

# Is Structural Change in Sub-Saharan Africa Different? New Historical Evidence from Ghana\*

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**Abstract:** Development is associated with structural changes, which usually consist of the decline of agriculture and the rise of manufacturing and services. However, structural change is not a homogenous process; it can take different forms depending on each country's experience of development. In Asia, it is reflected in industrialization, and promoted economic growth as labor moved towards higher-productivity sectors. In Africa, it was not synonymous to industrialization but was defined by a dramatic expansion of services, and the continent is still poor. One hypothesis is that structural change in Africa has not been as growth-enhancing as in Asia. Given the paucity of data for the continent, we shed light on this question using sectoral employment and added value data for one representative country, Ghana, over 50 years (1960-2010). We find that aggregate income changes were driven by changes in the productivity of specific sectors rather than structural change, i.e. employment shifts across sectors, before the country democratized in 1992. Ghana has then transitioned into a more efficient economy, and structural change has become a significant factor of productivity growth. This confirms that structural change can be growth-enhancing in Africa too. However, our results also suggest that the "nature" of structural change remains different in Ghana: structural change has occurred without a Green Revolution, an Industrial Revolution and a Service Revolution of the types seen in Asia.

**Keywords:** Structural Change; Industrialization; Service Economy; Africa

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According to Matusyama (2008), “structural change is a complex, intertwined phenomenon, not only because economic growth brings about complementary changes in various aspects of the economy, such as the sector compositions of output and employment, organization of industry, etc., but also these changes in turn affect the growth process. [...] The transformation from the rural agricultural society to the urban industrial society is just one of many aspects of structural change [...]” Economic development is thus associated with structural changes. In poor countries, these usually consist of the decline of agriculture and the rise of manufacturing and services. However, structural change is not a homogenous process; it can take different forms depending on each country’s experience of development.

In Asia, it is reflected in industrialization (and the rise of tradable services), and promoted economic growth as labor moved towards higher-productivity sectors, as shown by the literature on the Asian growth miracle (Ranis, 1995; Stiglitz, 1996; Bosworth & Collins, 2008; Brandt, Hsieh & Zhu, 2008). Asia’s urbanization rate was 15% in 1950 (Bairoch, 1988). It is now around 40% (United Nations, 2011). Given that agriculture is a rural-based sector, and industry and services are urban-based sectors, the evolution of urbanization informs us on the magnitude of the structural changes that took place post-1945. According to WDI data, in 2000 Asia’s employment shares in industry and services were 19% and 29% (23% and 28% in China), while GDP shares were 32% and 60% respectively (46% and 39% in China). Productivity was 10 times higher in non-agriculture than in agriculture.

In Sub-Saharan Africa, structural change was not always synonymous to industrialization, and the continent is three times as poor as Asia. Africa’s urbanization rate was 10% in 1950 (Bairoch, 1988). It is now around 35% (United Nations, 2011). Africa has also undergone major structural changes over the past 60 years. According to WDI data, in 2000 Africa’s employment shares in industry and services were 8% and 28%, while GDP shares were 29% and 54% respectively. Productivity was 9 times higher in non-agriculture than in agriculture. Overall labor productivity was 2.5 times lower than in Asia, the productivity gap being lower in agriculture (1.4) and industry (1.1) than in services (2.5).

As shown by McMillan & Rodrik (2011), changes in overall productivity can be decomposed into changes of productivity *within* sectors (what they call the “within” component) and changes in the allocation of labor *between* sectors (what they call the “structural change” component). There are two ways to increase productivity. Either some sectors become more productive (the magnitude of the effect depends on the initial size of the sectors in the economy), or labor moves from low-productivity to high-productivity sectors. Structural change is then growth-enhancing. Conversely, overall productivity decreases if productivity decreases within sectors, or if labor moves to low-productivity sectors. Structural change is then growth-reducing. What does the data tell us about Africa relative to Asia?

In 2000, the productivity gap was 2.5. What would happen to the gap if Africa had the same sectoral productivities as Asia (the *within* channel)? Basic calculations indicate that it would have reduced to 1.2. Second, what would happen to the gap if Africa had the same employment structure as Asia (the *structural change* channel)? It would have decreased to 1.7. While the combination of the *within* and *structural change* channels closes the gap, the results show that increasing sectoral productivity or promoting structural change are two potential paths for African economies to catch up with their Asian counterparts. Structural change has, for example, been a fundamental driver of long-term development in developed countries (Duarte & Restuccia, 2010; Herrendorf, Rogerson & Valentinyi, 2011).

Similarly, McMillan & Rodrik (2011) use data for 38 developing countries in 1990-2005 to show that structural change was growth-enhancing in Asia and growth-reducing in Africa. Economic growth in Africa was driven by the within component. This changed in the most recent period, as shown by McMillan (2013) who uses data for 19 African countries from 1990 to date. While structural change was growth-reducing in 1990-1999, it was growth-enhancing in 2000-2005. As productivity also increased within sectors, the within and structural change channels combined to dramatically increase productivity, which was the basis of the “African Growth Miracle” mentioned in the literature (Young, 2012).

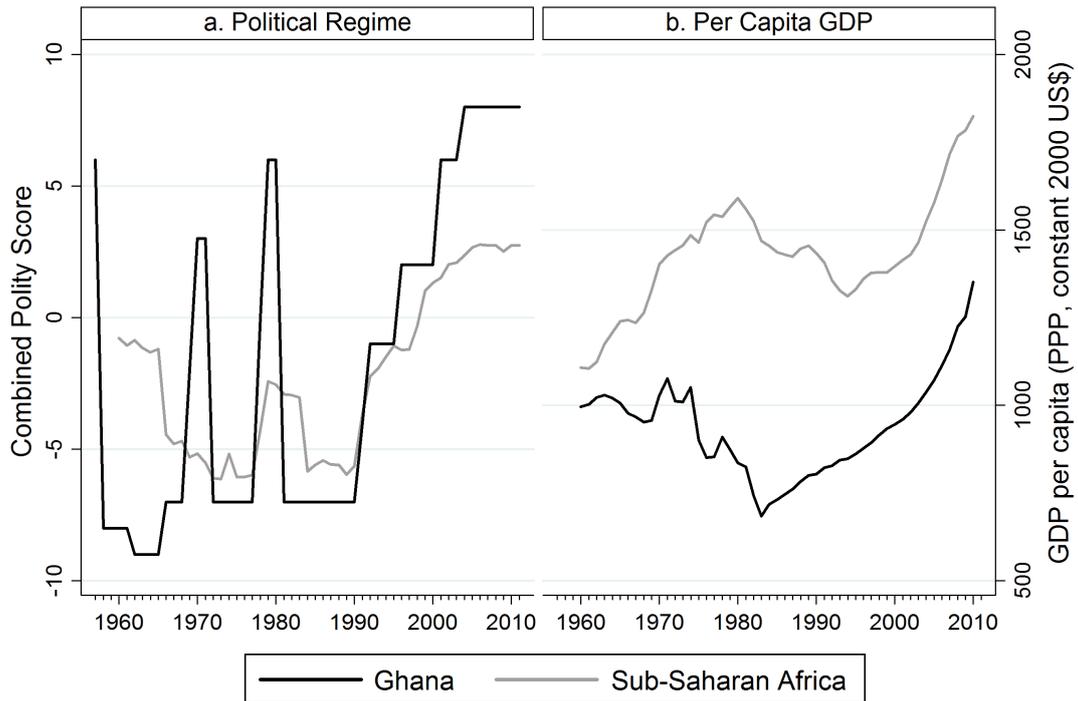
It is all the more important to study this question that the lack of structural change can lead to poverty traps. As Matusyama (2008) puts it: “Productivity growth can cause structural change, which in turn leads to further growth in productivity. The circular causality, however, is a double-edged sword, as the lack of productivity growth and the lack of structural change can reinforce each other, creating the vicious cycle of poverty.” However, if productivity increases sufficiently within sectors, the lack of structural change may not be a major constraint to economic development, and a poverty trap may not exist.

This compels us to raise the following questions: Is structural change in Africa different? If yes, why? What does it imply for public policy? Given the poverty of historical data for the continent, we choose to shed light on these questions using new sectoral employment and added value data for one representative country, Ghana, over 50 years (1960-2010). We first offer a conceptual framework to analyze structural change in poor countries, and Africa in particular. The results of our empirical analysis suggest that until the 1980s, aggregate income changes were mostly driven by changes in the productivity of specific sectors rather than structural change, i.e. employment shifts between sectors. Ghana then recently transitioned into a more efficient economy: overall productivity went up, as a result of the economic and democratic reforms of the 1980s-1990s. Structural change has become a significant factor of productivity growth, as many agricultural workers were absorbed by the (relatively more productive) industrial and service sectors. This confirms that structural change can be growth-enhancing in Africa too. However, our results also suggest that the “nature” of structural change remains different in Ghana: structural change has occurred without a Green Revolution, an Industrial Revolution and a Service Revolution of the types seen in Asia. Although Ghana is hailed as one African success story, the economy remains highly dependent upon natural resource exports and the manufacturing sector is still uncompetitive. Structural change was defined by a dramatic expansion of services, but not the tradable service sectors that have been recently driving growth in Asia.

Why was Ghana chosen in particular? First, political progression in Ghana has often been an indicator of upcoming events in the rest of the continent. Figure 1.a shows the evolution of political regimes in Ghana and Africa from 1957 to date. Ghana was the first country to gain independence. This happened one year before Guinea and three years before 16 other countries. Ghana quickly became a single-party autocracy. The overthrow of Nkrumah in 1966 marked the beginning of series of military coups and fragile political regimes. It was only with the transition to democracy in 1992 that the quality of institutions started improving. Ghana is now one of the most democratic African countries.

Second, the economic evolution of Ghana is symptomatic of what happened elsewhere. Figure 1.b shows the evolution of income in Ghana and Africa from 1960 to date. Throughout the post-independence period, the country largely depended on natural resource exports such as cocoa, mining (mostly gold) and timber. Its manufacturing and service sectors

Figure 1: Evolution of Political Regimes and GDP, Ghana and Africa 1957-2011



Notes: Figure 1.a plots the combined polity score for Sub-Saharan Africa (pop.-weighted average) and Ghana. Polity IV defines three regime categories: *autocracies* (-10 to -6), *anocracies* (-5 to +5) and *democracies* (+6 to +10). There were only 4 independent countries before 1960. Figure 1.b plots GDP per capita (PPP, constant 2000 US\$) for Sub-Saharan Africa and Ghana. See Jedwab & Osei (2012) for data sources.

have remained small and/or unproductive. Economic growth in the 1960s was driven by import-substitution industrialization, and an increasing role of the government in the economy. In the 1970s and early 1980s, income declined due to macroeconomic disequilibria and austerity measures adopted as a result of mounting public deficits. Growth resumed after two structural adjustment programmes (1983, 1987-89), and accelerated after a post-2000 improvement in the business environment, and a boom in commodity prices. According to McKinsey (2011), Ghana now belongs to the group of Africa's transition economies which also includes countries like Senegal, Kenya and Mozambique.

