

## Deindustrialization in Africa

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### Abstract

Economic growth in Sub-Saharan Africa has been characterized by deindustrialization. Conventional economists argue that this is due to a bad environment for business decision making. This paper provides a classical explanation for deindustrialization, the failure to solve the food problem. That is, food staple prices have risen rapidly resulting in labor becoming costly, although physically abundant. This has prevented the evolution of a comparative advantage in labor intensive manufacturing. Structural change is an important element of the process of economic development, especially in the early stages. Productivity grows by shifting labor out of agriculture where productivity is low, and into industry or manufacturing where labor productivity is high. However, there is not just a comparative static productivity gain from structural change. It also seems that there is a dynamic gain as well. Unconditional convergence in labor productivity does tend to occur in manufacturing. That is, once a manufacturing sector is established in a less developed region, labor productivity in that sector tends to converge to that found in that same sector in developed countries. Thus, aggregate (economy wide) convergence generally fails to occur in many low income countries because manufacturing remains much too small a share in the overall economy. There is a dynamic gain in labor productivity that results from successful structural change. Indeed the process described above seems to be a very good description of the development process in East and Southeast Asia. These countries managed to shift labor into labor intensive manufacturing and industry, a large part of which was produced for export. This led to dramatic increases in the rate of growth of per capita income as well as a dramatic reduction in overall levels of poverty.

Key words: *Africa, staple food, structural change, manufacturing*

Recently, economic growth in Sub-Saharan Africa has risen dramatically. Beginning in the 1990s a number of economic reforms occurred and there was rapid growth in the demand for raw materials and resources resulting from rapid Chinese growth. These factors resulted in a significant rise in growth rates of GDP per capita throughout much of Sub-Saharan Africa. However, the puzzling thing about this economic growth is that it has been accompanied by a lack of growth in manufacturing and perhaps even a deindustrialization of the economy, with the share of manufacturing and industry in GDP declining over time (reword SD). Compared to the East and Southeast Asian experience this is a significant anomaly. It would seem to indicate that the recent growth in the region is fragile in nature and not likely to persist. How does one explain this anomaly? This is a very important question since China's rapid economic development is opening up significant opportunities.

Specifically, unit labor costs are beginning to rise in China implying that China is shifting out of the production of low end (labor intensive) manufactured and industrial goods and is moving up the technological ladder by producing technologically more sophisticated (capital intensive, physical as well as human capital) products. Thus opportunities exist for Sub-Saharan Africa to shift into labor intensive, export oriented manufacturing and industry. However, the slow development of industry and the deindustrialization process (reword SD) the region is undergoing would seem to indicate that this opportunity is being or will be lost. Why is this process, deindustrialization, occurring ? Conventional analysis has usually argued that this failure is the result of governance issues, lack of investment in infrastructure and education, and a lack of openness to trade and foreign investment. However, a number of countries in East and Southeast Asia have managed to achieve rapid growth under similar circumstances. It will be argued, that classical economics is more useful in trying to explain why Africa has de-industrialized and the relevance of the classical model is related to a lack of institutional evolution.

### **Deindustrialization**

What is deindustrialization ? Williamson and Clingingsmith (2005) have developed the following explanation of the term : they assumed an economy in which two goods are produced (agriculture and manufacturing) utilizing three inputs: labor, land, and capital. Labor is used to produce both goods while capital is specific to manufacturing and land to agriculture. In this context, absolute deindustrialization occurs when labor moves out of the manufacturing sector and into the agricultural sector. Thus the absolute number of workers in manufacturing declines while that in agriculture rises. In a many sector model absolute deindustrialization would generally involve a fall in the number of workers in manufacturing. Relative deindustrialization occurs when the share of total employment in manufacturing declines, while the share of agriculture expands. In the context of a many sector model, relative deindustrialization involves a fall in the share of manufacturing in total employment.

One can make a similar sort of analysis by focusing on the share of manufacturing in total GDP. Thus absolute deindustrialization would be represented by a decline in real total manufacturing. Alternatively, relative deindustrialization occurs when the share of manufacturing in total GDP declines over time. Deindustrialization in terms of employment and production are likely to be related. Those countries for which manufacturing output as a share of GDP is declining are likely to be those countries for which manufacturing employment as a share of overall employment is also likely to decline.

