need to move this analysis forward and compute GHG emissions per value added for different sectors. This is however not easy, because the sectors distinguished in the GHG emissions data do not always match with the sectors distinguished in the national income accounting data for a large number of developing countries. The World Input-Output Database does provide above kind of matching data. However, its coverage is limited to 40 countries only, of which 27 belong to the European Union and 13 are other major countries. In the following, we use this dataset to compute sectoral emission intensity trends for three countries, namely People’s Republic of China, India, and Republic of Korea.

Figure 15-17 show that in all three countries, emission intensity decreased in almost all sectors, most notably in the manufacturing sector. However, the manufacturing sector still remains the sector with highest emission intensity among all sectors in these countries.²⁵ Mining and quarrying comes in the second place in China, while services sector does so in India, and agriculture, hunting and forestry do so in the Republic of Korea. Clearly, we need similar, matching output and emissions data for a large number of countries to make more comprehensive and firmer conclusions in this regard.

Figure 14

Total GHG Emissions, excluding land-use change and forestry, per GDP (tCO₂e / Million \$ GDP)

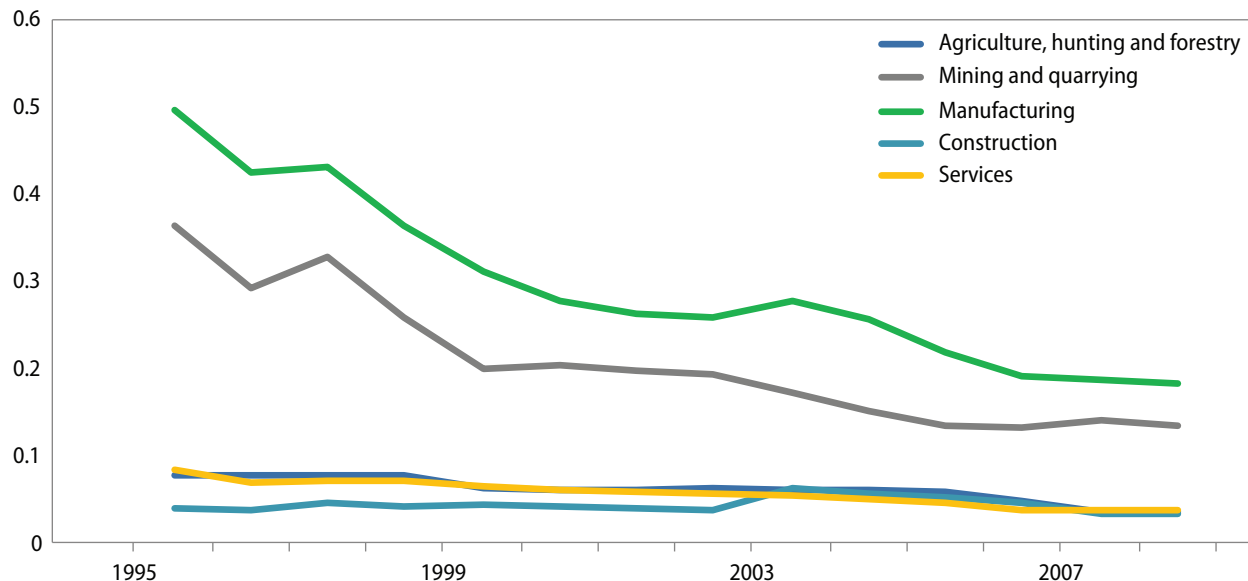
1990=1



Source: CAIT (2017)

²⁵ In the case of Republic of Korea, mining and quarrying has the highest emission intensity. However, this sector is very small, so it is removed from the graph.