Third, in 1954, Arthur Lewis, the intellectual father of structural transformation, wrote a report on industrialization in Ghana (Lewis, 1954b). He was also Ghana's first chief economic advisor in 1957-1958, but Nkrumah and Lewis strongly disagreed over the policies to be adopted for the development of Ghana. His economic analysis and its policy recommendations serve as a useful benchmark to gauge the various policies implemented post-1957. Retrospectively, his analysis of the strengths and flaws of the immediate post-independence Ghanaian economy and his recommendations were probably accurate.

Finally, analyzing structural change in one country requires that we have access to sectoral productivity and employment data over a long period. Sub-Saharan Africa is not only poor, but it is also suffering from data shortage, which limits our ability to better understand the reason behind its poverty. Because Ghana has one of the best statistical systems in Africa, we were able to obtain all the necessary data for this study. There are only a few African countries where such results can be replicated today.

The study is organized as follows. Section 1 provides a conceptual framework to analyze

structural changes in poor countries. Section 2 describes the broad patterns of economic and structural change in Ghana from 1957 to date, while Section 3 focuses on each agricultural, industrial and service subsectors. Section 4 documents the relationship between structural change and economic growth in Ghana. Section 5 discusses the role of public policies in promoting structural change in Ghana, and Section 6 concludes.

## 1. Conceptual Framework on Structural Change in Poor Countries

This section provides a conceptual framework to analyze structural changes in poor countries. It describes the various theories of structural change and discusses how these theories can help us interpret the relationship between structural change and economic growth.

### 1.1 The Standard Model of Structural Change: Labor Push vs. Labor Pull

Most countries follow a standard pattern: structural change is a by-product of either a push from agricultural productivity growth or a pull from industrial productivity growth.

**Positive Rural Push:** In poor countries, large fractions of land and labor are devoted to producing food for subsistence needs (Schultz, 1953; Gollin, Parente & Rogerson, 2002, 2007). This “food problem” prevents the reallocation of productive resources to other sectors. The labor push approach shows how a rise in food productivity (what we might think of as a *Green Revolution*) reduces the food problem and releases labor to the modern sector (Matsuyama, 1992; Caselli & Coleman II, 2001; Gollin, Parente & Rogerson, 2002; Nunn & Qian, 2011). This rural push is positive for growth, when it leads to higher agricultural wages, lower food prices and greater employment in the modern sector.

**Positive Urban Pull:** The labor pull approach describes how a rise in manufacturing productivity (an *Industrial Revolution*) attracts underemployed labor from agriculture into the industrial sector (Lewis, 1954a; Harris & Todaro, 1970; Hansen & Prescott, 2002; Lucas, 2004; Alvarez-Cuadrado & Poschke, 2011). In the long run, developed countries deindustrialize and specialize in tradable services (Herrendorf, Rogerson & Valentinyi, 2011; Buera & Kaboski, 2012). However, developing countries can also specialize in, and export, tradable services (Ghani & Kharas, 2010; Gollin, Jedwab & Vollrath, 2013). The *Service Revolution* becomes another factor of the labor pull. It is assumed that there is no food problem and labor can be reallocated to the modern sector. First, there could be a surplus labor in the food sector (Lewis, 1954a). Second, the Industrial Revolution could be preceded by a Green Revolution, as in Asia where the rice revolution occurred early (Evenson & Gollin, 2003). Third, an Industrial Revolution could facilitate the modernization of agriculture (Yang & Zhu, 2010). Lastly, a country can import food (Matsuyama, 1992; Teigner, 2011). This urban pull is positive for growth, when it leads to greater employment in the modern sector, and less underemployment or higher wages in the agricultural sector.

### 1.2 Other Labor Push and Labor Pull Factors

These models are not sufficient to explain the apparent nature of structural change in Africa, i.e. low income growth, non-industrialization and the rise of services. Four theories have emerged to account for these facts.

**A Less Positive Urban Pull:** It is possible for an economy to undergo structural change without any changes in agricultural, manufacturing and service productivity, if the country experiences a *natural resource revolution* (Gollin, Jedwab & Vollrath, 2013; Jedwab, 2013). If resource windfalls are spent on manufactured goods and services, this creates opportuni-

ties in the modern sector. Resource rich countries use their trade surplus to import food. If these countries also systematically import manufactured goods, structural change does not lead to industrialization, and the modern sector consists of non-tradable services.

**Negative Urban Pull:** A few studies argue that Africa has urbanized without high economic growth (Bairoch, 1988; Fay & Opal, 2000). This excessive urbanization is often attributed to the urban-biased policies (agricultural taxation, public employment in the manufacturing and service sectors, and food price subsidies). These urban pull factors can lead to structural change, in the form of “overurbanization” (Lipton, 1977; Bates, 1981). This theory is consistent with the previous theory, except the resource rents here are captured by the government and used to generate public employment.

**Negative Rural Push:** Rural poverty (whether it is due to agricultural taxation or not), land pressure (due to demographic growth) and man-made or natural disasters (e.g., wars or climate change) constitute rural push factors feeding rural exodus (Barrios, Bertinelli & Strobl, 2006; Poelhekke, 2010). A relative decrease in the agricultural wage leads to structural change, as migrants flock to the cities and seek employment in the modern sector. If they are unskilled, they will work in the low-productivity service sectors.

**Negative Urban Push:** Structural change out of (rural) agriculture and into the (urban) modern sector implies that labor reallocation is associated with migration. Natural increase also contributed to urban growth in Africa (Potts, 1995; Christiaensen, Gindelsky & Jedwab, 2013): urban fertility was high, while mortality has fallen to relatively low levels, due to the epidemiological transition. Christiaensen, Gindelsky & Jedwab (2013) find that natural increase causes the population of African cities to double every 15 years. These labor supply shocks may have been absorbed by the low-productivity service sectors.

### 1.3 The (Type of) Structural Change and Economic Growth

Per capita GDP is a function of the employment rate – the share of the total population that is employed – and overall productivity – the average productivity of each worker –. If the employment rate is stable, the evolution of per capita GDP is driven by changes in labor productivity. Overall productivity increases if either some sectors become more productive (the *within* channel) or labor moves to higher-productivity sectors (the *structural change* channel). The latter implies that labor was somewhat misallocated before. This could be due to institutional barriers to entry in the modern sector, e.g. state ownership of plants in China and licensing in India (Hsieh & Klenow, 2009). Or, this could be due to sectoral differences in the production function. For example, agricultural productivity could be low due to a lack of Green Revolution. Farm workers may not move into the more productive modern sector, if that sector is skill-intensive and cannot absorb this surplus labor.

The six theories described above lead to various predictions regarding the effects of structural change on growth: (i) Positive rural push: as food productivity increases, the demand for non-food goods also increases, and the modern sector expands. If wages are relatively higher in the modern sector, structural change is growth-enhancing. (ii) Positive urban pull: the rise in manufacturing productivity and wages leads to an enlargement of this sector, and structural change is growth-enhancing. (iii) Other pull factors: the consumption of resource and non-resource rents on non-agricultural goods increases wages and employment in the modern sector. Structural change is growth-enhancing, but these effects may not last long. If the quality of institutions is low and manufactured goods are imported, structural change occurs through an expansion of low-productivity services (e.g., a bloated

government sector). (iv) Other push factors: rural poverty and urban natural increase lead to labor supply shocks that must be absorbed by the modern sector. Structural change is growth-enhancing if the urban wage is relatively higher for these rural migrants. It is growth-reducing if natural increase is absorbed by low-productivity service sectors.

## **2. Aggregate Patterns of Economic Change in Ghana, 1957-2013**

This section details the aggregate patterns of economic development and structural change in Ghana from independence (1957) to date. We first summarize the political and economic history of Ghana. We then describe the sectoral evolution of Ghana's economy.

### **2.1 Economic History of Ghana (1957-2013)**

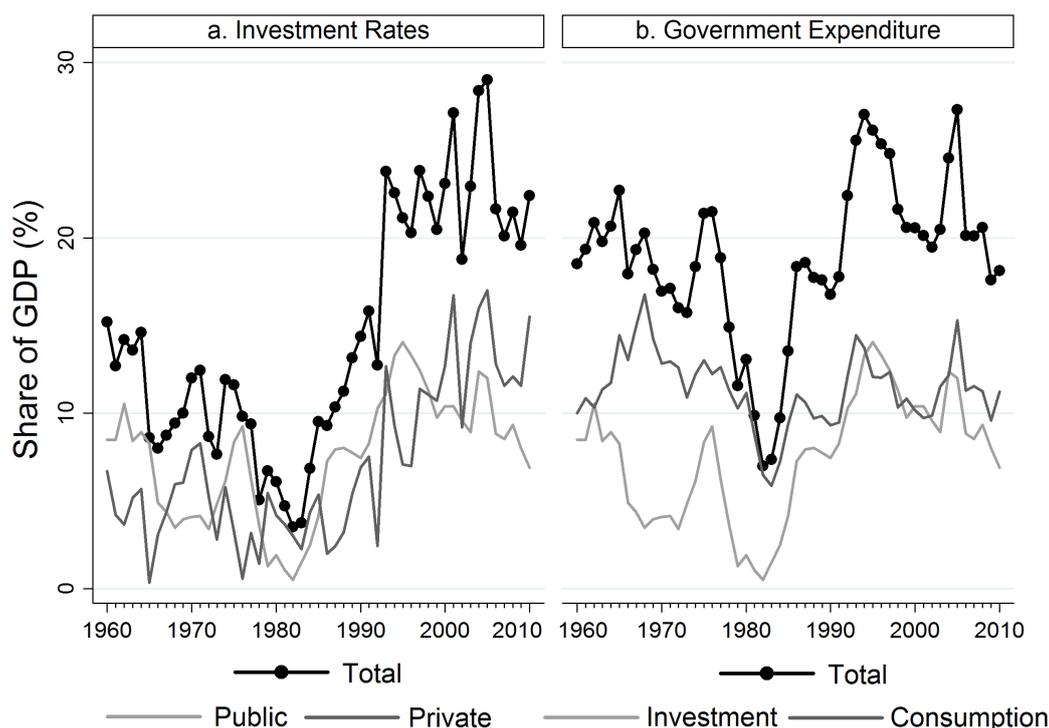
This section summarizes the political and economic history of Ghana, which helps determine turning points that may affect patterns of structural change. It draws on Aryeetey, Harrigan & Nissanke (2000), Agyeman-Duah (2008) and Breisinger et al. (2011).