One could interpret the concept of deindustrialization in a broader sense. In this interpretation manufacturing as a share of GDP or employment may not fall, instead it may remain stable or even increase, but to a much lesser degree than another sector, in particular services. This generally occurs while an economy attains a fairly high level of GDP per capita. However, this can be quite problematic if it begins to occur at much lower levels of income. Why problematic? Such a premature shift into services may limit future productivity growth. One can think of this as deindustrialization in the sense that the more common pattern experienced by developing nations

is that initially structural change involves a shift of production and employment into manufacturing and industry and only later into services. Thus, the process by which the manufacturing stage is skipped can also be thought of deindustrialization.

As growth has occurred over time in Sub-Saharan Africa, so has deindustrialization. Data concerning this issue is difficult to find. deVries, Timmer, and deVries (2013) have developed a useful data set for examining these issues. This data set covers eleven Sub-Saharan African nations for the period 1960 to 2010. It includes data on gross value added at nominal, real, and international prices as well as information on employment by sector of the economy. This data allows an examination of the issues discussed above, especially those pertaining to structural change.

In Table One, data is presented on value added, employment, and relative labor productivity by sector of the economy. The data for value added and employment represents each sector's proportion of the economy's total value added and employment. With respect to relative productivity levels, this represents the ratio of the sector's labor productivity level to the total economy's productivity level. A 0.5 for agriculture implies that this sectors labor productivity was half of that for the whole economy. Examining the data one can see that agriculture has certainly followed the typical pattern in terms of structural change. Agriculture's share in value added and employment has significantly declined over time. However, labor productivity in agriculture has lagged behind that of the rest of the economy.

Table 1

*Value added, employment, and relative labor productivity by sector*

Sector	Sectoral Shares								Relative Productivity Levels			
	Value Added				Employment							
	1960	1975	1990	2010	1960	1975	1990	2010	1960	1975	1990	2010
Agriculture	37.6	29.2	24.9	22.4	72.7	66.0	61.6	49.8	0.5	0.4	0.4	0.4
Industry	24.3	30.0	32.6	27.8	9.3	13.1	14.3	13.4	4.4	3.7	3.5	2.6
Mining	8.1	6.2	11.2	8.9	1.7	1.5	1.5	0.9	15.7	22.4	23.3	19.5
Manufacturing	9.2	14.7	14.0	10.1	4.7	7.8	8.9	8.3	2.5	2.8	2.4	1.6
Other Industry	7.1	9.2	7.3	8.9	3.0	3.8	3.9	4.2	8.5	5.8	5.3	2.9
Services	38.1	40.7	42.6	49.8	18.0	20.9	24.1	36.8	2.7	2.5	2.4	1.6
Total Economy	100	100	100	100	100	100	100	100	1.0	1.0	1.0	1.0

When focusing on the industrial sector several anomalies appear (word choice SD). Looking at the industrial sector as a whole, the share of value added seems to have risen between 1960 and 1990. However, after that there is a decline. Examining the subcategories under industry one can see that manufacturing actually begins to decline after 1975. In terms of employment, employment shares in both industry and manufacturing rise until 1990 and then decline. Examining relative productivity a similar story emerges. Overall productivity in industry is significantly greater than that found in the overall economy, but this overall advantage begins to decline as after 1975. Manufacturing follows a similar pattern.

Finally, the sector which has expanded most rapidly has been the service sector. It has grown both in terms of value added and employment shares. Looking at relative labor productivity, one can see that this sector is more productive than the economy as a whole, but not to the extent of industry. Also relative productivity has fallen over time. Lastly, relative labor productivity in services was certainly higher than that of agriculture throughout the time period.