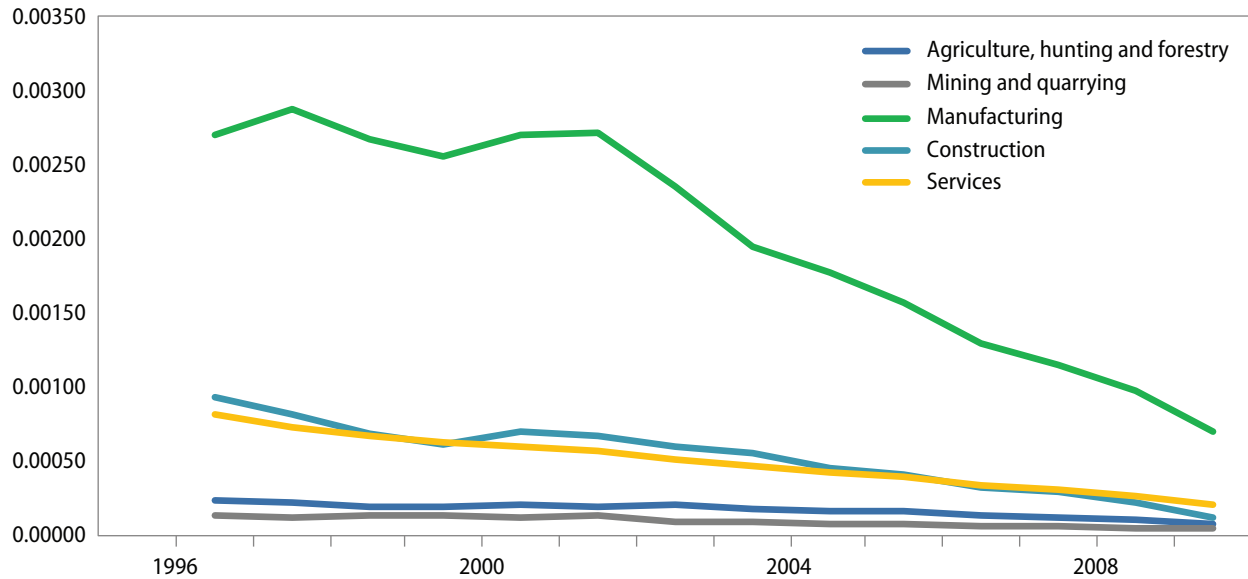
Figure 15
Emission intensity by key sectors, People's Republic of China²⁶



Source: Timmer, M. P., Dietzenbacher, E., Los, B., Stehrer, R. and de Vries, G. J. (2015)

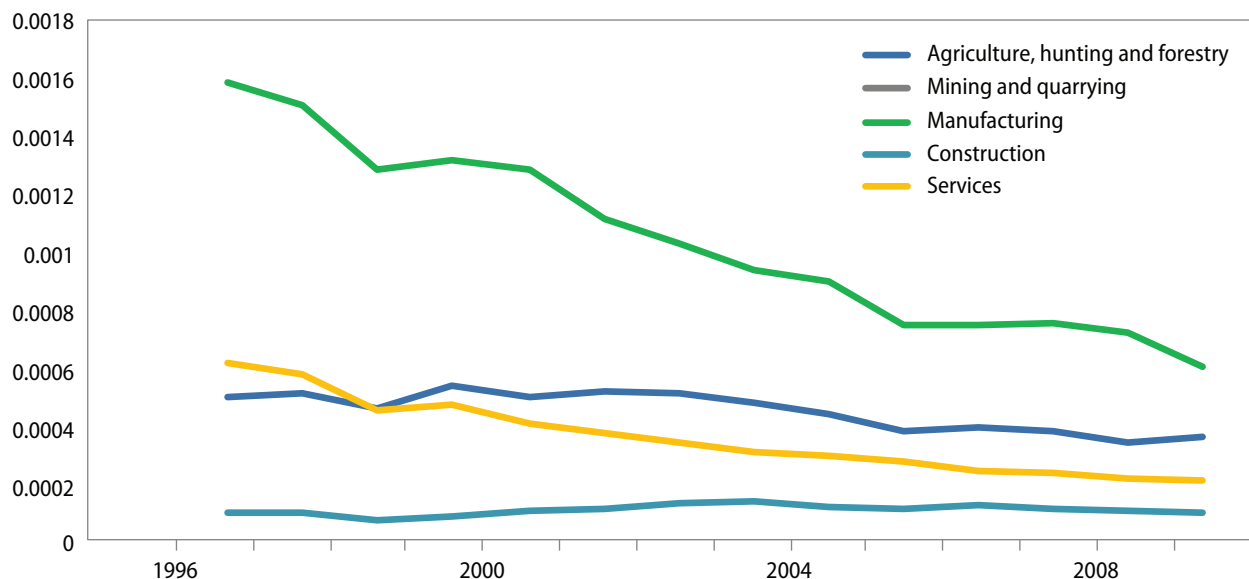
Figure 16
Emission intensity by key sectors, India

Source: Timmer, M. P., Dietzenbacher, E., Los, B., Stehrer, R. and de Vries, G. J. (2015)



²⁶ Measured as CO₂ emissions in Gg (kt) per gross value added at current basic prices (in millions of national currency).

Figure 17
Emission intensity by key sectors, Republic of Korea



Source: Timmer, M. P., Dietzenbacher, E., Los, B., Stehrer, R. and de Vries, G. J. (2015)

The evidence presented above therefore does not establish a clear correlation between types of effects of globalization on structural change, on the one hand, and emission reduction patterns, on the other. Variations in emission reduction pattern among countries witnessing similar kind of effect of globalization on their economic structure indicate that the volume and rate of growth of emissions depend, to a large extent, on the particular conditions and policies of a country.²⁷ In general, it appears that, regardless of the particular sector a country emphasizes, it has the scope to reduce the emission intensity.