**1957:** Ghana was one of the most developed African countries at independence. The boom in cocoa production made it one of the leaders of the "cash crop revolution" (Teal, 2002; Jedwab, 2013). According to Lewis (1954a), it could not develop without Import-Substitution Industrialization (ISI). Yet pursuing this strategy was not possible in the 1950s (Pickett & Shaeeldin, 1990; Agyeman-Duah, 2008). First, the price of labor was high because land was relatively abundant. Ghana was not in a situation of agricultural labor surplus, and the development of labor-intensive manufacturing implied that the country primarily needed a "vigorous agricultural programme". Although Lewis is often described as a proponent of the labor pull hypothesis and industrialist policies, he thought that labor push factors were more important at that time. Second, there were not enough skilled people, so developing capital-intensive manufacturing was not a sound economic strategy. Lewis recommended the government to increase agricultural productivity and lay the foundations for future industrialization; by providing infrastructure and investing in human capital, it would be possible to create a larger and more productive labor force.

**1957-1966:** When Kwame Nkrumah took power in 1957, his government adopted a capital-intensive ISI strategy. This strategy was in line with Lewis' model of development, but was in contradiction with Lewis' own recommendations to be more patient. The rationale behind Nkrumah's policy was that the surplus from the cocoa sector had to be used to expand the industrial sector. Due to coordination failures, only an enlightened leader could implement this massive industrial policy. Another benefit of a strong state was that it promoted nation-building, in a context of marked ethnic fractionalization. Investment rates increased but this evolution was driven by public investments. This is portrayed in Figures 2.a and 2.b which plot the investment rates and the GDP shares of government expenditure from 1960 to date. There were 53 state enterprises and 12 public boards in 1966 (Agyeman-Duah 2008). Government consumption increased, as the number of public employees rose from 140,000 in 1957 to 280,000 in 1965. These investments had no impact on per capita GDP due to wrong investment decisions, mismanagement, and the inflationary effect of import restrictions. When cocoa prices collapsed in 1965, the government relied on printing money and public debt. Nkrumah was overthrown in 1966.

**1966-1981:** The Nkrumah presidency was followed by a succession of military coups and fragile political regimes which were interrupted by short democratic episodes. The National Liberation Council (NLC) was composed of army officers and assumed executive power till

Figure 2: Investment Rates and Government Expenditure, 1960-2010



Notes: Figure 2.a plots the investment rates for Ghana as a whole (defined as the share of *gross fixed capital formation* in GDP), and separately for the private and public sectors. Figure 2.b plots the share of total government expenditure in GDP. Total government expenditure can be separated into government consumption (*recurrent Expenditure*) and government investment (*development expenditure*, as already shown in Figure 2.a). See Jedwab & Osei (2012) for data sources.

1969 when Kofi Busia was democratically elected. Busia was overthrown by another army coup in 1972 and Colonel Acheampong became the new head of state. Although Nkrumah was held responsible for the lack of economic growth before 1966, the following NLC, Busia and Acheampong governments all adopted the same policies, with a more limited budget. Government consumption remained high (see Fig. 2.b). At the same time, the country accumulated debt, inflation was soaring and private investment was collapsing. Population growth was high as mortality dropped, and urban natural increase became a major factor of urban growth (Christiaensen, Gindelsky & Jedwab, 2013). Between 1974 and 1983, per capita income declined by 34.9% (see Fig. 1.b). This decline in per capita income was felt by both the (rural) agricultural sector and the (urban) modern sector.

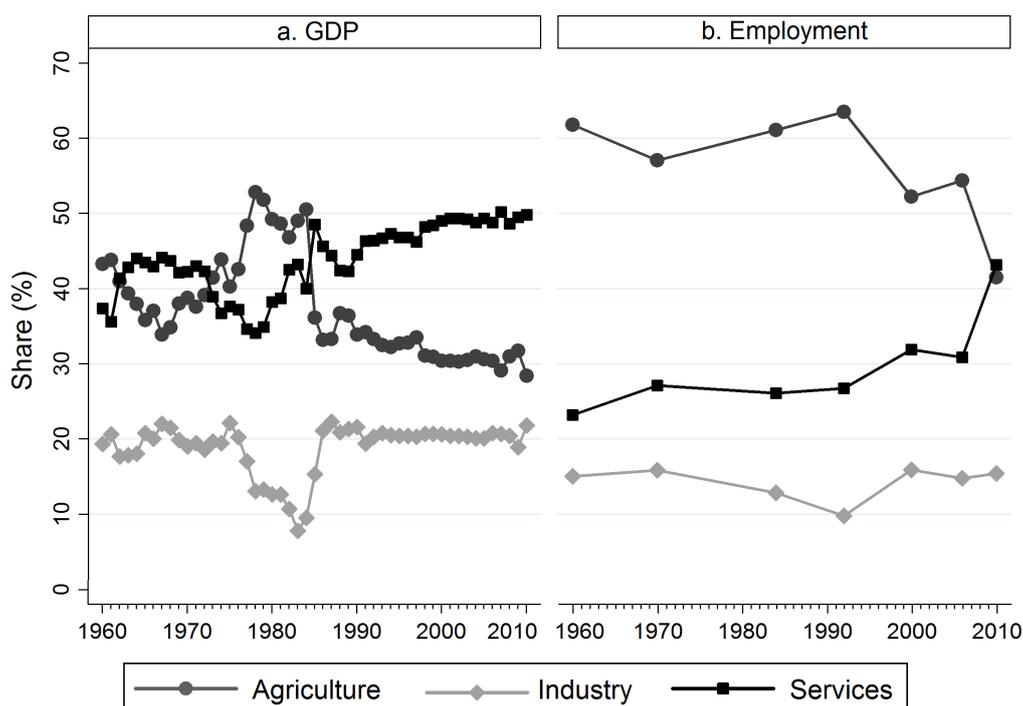
**1981-2001:** When Jerry Rawlings came to power after two coups in 1979 and 1981, he also thought that the economic situation was due to mismanagement rather than to poor policies (Agyeman-Duah, 2008). Ghana was as poor as in 1939. Cocoa production had collapsed, the manufacturing sector was severely affected by cronyism, import restrictions and price controls, and infrastructure was in a dire state. Moreover, Ghana had just been hit by the worst drought in fifty years, it was suffering from hyperinflation, and the state was bankrupt. The repatriation of about 1 million Ghanaians from Nigeria further heightened economic, political and social pressures (Killick, 2010). Rawlings had no choice but to implement the Economic Recovery Program in 1983, a structural adjustment program (SAP) under the guidance of international organizations. The government reduced expenditure while creating incentives for the development of the private sector, such as abolishing price controls and import restrictions. From 1987 to 1989, state enterprises were privatized and

the currency was devalued. The urban sector was particularly affected by the SAPs, as in most African countries (Potts, 1995). The economy slowly recovered though (see Fig. 1.b) and Rawlings was democratically elected in 1992 and re-elected in 1996.

**2001-2010:** Rawlings peacefully handed over power to his main opponent John Kufuor in 2001. The macroeconomic situation was still unstable but the economy rapidly took off, recording annual growth rates of 5% (see Fig. 1.b). This evolution was not coincidental as there was improvement across all dimensions. Ghana is currently one of the most democratic countries in Africa. The business environment has become more favorable, captured by rising investment rates in the private sector (see Fig. 2.a). The value of cocoa and gold exports has boomed, and the service sector has become more competitive.

All in all, the economic history of Ghana suggests that the country has not experienced a Green Revolution or an Industrial Revolution (the positive rural push and urban pull), as in Asia. The country was characterized by an extreme reliance on cocoa production and gold mining (the less positive urban pull), urban-biased policies (the negative urban pull), agricultural overtaxation and rural shocks (the negative rural push), and urban natural increase (the negative urban push) for most of the period. The issue is whether the nature of structural change was modified post-1992, when the country became democratic.

Figure 3: Sectoral Composition of GDP and Employment, 1960-2010

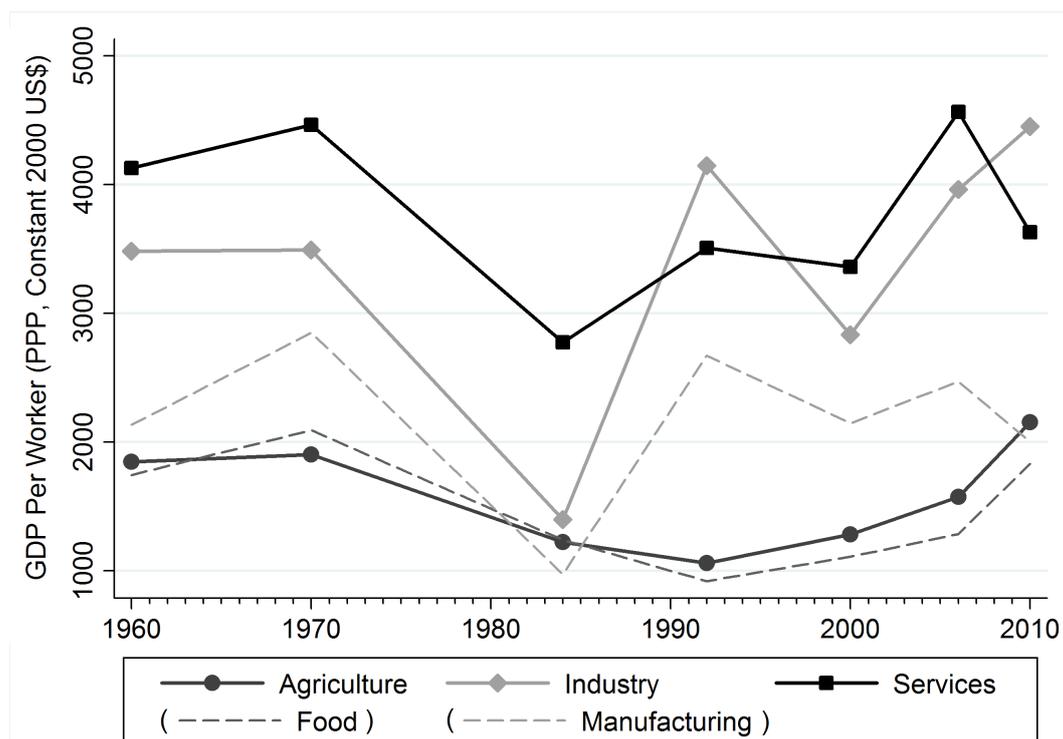


Notes: Figure 3.a plots the sectoral composition of GDP, using the three aggregate sectors “agriculture”, “industry” and “services”. Figure 3.b plots the sectoral composition of employment, using the same three sectors. Employment data is available for the following years = [1960, 1970, 1984, 1992, 2000, 2006, 2010]. See Jedwab & Osei (2012) for data sources.