So what conclusions can be drawn from this data? First, relative deindustrialization seems to have occurred both in terms of employment and value added. Second, deindustrialization has also seemed to occur in the sense that structural change seems to have skipped over industry with the service sector taking up the unused capacity in terms of both production and employment. The picture of structural change in Sub-Saharan Africa can be described in the following manner. Agriculture has shrunk in terms of both production and employment. Much of this production and employment has shifted into the service sector, not the industrial sector (nor manufacturing). The shift in labor has been from a low productive sector, agriculture, to a higher productive sector, services. However, the gain in productivity seems to have been much less than that which would have occurred from a shift to industry. Even more importantly, productivity growth in services is much lower than that in industry. We can describe this type of structural change as generating static gains at the expense of dynamic losses (deVries, et al., 2013).

Table 2

*Sectoral Composition Real GDP*

Year	Primary	Industry	Services	Construction	Infrastructure
1888	41.5	8.1	46.3	2.6	1.5
1900	34.6	11.3	47.5	3.5	3.1
1910	31.5	5.4	42.8	4.0	6.3
1920	24.7	19.0	43.2	3.4	9.7
1930	20.7	24.0	35.6	4.9	14.6
1938	15.9	32.4	32.3	6.9	12.3

*Note.* Adapted from: Teranishi (2005).

This pattern is much different than that found in the successful cases in Asia, particularly in East Asia. Japan represents the first non-Western nation to converge to developed country standards of living. This process began before World War II and accelerated thereafter. The focus

here will be on the prewar period and data on the sectoral composition of GDP in the prewar period is presented in Table Two. As one can see, the share of primary production declines throughout the period while that for industry rises. Employment trends followed trends in sectoral GDP as well. Structural change involved a shift from agriculture to industry.

South Korea too has managed to converge towards developed countries' living standards with rapid growth beginning in the 1960s. Table Three provides some information concerning the structural change process. As one can see, agriculture declined both as a share of GDP and employment from 1962 to 1980, while the share of industry in these two categories rose dramatically in tandem with the service sector. Thus economic development was accompanied by a shift of labor out of agriculture and into industry and manufacturing.

Table 3

*Structural Change - South Korea*

	<u>1962</u>	<u>1970</u>	<u>1980</u>
<u>Agriculture</u>			
% of GDP	39.8	29.7	17.8
% of Employment	63.1	50.4	34.0
<u>Industry</u>			
% of GDP	14.6	19.7	25.3
% of Employment	8.7	14.3	22.6
<u>Services</u>			
% of GDP	45.6	50.6	56.8
% of Employment	28.2	35.2	43.4

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*Note.* Adapted From: Looney (2012)

Finally, Taiwan has been able to converge to a standard of living similar to that found in developed countries. Rapid growth began in the 1960s and it was also accompanied by dramatic structural change with agriculture declining in importance both in terms of GDP and employment. This was accompanied by growth in both industry and services as shares of GDP and employment. These results are reflected in Tables Four and Five.

The contrast between the structural changes experienced by East Asia and Sub-Saharan Africa are quite stark. In East Asia, the shift out of agriculture was accompanied by the expansion of industry and in most instances services too. Alternatively, Sub-Saharan Africa has experienced relative deindustrialization in terms of both GDP and employment. The rapid expansion of manufacturing has failed to occur. It appears that industrialization has been skipped.

Table 4

*Structural Change in GDP -Taiwan*

<u>Year</u>	<u>Agriculture</u>	<u>Industry</u>	<u>Services</u>	<u>Total</u>
1952	36.0	18.0	46.0	100
1956	31.9	22.4	46.0	100
1960	32.9	24.9	42.2	100
1964	28.3	28.9	42.8	100
1968	22.1	32.6	45.4	100
1972	14.2	40.3	45.5	100
1980	9.2	44.7	46.1	100
<u>1988</u>	<u>6.1</u>	<u>46.2</u>	<u>47.7</u>	<u>100</u>

*Note.* Adapted From: Mao and Schive (1995)