It is in view of the above that the 2030 Agenda calls for environmental sustainability and reduction of GHG not only in goals that are directly related to environment, but also in goals that concern production sectors, such as agriculture, manufacturing, and even services. For example, the Agenda calls for “sustainable food production” (SDG 2.4), “sustainable industrialization and infrastructure” (SDG 9.2 and 9.4), and even “sustainable tourism” (SDG 8.9). The Agenda also calls for environmental sustainability in connection with the goals concerning housing, transportation, energy, and infrastructure. In other words, all structural change related processes have to be viewed and modified in the light of the environmental sustainability requirement. The concrete ways to do so will have to be determined through concrete research and analysis focused on individual countries.

VI Concluding remarks

The switch from “Structural Change” to “Transformative Change” is not a matter of mere rhetoric. There is a strong rationale for this switch, and it signifies an important paradigm shift. This paper tries to clarify the rationale and implications of this shift.

²⁷ The overriding importance of policies in determining environmental outcome was found in earlier analyses focusing on many particular indicators of environmental quality. See, for example, Islam (1997).

The concept of “structural change” focuses on changes in sectoral composition of an economy and has had a significant role in Development Economics. In its classical version, structural change provided a theory of growth by assuming that the “traditional” (often equated with the agriculture) sector had a lower productivity of labour than in the “modern” (often equated with manufacturing or industry) sector, so that transfer of labour from the former to the latter could raise aggregate output and productivity. It was further postulated that the increase in the share of manufacturing in the GDP however had a limit, after which this share declined, compensated by the rise in the share of the services sector in the GDP. This classical conception of structural change—also referred to as the Structural Change paradigm—was in part based on the actual experiences of the early industrializing countries.

With time however important changes occurred. First of all, use of machines—which was the reason why manufacturing originally had a higher labour productivity than agriculture—spread to other sectors too, so that it was not always necessary to raise the share of the manufacturing sector in the economy to raise aggregate productivity level. In other words, the classical pattern of structural change—in which agriculture was followed by manufacturing, in turn followed by services, as the dominant sector—was not the only successful pattern of structural change that a country could follow. Second, deeper globalization since the 1980s widened the possibilities regarding patterns of structural change. It allowed developing countries, on the one hand, to experience a more rapid increase in the share of manufacturing and to sustain this higher share for a longer time. On the other hand, it also led to stalled industrialization and pre-mature de-industrialization in many developing countries. Third, focusing exclusively on GDP growth proved to be inadequate, and it became important to give more and direct attention to social and environmental issues, which were by and large absent from the Structural Change paradigm. Fourth, the greater focus on the social and environmental outcomes also made it clear that the development agenda had to be universal, unlike Structural Change which focused mostly on developing countries.

As the world community embraced sustainable development as the overarching goal, it became necessary to switch to a more expansive paradigm that can provide more space for effective integration of all three dimensions of sustainable development and, in doing so, can subsume structural change by imparting it the characteristics necessary to be compatible with sustainable development. “Transformative change” provides this new paradigm.

The concrete ways in which structural change under the 2030 Agenda for Sustainable Development will have to differ from the earlier processes of structural change can be understood by looking at it in the light of the three dimensions of sustainable development.

From the viewpoint of economic growth, it is clear that structural change has to ensure *sustained* economic growth, avoiding the boom-bust cycle. This requires more attention to *within sector diversification*, something that the historical structural change discussion largely ignored because of its focus on sectoral composition of GDP. More attention is also needed on building and making use of *dynamic* comparative advantage in order to continue to participate successfully in the global division of labour.

From the viewpoint of social development, structural change has to lead to greater increases in the share of labour in national income. Furthermore, the distribution of the labour income itself has to be more favourable for those labour groups which are at the very low end of the scale.

From the perspective of environmental protection, the evidence shows that while industry generally tends to be more threatening to the environment, other sectors—such as agriculture and services—also pose considerable threat to the environment. Hence it is not possible to put at rest concerns for environment simply by

choosing a more agriculture—or service-oriented structural change. Moreover, the effect on environment of different patterns of structural change seems to depend more crucially on the concrete circumstances of a country and the *policies* it pursues. Hence, attention to the environmental impact has to be a constant concern no matter what particular pattern of structural change a country follows. The 2030 Agenda for sustainable development aiming at “transformative change” includes “structural change” as an important component. However, this structural change has to be such that it promotes sustainable development.

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