## 2.2 Aggregate Patterns of Structural Change in Ghana, 1960-2010

Turning points are the years 1957, 1966, 1974, 1983, 1992, 2001 and 2010. We have sectoral GDP data for all years between 1960 and 2010, but that is not the case for sectoral employment data. Although employment data is only available for 1960, 1970, 1984,

Figure 4: Sectoral Labor Productivity (GDP Per Worker), 1960-2010.



Notes: This figure plots sectoral labor productivity (PPP, constant 2000 US\$), using the three aggregate sectors “agriculture”, “industry” and “services”. Sectoral labor productivity is the ratio of sectoral GDP to the number of workers in that sector. Data is available for the following years = [1960, 1970, 1984, 1992, 2000, 2006, 2010]. See Jedwab & Osei (2012) for data sources.

1992, 2000, 2006 and 2010, the periodicity of the data set captures well the economic history of Ghana. The 1960-1970 period was characterized by ISI policies and income stagnation. The 1970-1984 period was marked by structural problems and economic decline. The Ghanaian economy slowly recovered in 1984-1992 and 1992-2000, after two SAPs were adopted in 1983 and 1987-1989. It boomed in 2000-2006 and 2006-2010.

In 1960, agriculture accounted for 43.3% of GDP and 61.8% of the labour force. Figure 3.a shows the sectoral composition of GDP from 1960 to date, while Figure 3.b plots the sectoral composition of employment for the same period. While Ghana experienced some structural change – a decline in agricultural employment – till 1966, the period from 1967 to 1984 saw a significant decline in economic activity and structural change in the wrong direction. The GDP share of agriculture increased to 52.8% in 1978, while both the industrial and service sectors collapsed. The service sector resumed its expansion in the late 1970s and early 1980s, while industrial output returned to its pre-crisis level in 1986. Likewise, productivity remained stable or increased across all sectors in the 1960s, dropped in the 1970s and 1980s, and increased in the 1990s and 2000s, as shown by Figure 4.

Before analyzing the evolution of each sector, we would like to make three comments. First, economic development and structural change are intertwined, as shown by the comparison of Figures 1 and 3. Periods of economic growth were associated with decreasing agricultural shares of GDP and employment, whereas periods of economic stagnation or decline saw a rise in the same shares. Second, structural change did not manifest itself in terms of less agriculture and more industry, but in less agriculture and more services. The GDP and employment shares of industry are almost the same in the 2000s as in the 1960s. Ghana’s

structural change occurred without industrialization, in contrast to Asia. This result is in line with what we find for Africa as a whole in 2000. Third, the employment share of agriculture decreased from around 60% in the 1960s and the 1980s to almost 40% in 2010. The Ghanaian economy has thus undergone major structural changes post-1992.

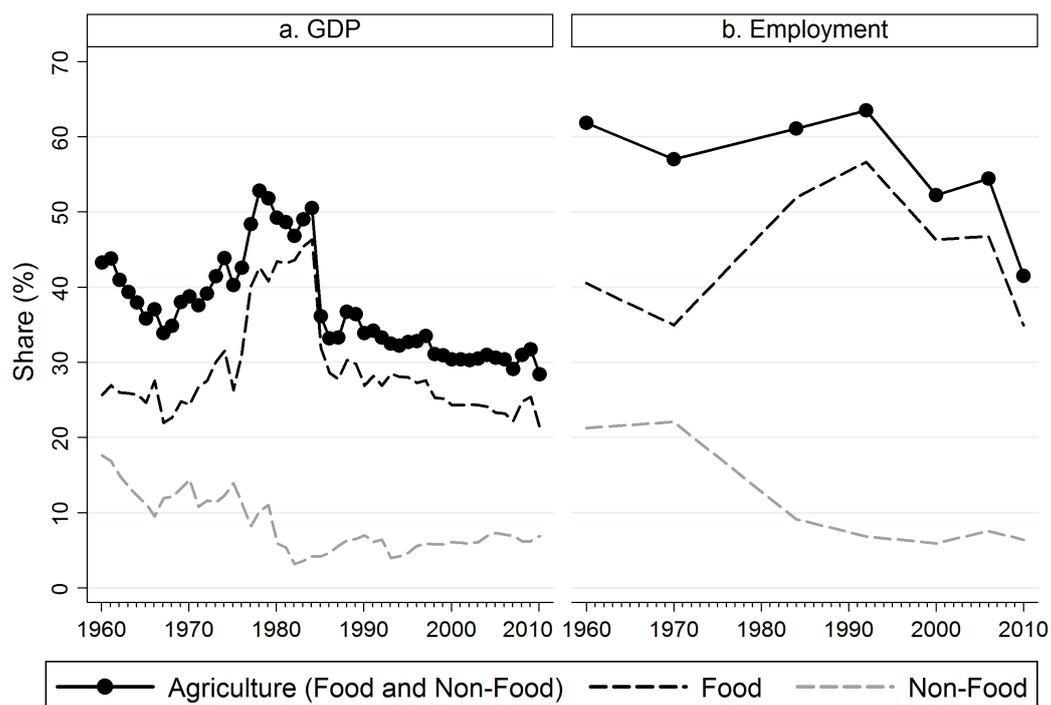
### 3. Refined Patterns of Structural Change in Ghana, 1960-2010

In this section we describe the refined patterns of structural change in Ghana, and use our conceptual framework to identify the main constraints on economic growth for each of the three aggregate sectors – agriculture, industry and services.

#### 3.1 Structural Change out of Agriculture

The GDP and employment shares of agriculture have remained almost unchanged between 1960 and 1992, with the exception of the 1967-1984 period. During this period, the economy was contracting and the GDP and employment contributions of the industrial and service sectors were decreasing. What could account for this non-evolution? Agriculture consists of four sectors in Ghana: the food sectors “agriculture, hunting and livestock” and “fishing”, and the non-food sectors “cocoa” and “forestry and logging”.

Figure 5: Sectoral Composition of Agricultural GDP and Employment, 1960-2010



Notes: Figure 3.a plots the sectoral composition of agricultural GDP, when distinguishing the food subsectors (“agriculture, hunting and livestock” and “fishing”) and the non-food subsectors (“cocoa” and “forestry and logging”). Figure 3.b plots the sectoral composition of agricultural employment, (using the same subsectors). Employment data is available for the following years = [1960, 1970, 1984, 1992, 2000, 2006, 2010]. See Jedwab & Osei (2012) for data sources.

**The Lack of Green Revolution:** Low food productivity force farmers to remain producers in the food sector (Breisinger et al., 2011). The GDP share of the food sector remained high (around 25%) throughout the period and even increased during the 1967-1984 period (see Fig. 5). Employment followed a parallel evolution. Food productivity has continuously increased since 1992, and even more so after 2006 (see Fig. 4). Why did food productivity

remain low before 2006? In 2000, Ghanaians derived about 70% of their calorie intakes and 60% of their protein intakes from cereals and starchy roots (FAO, 2010). Yet cereal yields in Ghana were twice lower than in Asia. Yields were 1.5 times lower if we consider starchy roots instead. These low yields can be partly explained by: (i) population pressure and a decrease in the land-labor ratio from 1.19 Ha per farmer in 1960 to 0.92 in 2006, which led to the exploitation of marginal fields, (ii) insecure property rights, which constrains long-term investments (USG-GoG, 2011) (iii) a low adoption rate of modern inputs, e.g. Ghanaian farmers only used 2 kg of fertilizer per ha as opposed to farmers in the rest of the world who used 94 kg per ha in 2000 (World Resources Institute, 2007), and (iv) a low level of mechanization, e.g. there are only 4.9 tractors per 100 sq. km of arable land in Ghana against 120.7 in Asia in 2000 (World Bank, 2010). Why did employment decrease and productivity increase after 1992? The employment share decreased faster than the GDP share in 1992-2005, and this was not due to a positive rural push as food productivity did not increase: cereals and starchy roots yields remained unchanged between 1992 and 2005. Ghana had surplus labor in agriculture, that was attracted to other sectors when urban wages increased. Productivity increased as a result. After 2006, this performance was permitted by higher yields: cereals and starchy roots yields both increased by 30% between 2005 and 2010. Labor was released for the modern sector (the positive rural push). Based on a few years of data, it is difficult to assert whether this evolution indicates a Green Revolution (see Nweke (2004) for a study on cassava). Furthermore, productivity is the same in 2010 as in 1960 (see Fig. 4). Even if Ghana has not experienced a Green Revolution, food productivity has increased in the rest of the world, and trade implies that Ghana has also benefited from these productivity gains. FAO data (2010) shows that the share of imports in cereal consumption increased from around 10% in the mid-1980s to 30% before the food price spike of 2007-2008. When international food prices are not too high, a Green Revolution is not necessary anymore, as food can be imported.

**Agricultural Exports:** Ghana is the world's largest exporter of cocoa, which accounted for almost 50% of exports during the 1960-2010 period (Jedwab, 2013). Yet the cocoa sector collapsed in the 1960s-1980s (see the evolution of the non-food sector in Fig. 5), due to low producer prices after 1958, restrictive migratory policies after 1969 and frequent droughts in the early 1980s. Producer prices were fixed by the government – and its Cocoa Marketing Board – to protect farmers against fluctuant international prices. Since the producer price was always below the international price, this actually served as a taxation mechanism of the sector (Bates, 1981). As the average taxation rate was 46% on average in 1960-2010, cocoa really accounted for 10.0% of GDP (instead of 5% when not accounting for taxation). Growth has now resumed in the sector. The producer price of cocoa was increased in the 1990s and the sector was liberalized. Production increased from 200,000 tons to a record 1 million tons in 2010. However, the GDP share of cocoa remained low, as the rest of the economy was also growing. The forestry and logging sector boomed after 1992, and employment has relatively increased. Jedwab (2013) shows how the resource rents of the cocoa and forestry sectors were consumed (by farmers, logging companies and the government) on (urban) manufactured goods and services. As manufactured goods were imported from abroad, this urban pull produced “urbanization without industrialization”, i.e. cities consisting of non-tradable services (Gollin, Jedwab & Vollrath, 2013).

### 3.2 Structural Change without Industrialization

The GDP and employment shares of industry have not changed much over the past 50

years, with the exception of the 1970s and early 1980s when the sector shrank (see Fig. 3). In 2010, it accounted for 21.8% of GDP and 15.4% of employment. Industry in Ghana consists of four sectors: “manufacturing”, “public utilities”, “mining” and “construction”.