Table 5

*Structural Change in Employment -Taiwan*

<u>Year</u>	<u>Agriculture</u>	<u>Industry</u>	<u>Services</u>	<u>Total</u>
1952	56.1	16.9	27.0	100
1956	53.2	18.3	28.5	100
1960	50.2	20.5	29.3	100
1964	49.5	21.3	29.2	100
1968	40.8	25.4	33.8	100
1972	33.0	31.8	35.2	100
1980	19.5	42.4	38.1	100
<u>1988</u>	<u>13.7</u>	<u>42.6</u>	<u>43.7</u>	<u>100</u>

*Note.* Adapted From: Mao and Schive (1995)

## **Why has Sub-Saharan Africa Failed to Develop a Comparative Advantage in Industry (manufacturing)?**

### **Explanations: Conventional and Classical**

#### *Conventional Perspective*

Conventional perspectives on Sub-Saharan Africa's failure to evolve a productive industrial sector tend to focus on issues of policy and governance. With respect to policy, it is often noted that after World War II and the successful move to independence, many of the new governments pursued a state centered process of economic development that has come to be known as import substitution industrialization (ISI). This approach to industrialization sought to protect or subsidize industrial production. Many of these countries had comparative advantages in a variety of primary types of goods, often based on minerals and other sorts of natural resources. The ISI strategy involved policies that shifted resources out of sectors in which these countries were relatively efficient and into sectors in which production was inefficient.

The policies utilized were quite varied. Tariffs and quotas were used to provide protection to domestic manufacturing firms. Foreign exchange controls were imposed so as to allow the state to control foreign exchange and direct it to sectors which were being promoted. In some instances, state ownership and control of specific sectors was undertaken to allow the state to directly manage resource allocation. Agriculture was often neglected in terms of investment since productivity there tended to be quite low. In addition, the state often created parastatal institutions for the marketing of important agricultural goods. This allowed the state to use monopsony power to push down the relative prices of these agricultural goods. This effectively transferred resources to the non-agricultural sector (Anderson and Masters, 2009).

The results of ISI have been viewed negatively. As was discussed in Table One, the share of industry in GDP and employment did rise, but not dramatically. The protected sectors of the economy remained largely inefficient. From a dynamic perspective this strategy seemed to fail. International indebtedness rose dramatically among the nations of the region eventually resulting in an economic collapse. Beginning in the 1990s many countries in the region underwent structural adjustment programs under the direction of various international institutions. In this process tariffs and quotas were reduced, exchange rates reformed and devalued, state ownership was reduced in extent, and marketing boards dismantled. The extent of protection of industry and manufacturing was dramatically reduced and the extent of discrimination against the agricultural sector was reduced. This has, according to some, laid the foundation for the rapid economic growth experienced by the region over the last fifteen years. Policy changes are seen to be the key in integrating Africa with the international economy and promoting rapid growth (Sachs and Warner, 1997).

The failure of manufacturing/industry to rapidly grow even during the recent period of rapid overall growth is often attributed to problems of governance or the bad business environment that results from flawed governance. Problems involving governance are often manifested in widespread corruption in government institutions. This results in misallocated investment, waste,

and slower growth. Resources are utilized to the benefit of small groups of powerful political elites. Authoritarian political structures dominate and there are few checks on the use of power. Bad business environments are also the result of the lack of infrastructure in many Sub-Saharan countries. The lack of infrastructure, including power generation and distribution, limits the spread of modern manufacturing firms. In addition, the red tape and bureaucracy limits entrepreneurial decision-making and inhibits investment in modern manufacturing firms. This results in productivity enclaves, “islands of high productivity in a sea of smaller low productivity firms.” (Gelb, et al., 2014).

The solution to the problems of corruption and the existence of a bad business environment are thought by many to involve political reform. This reform would involve the expansion of pluralism via the construction of democratic institutions and practices. In fact, better recent policies and economic performance have been at least partly linked to significant political reform (Ndulu and O’Connell, 1999).

The conventional or neoclassical perspective is undermined by the fact that most of the economically successful countries of East and Southeast Asia were faced with similar initial conditions. Governance issues and corruption in these countries, result in environments that limit the development of manufacturing. Democracy and pluralism did not precede rapid growth and the development of labor intensive manufacturing. In most cases, it was the exact opposite. South Korea and Taiwan industrialized under authoritarian regimes as has China. Japan began its industrialization process (prior to World War II) under a political regime which was authoritarian in nature, even though there were some aspects of democratic institutions in existence.

### *Classical Perspective*

A relatively modern version of classical analysis in development economics is represented by the work of Lewis (1954). He developed a model composed of two sectors: traditional and modern. The traditional sector was mainly distinguished by how production units make decisions. He argued that output in this sector was shared in a manner such that each worker receives their average product. Only labor and land are used in the production process and no capital is utilized or accumulated (saving and investment are zero). Finally, no technological innovation occurs in the staple food production.

The modern sector will be assumed to represent manufacturing. Profits are maximized with wage being equal to the marginal product of labor. Capital and labor are utilized in the production process with the former being accumulated via savings and investment. In the Model, technical change does not occur. Within this scheme, economic growth can only arise via structural change. The marginal product of labor in the traditional sector is assumed to be zero (surplus labor), while manufacturing is positive. As capital is accumulated in the modern sector, labor shifts from the sector where productivity is low to the sector where it is high (manufacturing) and growth occurs with labor productivity rising (per capita income).

Difficulties arise when surplus labor is exhausted. When this occurs continued expansion of manufacturing implies that food production declines and the relative price of food rises. Wages in the manufacturing sector must rise in order to cover the increased cost of food. This will tend to



reduce profits and slow or perhaps halt structural change (and thus growth) altogether. In addition, the production technology in the modern sector is likely to become more capital intensive, further slowing structural change.

There are several drawbacks to this analysis. First, as outlined above, the economy is closed to the outside world. Results are likely to alter if one allows trade. Second, the concept of surplus labor is controversial to say the least. Third, the growth process is structural in nature with no allowance for technical change. Within this limited context though, a simple implication does emerge. Labor may be physically abundant, but not economically cheap due to the rising cost of food. In this situation, manufacturing may very well fail to develop because food becomes increasingly expensive and what manufacturing that does develop is likely to be more capital intensive and less labor intensive in nature.

One can easily eliminate the surplus labor assumption and assume labor is paid its marginal product. Eswaran and Kotwal (2004) have constructed a dualistic model in which the expenditure patterns of households are dependent on income. Specifically, at low income levels all income is spent on food, however once income attains a specific threshold, an increasing share is spent on manufacturing. As savings and capital accumulation occur in the modern sector, income rises and households begin spending an increasing proportion of their income on manufactured goods. However, whether this structural change process continues still depends on what happens to productivity in the food sector. If productivity remains unchanged, then output in food production will decline as labor moves into manufacturing. The rising price of food is likely then to stop the expansion of the modern sector since the real wage in manufacturing will have to dramatically rise. Rapid growth in agricultural productivity will keep food prices down and allow structural transformation.

Given the dynamic characteristics of manufacturing, structural change from agriculture to manufacturing is crucial to development. Rodrik (2013) has shown that unconditional productivity convergence does tend to occur in manufacturing. That is, although the labor productivity of newly established manufacturing firms is likely to be low by the international standards of developed countries, the productivity of the sector quickly tends to converge to international standards of productivity. The shift from agriculture to manufacturing in the development process creates static gains. Labor moves from low to high productivity activities. But, dynamic gains in labor productivity in manufacturing tend to grow rapidly. The key to this process involves raising productivity in staple foods so as to allow structural change to occur.

Up to this point, the dualistic model under discussion is closed in nature. However, the implications of low productivity in staple food production persist within the context of a semi-open economy. This idea was originally developed by Myint (1975). A semi-open economy is one in which part of the domestic economy remains insulated from foreign trade while part of the economy is fully open to trade. In this case, the food producing sector is presumed to be closed to trade while manufacturing is open. It is, at this point, useful to presume that agriculture can be divided into two sectors, a closed sector producing food and a commercial agricultural sector that

produces an export product utilizing labor and land (a comparative advantage in this product exists).