Figure 6: Sectoral Composition of Industrial GDP and Employment, 1960-2010



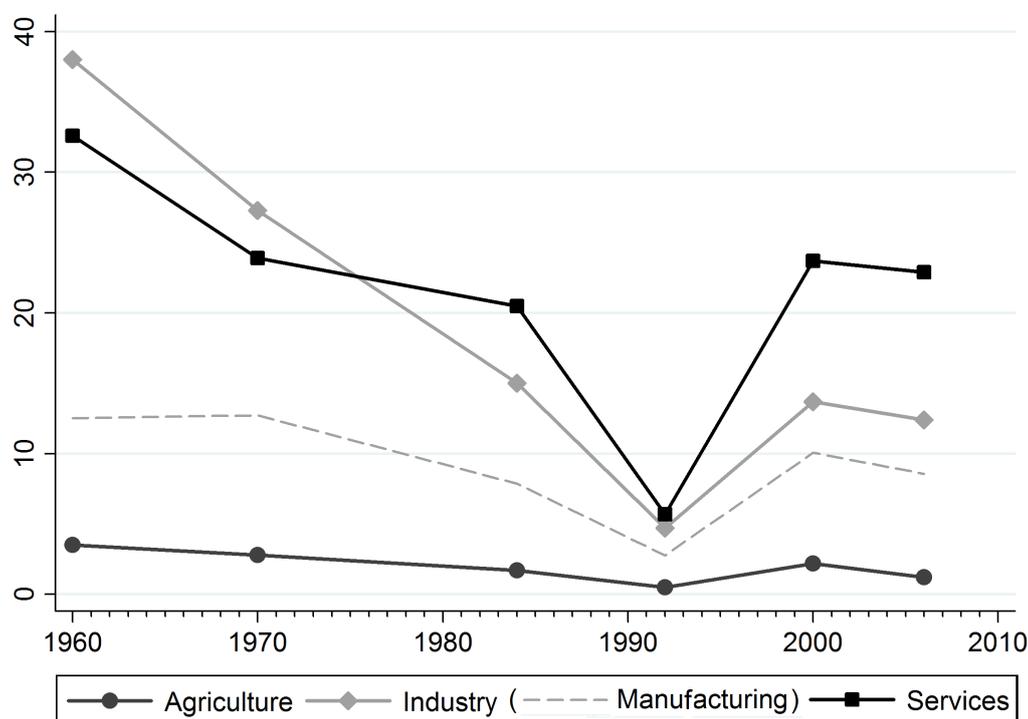
Notes: Figure 3.a plots the sectoral composition of industrial GDP, when distinguishing manufacturing from other industrial subsectors (“mining”, “construction” and “public utilities”). Figure 3.b plots the sectoral composition of industrial employment, using the same subsectors. Employment data is available for the following years = [1960, 1970, 1984, 1992, 2000, 2006, 2010]. See Jedwab & Osei (2012) for data sources.

**The Lack of Industrial Revolution:** The Nkrumah government and the following governments all thought that industrialization was the only source of development. Massive public investments in the 1960s and 1970s led to a slight increase in the GDP and employment shares of manufacturing (see Fig. 6). Manufacturing productivity increased (see Fig. 4), but this rise was not sustainable as it did not represent a structural change of the economy, but reflected biased public policies (the negative urban pull). When per capita income declined after 1976, the whole manufacturing sector contracted and productivity dropped. Manufacturing informalized post-1970, and became more formal after 1992, as shown in Figure 7. Formal employment includes recorded employees of the public and private sectors. It was only after the SAP in 1983 that manufacturing production was resumed. Yet the fact that manufacturing productivity in 2010 was the same as in 1960 (see Fig. 4) confirms the lack of Industrial Revolution (the positive urban pull) in Ghana (Jedwab, 2013). Manufacturing exports have also remained low due to high wages relative to productivity (Teal, 1999) and the competition from China. Ghana has, like many African countries, urbanized without industrialization (Gollin, Jedwab & Vollrath, 2013).

**Other Sectors:** Construction follows economic activity and two housing and infrastructure construction booms occurred in the 1960s and the 2000s (see Fig. 6). The mining sector collapsed post-1961, due to low investments and poor maintenance. However, the contribution of mining to GDP recently increased as a result of rising gold prices and booming

oil exports. This contribution increased to 8.5% of GDP in 2011.

Figure 7: Sectoral Formal Employment Shares (%), 1960-2006.



Notes: This figure displays the shares of formal employment in sectoral employment, using the three aggregate sectors “agriculture”, “industry” and “services”, and the subsector “manufacturing”. Data is available for the following years = [1960, 1970, 1984, 1992, 2000, 2006]. See Jedwab & Osei (2012) for data sources.

### 3.3 Structural Change and The Dramatic Expansion of Services

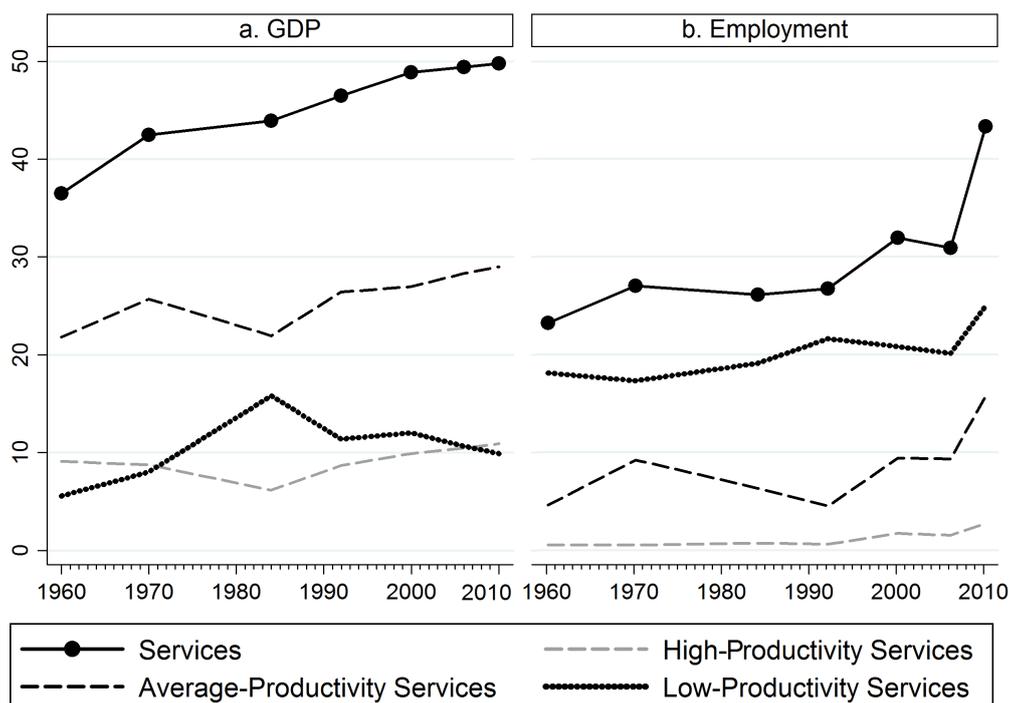
The GDP share of services is now 49.8% against 37.4% in 1960 (see Figure 8). The employment share also increased, from 23.2% in 1960 to 43.3% in 2010. The service sector consists of 7 subsectors in Ghana: “wholesale and retail trade”, “hotels and restaurants”, “transport and storage”, “communications”, “finance, real estate and business services”, “government services” and “community, social and personal services”.

**A Service Revolution?** Structural change was defined by a dramatic expansion of services (see Fig. 3). Their employment share increased by 20 percentage points since 1960. While productivity is twice higher in services than in agriculture, it is 4 times lower than in Asia. As productivity was not high in services, the rise in service employment had a limited effect on per capita income. Besides, productivity is the same in 2010 as in 1960 (see Fig. 4). This evolution does not suggest a service revolution of the type seen in Asia.

**Government Services:** In the pre-1992 period, service employment first increased, and then decreased. In the 1960s, this expansion was the result of government consumption and a rising number of civil servants (see Fig. 2.b). Service productivity increased because of this compositional effect. It then decreased because productivity in the government sector dropped after 1970. Post-1992, employment increased relatively more in the private service sector. However, the employment and GDP shares of the government sector both increased post-1992, as economic growth led to an increase in the government budget.

**Services and Productivity:** We classify the 7 subsectors into 3 groups, depending on whether the subsector belongs to the top tier, middle tier or lower tier of the 15 subsectors

Figure 8: Sectoral Composition of Service GDP and Employment, 1960-2010



Notes: Figure 3.a plots the sectoral composition of service GDP, when distinguishing the low-productivity service subsectors (“wholesale and retail trade” and “community, social and personal services”), the average-productivity service subsectors (“government services”, “transport and storage” and “hotels and restaurants”) and the high-productivity service subsectors (“communications” and “finance, insurance, real estate and business services”). Figure 3.b plots the sectoral composition of service employment, using the same subsectors. GDP and employment data is available for the following years = [1960, 1970, 1984, 1992, 2000, 2006, 2010]. See Jedwab & Osei (2012) for data sources.

in terms of labor productivity in 2010. High-productivity services are twice and tenfold more productive than average-productivity services and low-productivity services respectively (see the footnote of Table 8 for a list of these sectors). First, the employment and GDP shares of low-productivity services (trade and personal services) increased with the economic crisis. These sectors are employers of last resort. Second, the rise in service employment in 1960-2010 was driven by average-productivity and low-productivity services, as shown in Figure 8: their combined employment shares increased from 22.7% in 1960 to 40.6% in 2010. Third, although employment increased in low-productivity services, it did not alter the GDP share of services, as productivity was too low. The increase in service GDP was thus driven by average-productivity services, whose GDP share increased from 21.8% in 1960 to 29.0% in 2010. High-productivity (tradable) services did not contribute much to structural change. This confirms that Ghana has not experienced a service revolution. Lastly, the employment and GDP shares of “hotels and restaurants” increased post-1992: the number of tourists grew from 100,000 arrivals in 1985 to 1 million in 2010. The share of service exports increased from 0.6% of GDP in 1985 to 10.3% in 2005, with most of this increase being explained by tourism. The transport and government sectors also grew post-1992. Lastly, the negative rural push, urban pull and urban push probably all contributed to the expansion of services before 1992. In the recent period, there is no evidence of a major positive urban pull in the case of tradable services, with the exception of tourism. But non-tradable services managed to attract workers from the food sector.

#### 4. Structural Change and Economic Growth in Ghana

We now estimate the respective contributions of the within and structural change components to productivity growth in Ghana, as in McMillan & Rodrik (2011).

#### 4.1 The Role of Structural Change in Economic Change

Overall productivity increases if either some sectors become more productive (the *within* channel) or labor moves to higher-productivity sectors (the *structural change* channel). We use the methodology of McMillan & Rodrik (2011) and McMillan (2013) to estimate the respective contributions of the two channels to productivity growth. For the year 2005, economy-wide labor productivity was 9.7 times lower in Ghana than in the sample of countries of McMillan & Rodrik (2011). Second, labor productivity in Ghana was always relatively lower across sectors, for example 20 times lower for manufacturing. Third, the Ghanaian ranking of sectors in terms of labor productivity was relatively similar to what could be found elsewhere. Table 1 displays the main results of our analysis.