In this context economic growth can occur in a variety of ways. For example, an exogenous increase in this demand for the commercial agricultural product (in terms of trade improvement) would cause resources (labor) to shift out of staple food production and into export production. However, it will also draw resources from the tradable modern manufacturing sector with imports of manufacturing goods rising. However, if food productivity does not increase rapidly enough, the comparative advantage of the commercial, export oriented agricultural sector will decline and the comparative disadvantage of manufacturing will increase as wage increases occur as a result of the rise in staple food prices. Structural change (into manufacturing) will be stymied, deindustrialization will occur.

An alternative process of economic growth could occur if government policy is used to subsidize the expansion of manufacturing (initially this sector is characterized by comparative disadvantage). The resulting expansion of this sector will draw labor from both staple food production and export production, but if agricultural productivity stagnates, then rising wages will reduce the comparative advantage in the commercial export crop and eventually prevent the structural transformation of the economy via a shift into manufacturing. Structural change is found to be crucially dependent on growth in food productivity.

Does it make sense to think that the staple food producing sectors in Sub-Saharan Africa are closed to trade? Gollin, et al. (2007) has argued that for many Sub-Saharan nations the staple food sector is to all intents and purposes a closed sector. Data from the FAO indicates that most poor countries meet their demand for food from domestic production. Thus Gollin, et al. (2007) concludes that “it is reasonable to view most economies as closed from the perspective of trade in food”. This conclusion seems to be even more relevant for the case of Sub-Saharan Africa. Many of the food staples for these countries are not extensively traded. Delgado, et al. (2004) argues that the cost of transporting and marketing staple foods isolates this type of production from international markets.

Even when staple foods are traded, the markets for these goods are often quite thin. That is, of total production of a particular staple worldwide, the percent that is actually traded is quite small. As a result, changes in purchases on the international market by relatively small food importers can still have dramatic effects on the price of such staples. Thus the price of staple foods cannot be assumed to be an exogenous variable. Instead, it must be stipulated to be endogenously determined in any model purporting to explain structural change.

A number of hypotheses can be put forward based upon analysis within the content of the semi-open economy developed in this section. The deindustrialization of Sub-Saharan Africa should be associated with slow growth in food staple production. Rapid growth over the last decade or so should have resulted in rapid increases in staple food prices. Finally, although Africa is characterized as being increasingly labor abundant, one should expect to find that labor is not relatively cheap in this region.

## Empirical Evidence

Whether successful transformation occurs as growth takes place depends on whether productivity in food production rises and keeps pace with the growth of the modern manufacturing sector. Data on food production per capita for Sub-Saharan Africa is presented in Table Six indicating that food production per capita has generally stagnated. By the year 2009, agricultural output had not risen by much compared to what it was in the early 1960s. Sub-Saharan Africa has not experienced a “Green Revolution” as has much of East and Southeast Asia. This is likely due to several factors. First, much of East and Southeast Asia relied upon rice as the main wage good. Technical innovation that creates higher yielding seed varieties has the potential to have an impact over a broad geographical area. It is true that seeds must be tailored to particular soil and climatic conditions.

Table 6

*Net food production per capita (Index)*

<u>Year</u>	<u>Per Capita</u>	<u>Year</u>	<u>Per Capita</u>
1961	100	1986	91
1962	103	1987	89
1963	104	1988	92
1964	103	1989	93
1965	102	1990	93
1966	99	1991	98
1967	104	1992	94
1968	103	1993	95
1969	104	1994	95
1970	105	1995	93
1971	106	1996	100
1972	102	1997	97
1973	98	1998	99
1974	103	1999	100
1975	101	2000	103
1976	99	2001	104
1977	95	2002	105
1978	95	2003	107
1979	93	2004	104
1980	93	2005	105
1981	93	2006	107
1982	91	2007	104
1983	88	2008	107
1984	86	2009	107
1985	90		

However, research into high yielding rice varieties has the potential to generate very high rates of return. In Sub-Saharan Africa, the situation is quite different. No single food crop serves as the wage good. Instead, a variety of different crops serve this function depending on which

region in Sub-Saharan Africa one focuses on. The net direct return to investment in research in any particular staple food crop research in Sub-Saharan Africa is likely to be much lower than that for rice. This in itself will tend to reduce the incentive for private research firms to undertake investment. Also, public authorities are likely to be reluctant to make investments in areas where the direct return is so low.

Given the wages good function of these staple foods, the benefits to society of investment in such research are likely to be immense. Without productivity growth in staple food production, the growth of labor intensive manufacturing is likely to be quite limited. This represents a situation in which the investment in such research is likely to be significantly below what is optimal from society's point of view and this implies a significant role for the state in terms of providing resources for such agricultural research (Hayami and Ruttan, 1985). The problem of actually creating an institutional structure to carry out such research will likely be more complex than that faced in parts of Asia.

Table 7

*Consumer prices, food indices (2000 = 100)*

<u>Region</u>	<u>Food Price Index</u>
World	232.5
Africa	354.4
Eastern Africa	445.4
Middle Africa	711.2
Western Africa	356.3
Southern Africa	245.7
Northern Africa	257.5
Americas	211.7
Northern America	141.3
Central America	209.8
Caribbean	364.8
South America	293.9
Asia	229.2
Eastern Asia	188.2
Southern Asia	255.7
Southeastern Asia	259.4
Western Asia	421.6
Europe	189.7
Eastern Europe	293.8
Northern Europe	148.2
Southern Europe	149.7
Western Europe	128.0

*Note.* Source: FAO

It has been assumed in this paper that food staples are not widely traded and the price of food in the dualistic model is endogenously determined. If staple food was widely traded, then we would see similar movement in prices in the various regions of the world. Data on food prices

for various regions of the world is presented in Table Seven. Consumer food price indices are presented for various regions of the world utilizing 2000 as the base year. Data is presented for the year 2013 for each region. As can be seen, from 2000 to 2013 food prices around the world have increased, but the patterns vary dramatically from region to region. First, world food prices have risen to 232.5, more than doubling. But the variation by region is large.

The lowest increase was registered by Western Europe where prices increased very little. Alternatively, for Middle Africa, food prices increased by seven times from 2000-2014. Further examination of the table reveals that increases in food prices were highest for Middle Africa, Eastern Africa, Western Asia, the Caribbean, and Western Africa. Food prices followed dramatically different trends in various regions of the world lending support to the notion that limited trade in food implies food price endogeneity. Second, large parts of Sub-Saharan Africa experienced very rapid increases in food prices.

Such rapid increases in the cost of food in large parts of Africa, in comparison with other regions of the world would, in the dualistic theoretical framework discussed above lead to labor being relatively costly (although it may be physically abundant). Some light can be shed on this issue by looking at unit labor costs which measures the ratio of wages to value added in manufacturing. Using data from the World Bank Enterprise surveys Ramachandran, et al. (2009) calculate unit labor costs for much of Sub-Saharan Africa and compare it to that for China and India. What they find is that except for Mali, all other countries in Sub-Saharan Africa have unit labor cost ratios which are higher than that for India and China.

The comparison with China is particularly enlightening. China has dominated the production and export of labor intensive manufactured goods. Their ability to dominate the world market for such products is based on their “cheap labor”, which in this case means low unit labor costs. The inability of Sub-Saharan Africa to compete on a unit labor cost basis indicates that the latter will have trouble making inroads in terms of producing and exporting labor intensive manufactured goods. It is possible that wages in China are being driven up as a result of rapid economic growth and that unit labor costs in China will rise above those in Sub-Saharan Africa. However, it would seem that the country most likely to benefit from this would more likely be India, rather than Sub-Saharan Africa.

If labor is relatively more expensive in Sub-Saharan Africa, then one should find that manufacturing firms are more capital intensive there than they should be as firms seek to shift their resource combinations. Gelb, et al. (2013), using data drawn from the World Bank Enterprise Surveys are able to calculate capital per worker ratios for formal sector firms in Africa and compare them with those in firms in other regions of the world. The results are presented in Table Eight. The interesting thing to note is that in comparison with East and South Asia, many countries in Sub-Saharan Africa have substantially higher capital to labor ratios. Thus these firms are not likely to generate significant increases in employment as growth occurs.