Before 1992, no matter the decomposition used, the changes in overall productivity were essentially driven by the within component. Within-sector productivity collapsed in 1970-1984 (the within component being -3.6 with 9 sectors). Some sectors have been more severely hit than others: agriculture, cocoa, manufacturing (whose productivity dropped by 65%!), finance and government services. Productivity reincreased in most sectors in 1984-1992. Structural change component was growth-reducing in 1970-1992.

This changed after 1992. The structural change component was positive in 1992-2000 (+2.0% for 9 sectors; +2.9 for 15 sectors) and 2006-2010 (+2.6%; +3.2%). The food sector, trade and personal services were the three least productive subsectors in 1992. They were employers of last resort during the economic crisis. For the structural component to be positive, we needed people to move from these sectors to more productive sectors. While the employment share of the two service subsectors did not change much post-1992, the employment share of the food sector decreased in 1992-2000 (from 54% to 43%) and 2006-2010 (from 45% to 34%). As food was the least productive sector, the absorption of many farm workers by other sectors increased productivity. The structural change components are stronger when using the decomposition of 15 sectors, as we isolate the effect for the food sector, instead of studying the whole agricultural sector. The within component was very high in 2000-2006, as productivity increased across all sectors.

Table 1: Decomposition of Overall Productivity Growth, 1960-2010.

Period:	Labor productivity		Component of annual growth (%) due to:			
	at starting year (2000 PPP \$US)	growth (annual, %)	<i>within</i> (9 sectors)	<i>structural</i> (9 sectors)	<i>within</i> (15 sectors)	<i>structural</i> (15 sectors)
1960-1970	2,622	0.8	0.5	0.3	0.5	0.3
1970-1984	2,850	-3.8	-3.6	-0.2	-3.8	-0.0
1984-1992	1,651	2.5	3.2	-0.7	4.2	-1.7
1992-2000	2,017	1.0	-0.9	2.0	-1.8	2.9
2000-2006	2,190	4.5	6.0	-1.5	6.1	-1.7
2006-2010	2,851	2.7	0.0	2.6	-0.5	3.2
1960-2010	2,622	0.4	0.2	0.2	0.1	0.3
1992-2010	2,017	3.0	1.9	1.1	1.4	1.6

Notes: This table displays labor productivity at starting year (2000 PPP \$US) and the decomposition of annual productivity growth (%) into its *within* and *structural change* components using two sectoral decompositions: 9 sectors as in McMillan & Rodrik (2011), or 15 sectors. See Jedwab & Osei (2012) for data sources.

We test the robustness of these results using data on formal and informal sectors. We per-

form a decomposition analysis using panel data for 18 formal and informal sectors ( $2 \times$  the 9 sectors) for the periods 1960-1970, 1970-1984, 1984-1992, 1992-2000 and 2000-2006. If the economy formalized, we examine whether this change was driven by the fact that some sectors became more formal (the *within* channel) or the fact that labor moved to the more formal sectors (the *structural* change channel), and conversely if the economy informalized. We have no data on informal GDP for the 9 sectors, hence our focus on employment. Changes in formalization were mostly driven by the within component. However, the structural change component was positive in the 1960s when non-agricultural sectors formalized as a result of public investments, and the 1990s when the economy recovered and the more formal non-agricultural sectors hired more farm workers (not shown).

## 4.2 Specific Sectors Involved in Structural Change

Before 1992, productivity growth was driven by the within component. Productivity decreased in most subsectors, whether they belonged to agriculture, industry or services: food production, cocoa, manufacturing, construction, transport, finance, government services and personal services were all negatively affected by the economic crisis. Productivity increased in all sectors (except food production) the next period. The fact that the decline was widespread suggests the importance of national factors rather than sectoral factors. However, the recovery was stronger in non-agricultural sectors than in agriculture (see Fig. 4). Agricultural overtaxation (the negative rural push) probably had a medium-run effect on agricultural productivity. Structural change was then growth-reducing in 1970-1992, as many workers returned to agriculture or were hired by retail trade or personal services, three unproductive sectors that acted as employers of last resort.

After 1992, productivity growth was driven by both within-sector productivity and structural change. During the 1992-2000 period, many workers left the food sector, while many workers entered the following (relatively more productive) sectors: construction, manufacturing, mining, tourism, transport, finance and business services, and government services. As discussed in section 3.1, surplus labor in agriculture was absorbed by other sectors, probably thanks to new opportunities in these sectors. The within component was then negative because these sectors were characterized by declining marginal returns to labor: as employment increased, sectoral productivity decreased, even if the aggregate effect on overall productivity was positive. During the 2000-2006 period, the within effect was very high, at around 6% of annual growth. Interestingly, productivity increased in all sectors. The structural change component was negative, because the economy was further rationalized after the economic reforms of the 1980s and 1990s. Each sector got rid of its less efficient workers, which had to enter a relatively less productive sector. During the 2006-2010 period, we find exactly the same effects for exactly the same sectors as in 1992-2000. Urban pull factors probably explain why these sectors hired more workers.

However, it is not obvious to what extent this growth was ultimately driven by internal or foreign demand. When adding both the within and structural change components for each sector during the whole period 1992-2010, we find that growth was driven by mostly seven sectors: food production, cocoa, construction, mining, tourism, finance and business services, and government services. Construction and government services are procyclical sectors, so their growth is tied to the rest of the economy. Obviously, the economy grew because the international demand for Ghana's natural resources (cocoa, gold, timber and oil) and tourism services increased. The combined GDP share of these sectors rose from 9 to 18% in 1992-2010. This fueled demand in the rest of the economy. In that case,

the urban pull is driven by natural resources and tourism, rather than industrialization or high-productivity services, with the exception of finance and business services. As discussed above, rising food yields also released labor for the modern sector, so there was a positive rural push in the economy. Food imports increased after 1992, which fed even more urban workers. The total contribution of manufacturing was actually nil, which confirms that Ghana has experienced structural change without industrialization. The manufacturing sector is relatively unproductive. First, the informal manufacturing sector accounted for at least 90% of manufacturing employment in 2000. Second, manufacturing productivity was 22.7 times lower in the informal sector than in the formal sector in 2000. In other words, Ghana has the “wrong” manufacturing sectors. For example, the informal clothing and furniture sectors altogether accounted for almost 40% of total manufacturing employment in 2000. These informal sectors serve the domestic market, and are not that different from non-tradable services. These results suggest that the “nature” of structural change is different in Ghana: it has occurred without a Green Revolution, an Industrial Revolution and a Service Revolution of the types seen in Asia.

### **4.3 The Potential Gains from Structural Change**

These results are clearly ambiguous. On the optimistic side, our data for the recent period indicate that: (i) Productivity continuously increased after 1992, and the country transitioned into a more efficient and formalized economy. (ii) The structural component was mostly positive, which showed a reallocation of labor towards more productive sectors. (iii) This reallocation was permitted by an increase in the food supply (the positive rural push), whether it was due to imports or rising food yields. (iv) This reallocation benefited other sectors such as construction, and finance and business services. As urban wages increased, they attracted more workers from the food sector (the positive urban pulls). (v) The economy diversified: while cocoa, timber and mining accounted for almost 100% of exports in 1960, Ghana now also exports tourism services and crude oil.

On the pessimistic side, these positive growth rates were not high considering that the economy collapsed in the 1980s, which resulted in a convergence effect in the next periods. Moreover, Ghana is still two times as poor as India. Our data indicate that: (i) Income and sectoral productivities did not increase much between 1960 and 2010. (ii) Changes in labor productivity are volatile, and the overall economy can improve or deteriorate in a matter of years, as exemplified by the 1970s. (iii) The economy has not experienced a Green Revolution, which has limited its ability to release agricultural labor for the modern sector. (iv). Structural change occurred without industrialization. Manufacturing and tradable services have little contributed to productivity growth. (v) Productivity growth was actually driven by the resource and tourism sectors, and the expansion of the construction and government sectors could just be the result of that economic growth.

How do these results compare with what we know from other studies? First, the analysis of the Asia-Africa productivity gap in the introduction shows that structural change could be less important than within-sector productivity: the gap was reduced from 2.5 to 1.2 when adjusting sectoral productivities versus 1.7 when reallocating labor. Using the same methodology for Ghana, the Asia-Ghana gap would be reduced from 2.7 to 1.0 vs. 2.0. Sectoral productivity is much lower in manufacturing and services in Ghana and in Africa than in Asia. Therefore, reallocating labor from agriculture to other sectors that are relatively unproductive has a smaller effect on overall productivity. Yet it could be easier to reallocate workers across sectors rather than increasing productivity in all sectors, at least

in the short run. For example, should we incite African farmers to enter the manufacturing sector, where they could earn a higher income, or should we try to increase productivity in the African manufacturing sector so that it becomes as productive as in Asia? These strategies do not require the same policies, and previous attempts to raise manufacturing productivity have failed. Second, McMillan (2013) finds that structural change in Africa was growth-reducing in 1990-1999 and growth-enhancing in 2000-2005. The figure 5 of her paper shows that the total contribution of structural change to growth was almost nil during the whole period 1990-2005. In Ghana, structural change was growth-enhancing in 1992-2000 and 2006-2010. However, the sample of McMillan (2013) includes many countries for which patterns could have been different. Our results are in line with Adeyinka, Salau & Vollrath (2013) who find that the contribution of structural change to growth was positive, at 2.3% per year, for Nigeria in 1996-2009 (see Table 4 of their paper). However, in Ghana as well as in Nigeria, it is not obvious to what extent these changes are ultimately due to resource exports, or agricultural modernization and industrialization.

Promoting structural change can clearly enhance overall productivity, provided workers from the low-productivity sectors can be absorbed by higher-productivity sectors. Workers are unlikely to move from the least productive sector, such as food production, to the most productive sectors, such as public utilities or finance. These are capital- or skill-intensive sectors, which limit their ability to absorb unskilled workers from other sectors. Besides, the demand for the goods and services produced by these sectors is limited by the size of the domestic economy or the growth of exports. But workers could gradually climb the productivity ladder, and move to the next more productive sector, as the constraints to sectoral mobility would then be less stringent. Adeyinka, Salau & Vollrath (2013) show that value-added in Nigeria could be 54% higher if there was perfect sectoral mobility, an assumption not credible given sectoral differences in the production function. They find that it would be just 25% higher when accounting for sectoral differences in skill intensity. In the case of Ghana in 2000, the mean number of years of schooling was 2.8 for the food sector, but 7.1 in the rest of the economy (6.2 in manufacturing, 10.5 in finance, and 13.4 in government services). Within the agricultural sector, only 25% of the workers had at least 7 years of schooling. This shows how limited sectoral mobility is in Ghana. These farmers could move to the least productive urban sectors. However, wages are probably not much higher once we account for rural-urban differentials in housing and consumer prices. Therefore, the Asia-Ghana gap is unlikely be reduced from 2.7 to 2.0 when relying on structural change only. 2.0 is an upper bound of the gap that can be potentially achieved. Estimating a more realistic potential gap would require us to have very precise data on skill intensity by sector, housing prices, etc. We leave this issue aside for future research.

## **5. The Role of Government Policies in Structural Change in Ghana**

In this section we discuss the role of government policies in promoting structural change in Ghana. We distinguish the pre-1992 and post-1992 periods.

### **5.1 Government Policies and Structural Change Before 1992**

The fact that all sectors were affected by the economic crisis in the 1967-1984 and were then able to recover through economic growth in 1984-1992 confirms that poor economy-wide policies - and not only poor sectoral policies - constrained economic development during the pre-1992 period. Section 2.1 and Figure 1 have shown how the quality of institutions shaped the economic situation of Ghana. The regulatory and non-regulatory

constraints on the private sector hampered economic development (see Fig. 2). Growth resumed and accelerated after the first phase of the Economic Recovery Program (ERP) in 1983. The goal of the ERP was to halt the decline of the economy, and revive its moribund sectors: agriculture, cocoa, manufacturing and mining. Economic distortions were removed: price controls and import restrictions were abolished, producer prices were raised for farmers and the currency was devalued. The ERP also managed to reduce macroeconomic imbalances (government overborrowing, inflation, etc.) by imposing fiscal and monetary discipline. In the second phase of the ERP in 1987, state enterprises were privatized and the currency was further devalued. The government also reduced private corporate taxes. Economic growth resumed, at 2.5% per year in 1984-1992. Private investment increased (see Fig. 2), and most sectors benefited from this improved economic and institutional climate. Economic growth resumed more slowly in the agricultural sector, as the urban-biased policies of 1960s-1980s disproportionately affected the cocoa and non-cocoa farmers. It took some time before farmers were convinced to invest again.

## 5.2 Government Policies and Structural Change After 1992 and Beyond

We now apply the growth diagnostics framework of Hausmann, Rodrik & Velasco (2008) to analyze the role of government policies in promoting structural change in 1992-2010. As discussed in section 4.2, structural change could be even more growth-enhancing, if productivity increased further in the food sector, manufacturing and/or tradable services. We thus discuss the various binding constraints on structural change today. This section draws extensively on the previous analyses of Lejárraga (2010) and USG-GoG (2011).

**Cost of Finance:** The low level of investment in Ghana (20% of GDP vs. almost 35% in India and 50% in China) could be due to a high cost of finance. During the pre-SAP period, savings were captured by the government and “misallocated”. After the SAPs, the level of private investment rose, but firms still cite the inadequate availability of finance as a major constraint. For example, Kalemli-Ozcan & Sorensen (2012) find that capital is still highly misallocated in Ghana, as the marginal return to investment is higher in firms with less access to finance. The same firms also complain that the domestic demand for their products is too low. In these conditions, the lack of credit is understandable, and the question becomes why Ghanaian firms seem unable to sell their non-resource goods to the rest of the world. Likewise, foreign firms may not be credit-constrained. Why do we not see more FDI inflows in Ghana then? If the cost of finance is a non-issue, the poor performance of the private sector must be explained by a low return to economic activity.

**Poor geography:** Although Ghana is in the tropics, it is close to international markets. Population is concentrated in the forested South. The tropical forest was an asset, as forested land was exploited for the cultivation of cocoa. As such, physical geography does not seem to be a major constraint, relative to countries such as Mauritius or Thailand.

**Low human capital:** Low human capital may not be a major constraint in Ghana (Lejárraga, 2010). First, its stock of human capital is relatively high for its income level (e.g., relative to other countries in West Africa). Second, Lejárraga (2010) shows that the returns to education are around 4% in Ghana, vs. 8-12% on average in developing countries. As most resource-rich economies, Ghana does not typically rely on human capital (Gollin, Jedwab & Vollrath, 2013). The demand for human capital must be relatively low. Third, even if it was high and there was a skill shortage in the country, Ghana could rely on its large well-educated and entrepreneurial emigrant population in the developed world.

**Bad infrastructure:** Poor roads also account for the lack of Green Revolution. Transportation costs are high, which increases the price of agricultural inputs and decreases farmgate prices (Breisinger et al., 2011). Yet Ghana has relatively better infrastructure than most countries with the same income level (Lejárraga, 2010). Trade is also constrained by a lack of competition in the transport sector and numerous road blocks. Second, the energy sector is facing significant challenges, with frequent disruptions to power. Firms are relying increasingly on their own power generation. Should the situation continue, it is unlikely that manufacturing firms can improve their competitiveness. Lejárraga (2010) explains that power outages cost 6.5% of annual sales for Ghanaian firms in 2007 on average.

**Market Failures:** The lack of *self-discovery* and *coordination externalities* (when the actions of economic agents need to be coordinated to improve efficiency) could account for the low level of private investment. First, the economy has little diversified its exports, although Lejárraga (2010) indicates that there have been many “export discoveries” in the last 20 years. Export discoveries are products that are exported for the first time by a country. Most discoveries did not mature in larger export sectors, due to either a lack of international demand or constraints in the expansion of small firms. Gollin (1995) shows how the firm distribution in Ghana is skewed towards small firms, because of asymmetric taxes and regulations. Lejárraga (2010) also explains that smaller exporting firms rely on export intermediaries to sell their products. This could be due to an imperfect knowledge of foreign markets or the fact that firms need an export license that is difficult to obtain.

**Macro Risks:** The democratization process started in 1992 contributed to a marked improvement in macroeconomic fundamentals. Government consumption was rationalized, the fiscal deficit narrowed and inflation fell. The country’s participation in the Highly Indebted Poor Countries (HIPC) initiative meant that it was forced to comply with its associated conditions. These included, among others, the Poverty Reduction and Growth Facility (PRGF). The PRGF guided the macroeconomic policy implementation during the HIPC process (Oduro, 2002). The period of the HIPC process saw Ghana achieve considerable stability in its fiscal outcomes, in addition to debt relief. Second, there have been two peaceful political transitions from one party to another in 2000 and 2008. This improvement in the political environment has engendered more confidence in the institutions and the economy (Osei, 2012). Yet, while a stable macroeconomic environment is a necessary condition for long-run growth, it is not a sufficient condition for the development of a strong (non-resource) tradable sector (Lejárraga, 2010). Besides, the macroeconomic situation has deteriorated owing to the oil boom in the last few years. Private investment is concentrated in the resource sector after the discovery of oil in 2008 (Barthel, Busse & Osei, 2011), while there are signs of eviction effects of public borrowing on private investment (CEPA, 2012). Osei (2012) cautions that oil has the potential to impact the structure of the economy in a way that is not developmentally transformative. For example, the share of capital spending in government expenditure decreased from 50% in 2000 to 40% in 2011, as the choice was made to hire more civil servants and pay them better.

**Micro Risks:** Institutional change in the 1990s has permitted a significant improvement in the business environment. The reforms underlined the effort by the government to rebalance the economy in favor of the private sector (Asem et al., 2013). Evidence of this policy shift is seen in the reduction of the transaction costs associated with doing business in Ghana. Over the period 2006-2012, Ghana was one of the top 10 reformers according to the World Bank’s *Doing Business Report*. The country is now ranked 64th in the world (out

of 185) and 5th in Sub-Saharan Africa (out of 46). Ghana is also ranked 64th in the world according to the *Corruption Perception Index* of Transparency International. It outperforms other countries for the following sub-indices: registering property (45/185), enforcing contracts (48/185) and protecting investors (49/185). It then underperforms other countries for the following sub-indices: paying taxes (89/185), starting a business (112/185), resolving insolvency (114/185) and dealing with construction permits (162/185). One issue seems to be the high taxation rates faced by firms. While taxes are necessary for funding public goods (e.g., roads), taxes often include informal payments to tax inspectors (Lejárraga, 2010). Taxes are also higher for large firms, which skews the firm distribution towards small firms (Gollin, 1995). Second, the regulatory framework is constraining, as it is complicated to start and shut down a business, and hire and fire workers in the formal sector (Lejárraga, 2010). The current regulations favor large firms that are already existing and politically connected, while smaller but successful firms cannot mature into larger ones. Thus, changes in the regulatory environment have not always benefited the majority of firms in Ghana (Asem et al., 2013). Another example of micro risks is the insecurity of property rights in the agricultural sector (USG-GoG, 2011).

Ghana must cope with several binding constraints. These contribute to the lack of Green, Industrial and Service Revolutions, and are sometimes the causes and consequences of the other mechanisms of structural change, such as the negative rural push, urban pull and urban push. While the contribution of structural change was positive in 1992-2010, it could increase further. In Asia, manufacturing and tradable services have absorbed the surplus labor from the food sector (Breisinger et al., 2011; Gollin, Jedwab & Vollrath, 2013). However, these sectors are 19 and 6 times less productive in Ghana than in the rest of the world respectively. Labor costs are relatively high, because the food problem has not been reduced. Non-labor costs are also high, due to a constraining regulatory framework, power outages and poor roads. Although the business environment has considerably improved in the last twenty years, a lot remains to be done for Ghana to be as competitive as Mauritius or South Africa. Ghana is unlikely to develop a strong non-resource tradable sector in the near future. But anything is possible in the longer run, as exemplified by the development experience of the countries mentioned above. The reverse scenario is also true; the recent cocoa, gold and oil booms could cause a new resource curse in Ghana.

## 6. Conclusion

In Africa, structural change was not synonymous to industrialization but was defined by a dramatic expansion of services, and the continent is still relatively poor. One hypothesis is that structural change in Africa has not been as growth-enhancing as in Asia. Our results for Ghana suggest that: (i) structural change is both a factor and a consequence of development, as episodes of negative economic growth are associated with structural change in the wrong direction; (ii) the contribution of structural change to productivity growth was nil or negative until the 1980s, as the political and economic environment was not conducive to long-run growth; (iii) structural change was growth-enhancing after the country democratized in 1992, so structural change can also be a factor of economic development in Africa; and (iv) our results also suggest that the “nature” of structural change remains different in Ghana: structural change has occurred without a Green Revolution, an Industrial Revolution and a Service Revolution of the types seen in Asia. Although Ghana is hailed as one of Africa’s success stories, the economy remains highly dependent upon natural resource exports and the manufacturing sector is still uncompetitive.