Table 8

*Firm level capital to worker ratio (2005 \$)*

<u>Region</u>	<u>Capital/Worker (Survey Medians)</u>
Sub-Saharan Africa	
Angola	2118
Ethiopia	999
Ghana	474
Kenya	9211
Mali	864
Mozambique	1906
Nigeria	627
Senegal	1621
South Africa	8804
Tanzania	3410
Uganda	2162
Zambia	4007
East Asia	
Indonesia	665
Philippines	3196
Vietnam	2824
Europe/Central Asia	
Russia	6130
Turkey	22090
Ukraine	4140
Latin America/Caribbean	
Argentina	8867
Brazil	6579
Chile	7146
Columbia	4417
Mexico	4437
Uruguay	5836
South Asia	
Bangladesh	624
India	1267

*Note.* Adapted From: Gelb, et al. (2013)

This section of the paper has shown a number of related things. First, food production has barely kept up with population growth and that dramatic increases in food productivity have yet to occur. Food prices in Sub-Saharan Africa have, over time, followed a different pattern when compared to other regions of the world. Specifically, food prices have risen dramatically faster in this region relative to much of the rest of the world. Unit labor costs in most Sub-Saharan African countries are above those found in China and India. Even adjusting for the level of GDP per capita, labor costs are higher in Sub-Saharan Africa. “Labor is relatively more costly in high-productivity firms with relatively low levels of capital intensity, the most desirable kind of a firm in a poor capital constrained country” (Gelb, et al., 2013, p.15). Finally, in many Sub-Saharan countries production in formal sector firms is relatively capital intensive.

## Summary and Conclusions

It has been argued in this paper that Sub-Saharan Africa, while growing rapidly by historical standards, is also experiencing deindustrialization. Structural change has not involved a dramatic shift of labor from agriculture to manufacturing. Manufacturing has instead stagnated and/or shrunk as a share of GDP and employment. This is important since manufacturing, once established, experiences catch-up in terms of labor productivity and grows rapidly approaching levels found in developed countries. Services, although having higher labor productivity in agriculture, do not seem to be characterized by absolute convergence.

Conventional economics has argued that the inability of manufacturing to rapidly expand is related to the poor business environment which exists in Sub-Saharan Africa. Efforts should be made to reduce rules, regulations, and red tape which restrict manufacturing growth. In addition, corruption also makes it very difficult to establish new firms. Efforts also need to be devoted to expanding basic infrastructure.

While not denying that the above are possible important factors restricting the growth of manufacturing, this paper, using a classical approach, focuses on a much more straight forward explanation. Manufacturing firms (formal sector) in the region find that labor is relatively expensive and as a result utilize more capital intensive technology and thus find it extremely difficult to develop a comparative advantage in manufacturing. Labor is increasingly abundant in the region due to population growth, but it is increasingly expensive due to the rapid rise in the cost of food. In a semi-open economy the prices of food staples are endogenous. Rapid expansion in modern manufacturing is restricted by the rising cost of food. Empirical evidence supporting these propositions was presented for the region.

The key policy implication is very clear. Unless agricultural productivity can be rapidly increased, stabilizing the price of food staples, labor will remain expensive even though it is relatively abundant and modern, and labor intensive manufacturing growth will be limited. The difficulty in raising agricultural productivity is not so much technical or scientific in nature. Instead, the main difficulty is institutional in nature. The great diversity of staple food agriculture in the region implies that the research and extension system necessary to create and adapt the technology must be decentralized. However, funding such an institutional structure from within the region will create significant problems. Research into particular crops will benefit specific regions only. Regions dependent on a particular food staple are unlikely to support funding for other food crops. Economies of scale from research are likely to be limited. Significant investment at the regional level is likely to be required, most likely beyond the financial means of the region involved. Creating the institutional structure necessary to generate the technical innovation in food staple production will prove to be difficult. In the face of these institutional difficulties much of the agricultural research that has been carried out in the past has focused on non-staple agricultural commodities which have generally been exported. Research and development has been biased against staple food production. Unless this bias is altered, it is highly unlikely that rapid growth in manufacturing can occur.

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