## REFERENCES

- Adeyinka, Adedeji, Sheu Salau, and Dietrich Vollrath.** 2013. *Structural Change in Nigeria*. Unpublished Manuscript, Department of Economics, University of Houston.
- Agyeman-Duah, Ivor.** 2008. *An Economic History of Ghana: Reflections on a Half-Century of Challenges and Progress*. Edited by Agyeman-Duah, Ivor. Banbury, UK: Ayebia Clarke publishing.
- Alvarez-Cuadrado, Francisco, and Markus Poschke.** 2011. "Structural Change Out of Agriculture: Labor Push versus Labor Pull." *American Economic Journal: Macroeconomics*, 3(3): 127–58.
- Aryeetey, Ernest, Jane Harrigan, and Machiko Nissanke.** 2000. *Economic Reforms in Ghana: The Miracle and The Mirage*. Edited by Ernest Aryeetey and Jane Harrigan and Machiko Nissanke, UK: James Currey Ltd.
- Asem, Freda, Matthias Busseb, Robert Darko Osei, and Magdalene Silberberger.** 2013. *Private Sector Development and Governance in Ghana*. International Growth Centre Working Paper April 2013.
- Bairoch, Paul.** 1988. *Cities and Economic Development: From the Dawn of History to the Present*. Chicago: The University of Chicago Press.
- Barrios, Salvador, Luisito Bertinelli, and Eric Strobl.** 2006. "Climatic Change and Rural-Urban Migration: The Case of Sub-Saharan Africa." *Journal of Urban Economics*, 60(3): 357–371.
- Barthel, Fabian, Matthias Busse, and Robert Osei.** 2011. "The Characteristics and Determinants of FDI in Ghana." *The European Journal of Development Research*, 23(3): 389–408.
- Bates, Robert.** 1981. *Markets and States in Tropical Africa: The Political Basis of Agricultural Policies*. Berkeley: University of California Press.
- Bosworth, Barry, and Susan M. Collins.** 2008. "Accounting for Growth: Comparing China and India." *The Journal of Economic Perspectives*, 22(1): 45–66.
- Brandt, Loren, Chang-Tai Hsieh, and Xiaodong Zhu.** 2008. "Growth and Structural Transformation in China." In *China's Great Economic Transformation*. , ed. L. Brandt and T. G. Rawski, 683–728. Cambridge: Cambridge University Press.
- Breisinger, Clemens, Xinshen Diao, Shashidhara Kolavalli, Ramatu Al Hassan, and James Thurlow.** 2011. *A New Era of Transformation in Ghana: Lessons from the Past and Scenarios for the Future*. IFPRI Research Monograph. Washington D.C.: International Food Policy Research Institute.
- Buera, Francisco J., and Joseph P. Kaboski.** 2012. "Scale and the origins of structural change." *Journal of Economic Theory*, 147(2): 684–712.
- Caselli, Francesco, and Wilbur John Coleman II.** 2001. "The U.S. Structural Transformation and Regional Convergence: A Reinterpretation." *Journal of Political Economy*, 109(3): 584–616.
- CEPA.** 2012. *Overview of Ghana Economic Review and Outlook (2013)*. Legon, Ghana: Centre for Policy Analysis.
- Christiaensen, Luc, Marina Gindelsky, and Remi Jedwab.** 2013. "The Speed of Urbanization and Economic Development: A Comparison of Industrial Europe and Contemporary Africa." Unpublished manuscript, George Washington University, Department of Economics.
- Duarte, Margarida, and Diego Restuccia.** 2010. "The Role of the Structural Transformation in Aggregate Productivity." *The Quarterly Journal of Economics*, 125(1): 129–173.
- Evenson, Robert E., and Douglas Gollin.** 2003. "Assessing the Impact of the Green Revolution, 1960 to 2000." *Science*, 300(5620): 758–762.
- FAO.** 2010. *FAOSTAT*. Rome: Food and Agricultural Organization.
- Fay, Marianne, and Charlotte Opal.** 2000. "Urbanization without growth : a not-so-uncommon phenomenon." The World Bank Policy Research Working Paper Series 2412.
- Ghani, Ejaz, and Homi Kharas.** 2010. "The Service Revolution." World Bank Economic Premise Note Series 14.
- Gollin, Douglas.** 1995. "Do Taxes on Large Firms Impede Growth? Evidence from Ghana." University of Minnesota, Economic Development Center Bulletins 7488.

- Gollin, Douglas, Remi Jedwab, and Dietrich Vollrath.** 2013. "Urbanization with and without Industrialization." Unpublished manuscript, Oxford University, Department of International Development.
- Gollin, Douglas, Stephen L. Parente, and Richard Rogerson.** 2002. "The Role of Agriculture in Development." *American Economic Review*, 92(2): 160–164.
- Gollin, Douglas, Stephen L. Parente, and Richard Rogerson.** 2007. "The food problem and the evolution of international income levels." *Journal of Monetary Economics*, 54(4): 1230–1255.
- Hansen, Gary D., and Edward C. Prescott.** 2002. "Malthus to Solow." *American Economic Review*, 92(4): 1205–1217.
- Harris, John R., and Michael P. Todaro.** 1970. "Migration, Unemployment & Development: A Two-Sector Analysis." *American Economic Review*, 60(1): 126–42.
- Hausmann, Ricardo, Dani Rodrik, and Andres Velasco.** 2008. "Growth Diagnostics." In *The Washington Consensus Reconsidered: Towards a New Global Governance*. . Oxford University Press, New York ed., , ed. J. Stiglitz and N. Serra.
- Herrendorf, Berthold, Richard Rogerson, and Akos Valentinyi.** 2011. *Growth and Structural Transformation*. Draft prepared for the Handbook of Economic Growth.
- Hsieh, Chang-Tai, and Peter J. Klenow.** 2009. "Misallocation and Manufacturing TFP in China and India." *The Quarterly Journal of Economics*, 124(4): 1403–1448.
- Jedwab, Remi.** 2013. "Urbanization without Industrialization: Evidence from Consumption Cities in Africa." Unpublished manuscript, Department of Economics, George Washington University.
- Jedwab, Remi, and Robert Darko Osei.** 2012. "Structural Change in Ghana 1960-2010." George Washington University IIEP Working Paper.
- Kalemli-Ozcan, Sebnem, and Bent E. Sorensen.** 2012. "Misallocation, Property Rights, and Access to Finance: Evidence from Within and Across Africa." National Bureau of Economic Research, Inc NBER Working Papers 18030.
- Killick, Tony.** 2010. *Development Economics in Action: A Study of Economic Policies in Ghana*. London, UK: Heinemann Educational Books Limited.
- Lejárraga, Iza.** 2010. "Roaring Tiger or Purring Pussycat: A Growth Diagnostics Study of Ghana." Paper prepared for the session on "Growth Diagnostics in Practice", Annual Meeting of the American Economic Association, Atlanta, 4 January 2010.
- Lewis, Arthur.** 1954a. "Economic Development with Unlimited Supplies of Labour." *The Manchester School*, 22(2): 139–191.
- Lewis, Arthur.** 1954b. *Report on The Industrialisation of the Gold Coast*. Accra, Gold Coast: Govt. Print. Dept.
- Lipton, Michael.** 1977. *Why Poor People Stay Poor: Urban Bias in World Development*. Cambridge: Harvard University Press.
- Lucas, Robert E.** 2004. "Life Earnings and Rural-Urban Migration." *Journal of Political Economy*, 112(S1): S29–S59.
- Matsuyama, Kiminori.** 1992. "Agricultural Productivity, Comparative Advantage, and Economic Growth." *Journal of Economic Theory*, 58(2): 317–334.
- Matusyama, Kiminori.** 2008. "Structural change." In *The New Palgrave Dictionary of Economics*. , ed. Steven N. Durlauf and Lawrence E. Blume. Palgrave Macmillan.
- McKinsey.** 2011. *Lions on the Move: The Progress and Potential of African Economies*. London: McKinsey Global Institute.
- McMillan, Margaret.** 2013. "Structural Change in Africa." Unpublished manuscript, Department of Economics, Tufts University.
- McMillan, Margaret S., and Dani Rodrik.** 2011. "Globalization, Structural Change and Productivity Growth." NBER Working Papers 17143.
- Nunn, Nathan, and Nancy Qian.** 2011. "The Potato's Contribution to Population and Urbanization: Evidence from an Historical Experiment." *The Quarterly Journal of Economics*, 126(2).
- Nweke, Felix.** 2004. "New challenges in the cassava transformation in Nigeria and Ghana." Inter-

- national Food Policy Research Institute (IFPRI) EPTD discussion papers 118.
- Oduro, Abena.** 2002. *Enhanced HIPC Initiative: Benefits and Implications*. Centre for Policy Analysis.
- Osei, Robert Darko.** 2012. *Aid, Growth and Private Capital Flows to Ghana*. UNU-WIDER Working Paper 2012/22.
- Pickett, James, and Ezra Shaeeldin.** 1990. "Comparative Advantage in Agriculture in Ghana." OCDE Development Centre Working Paper 31.
- Poelhekke, Steven.** 2010. "Urban Growth and Uninsured Rural Risk: Booming Towns in Bust Times." *Journal of Development Economics*, In Press.
- Potts, Deborah.** 1995. "Shall We Go Home? Increasing Urban Poverty in African Cities and Migration Processes." *The Geographical Journal*, 161(3): pp. 245–264.
- Ranis, Gustav.** 1995. "Another Look at the East Asian Miracle." *World Bank Economic Review*, 9(3): 509–34.
- Schultz, Theodore W.** 1953. *The Economic Organization of Agriculture*. New York: McGraw-Hill.
- Stiglitz, Joseph E.** 1996. "Some Lessons from the East Asian Miracle." *World Bank Research Observer*, 11(2): 151–77.
- Teal, Francis.** 1999. "Why Can Mauritius Export Manufactures and Ghana Not?" *The World Economy*, 22(7): 981–993.
- Teal, Francis J.** 2002. "Export Growth and Trade Policy in Ghana in the Twentieth Century." *The World Economy*, 25(9): 1319–1337.
- Teigner, Marc.** 2011. "The Role of Trade in Structural Transformation." Unpublished manuscript, University of Chicago, Department of Economics.
- United Nations.** 2011. *World Urbanization Prospects: The 2011 Revision*. New York: United Nations, Department of Economic and Social Affairs.
- USG-GoG.** 2011. *Ghana Constraints Analysis (Partnership for Growth)*. U.S. Government and Government of Ghana.
- World Bank.** 2010. *World Development Indicators*. Washington D.C.: World Bank.
- World Resources Institute.** 2007. *EarthTrends*. Washington: World Resources Institute.
- Yang, Dennis, and Xiaodong Zhu.** 2010. "Modernization of Agriculture and Long-Term Growth." *IZA Discussion Papers*, 5239.
- Young, Alwyn.** 2012. "The African Growth Miracle." *Journal of Political Economy*, 120(4): 696 – 739.