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# Leading Dragons Phenomenon

## New Opportunities for Catch-Up in Low-Income Countries

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## Abstract

Modern economic development is accompanied by the structural transformation from an agrarian to an industrial economy and occurs through a process of continuous industrial and technological upgrading. Since the 18th century, all countries that industrialized successfully in Europe, North America and East Asia followed their comparative advantage and leveraged the late-comer advantage to emulate the leader-follower flying geese pattern of industrial upgrading. The large dynamic emerging market countries such as China, India and Brazil are also engaged in industrial upgrading but with a critical difference. In particular, because of its sheer size, China has absorbed nearly all labor-intensive jobs and become the world's largest exporter of labor-intensive products. The current view is that China's dominance hinders poor countries from developing similar industries. The authors argue that industrial upgrading has increased wages and is causing China to graduate from labor-intensive to more capital- and technology-intensive industries. These industries will shed labor and create a huge opportunity for lower wage countries to start a phase of labor-intensive industrialization. This process, called the Leading Dragon Phenomenon, offers an unprecedented opportunity to low-income Sub-Saharan Africa where the industrial sector is underdeveloped and investment capital and entrepreneurial skills are leading constraints to manufacturing. It can seize the opportunity and resolve the constraints by attracting some of the OFDI flowing currently from China, India and Brazil into the manufacturing sectors of other developing countries. All low-income countries will compete but to catch the jobs spillover from China, the winner must implement credible economic development strategies that are consistent with its comparative advantage.


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# Leading Dragons Phenomenon: New Opportunities for Catch-Up in Low-Income Countries

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## Introduction

To reduce poverty and catch-up with the developed countries is a common aspiration of all developing countries but the pace and pattern of catch up has varied significantly. In the wake of the industrial revolution, there was a large divergence in the per capita income levels of the rich countries and the developing countries. The divergence continued in spite of many efforts by developing countries to catch up with the industrialized developed countries. Only a limited number of developing countries, mostly in East Asia, realized the dream by the end of 20th century. Entering into the 21st century, Brazil, China, India and a number of other large developing countries achieved dynamic growth. For the first time, these large dynamic emerging market countries have become the drivers of global growth in a new pattern of a multi-polar world.[1]

Lin (2011) and Lin and Monga (2011) explore the nature of modern growth and show that a developing country can achieve dynamic growth for several decades and catch up with the developed countries by developing industries that are aligned with its comparative advantage as determined by its endowment structure and exploiting the latecomer advantage in the process of industrial upgrading. We build on this theme in this paper. We show that because of the *similarity* in the comparative advantage of low-income countries and the dynamic emerging market economies, when the latter upgrade their industrial sectors, they will create a huge space for low-income countries. The latter can use the opportunity to tap the potential latecomer advantage to start industrialization and achieve dynamic growth and poverty reduction.

This paper constructs a new paradigm to explain how structural transformation lay at the core of the catch-up in the Western countries in the 19th century as well as the catching up of East Asia in the 20th century. Moreover, it elucidates how China's spectacular structural transformation is fueling its emergence and contributing to a multi-polar world. In contrast to the common thinking that China's dominance in the global economy dooms poor countries to even more economic backwardness, China's amazing growth spiral may, in fact, be a boon for them. As China upgrades its labor intensive industries and cedes market shares, it will relocate millions of labor intensive jobs to poor countries and accelerate their industrialization. The manufacturing industries China relocates will be compatible with the comparative advantage of low wage countries, just as it was when rising wages pushed East Asian jobs to China. Which countries will succeed in harvesting the jobs spillover from China will depend upon how efficiently they facilitate the entry of domestic private firms and FDI into industries in which they have a comparative advantage. Similar stories apply to the industrial upgrading of other large emerging markets such as Brazil, India, Indonesia, etc. To the skeptics who doubt that Sub-Saharan Africa can seize the opportunity, we point to current trends. Current outward FDI flows from large emerging market countries, including China, to manufacturing industries in developing countries can be leveraged to drive industrialization in even the poorest countries where financial capital

[1] In the old pattern, the drivers of global growth were developed countries.

and entrepreneurial skills are binding constraints. If other emerging market countries such as Brazil and India follow China's growth trajectory, they will create even more labor-intensive jobs in low-income countries.

Part 1 motivates the analysis by providing a review of the background and structural transformation in the world. In light of the available evidence, Part 2 examines the experiences of industrial revolution, the post WWII period, and East Asian successes in catching up. Part 3 first discusses the frustrations or failures in catching up in various countries that followed protectionist strategies. It then analyzes China's meteoric rise in the context of its *comparative advantage following* growth strategy. Part 4 investigates the impact of rising labor costs in China on its employment structure, and the industrial upgrading and job relocation that is happening and is being facilitated through outward foreign direct investment (OFDI). Part 5 concludes by exploring the implications of industrialization in currently low-income countries.

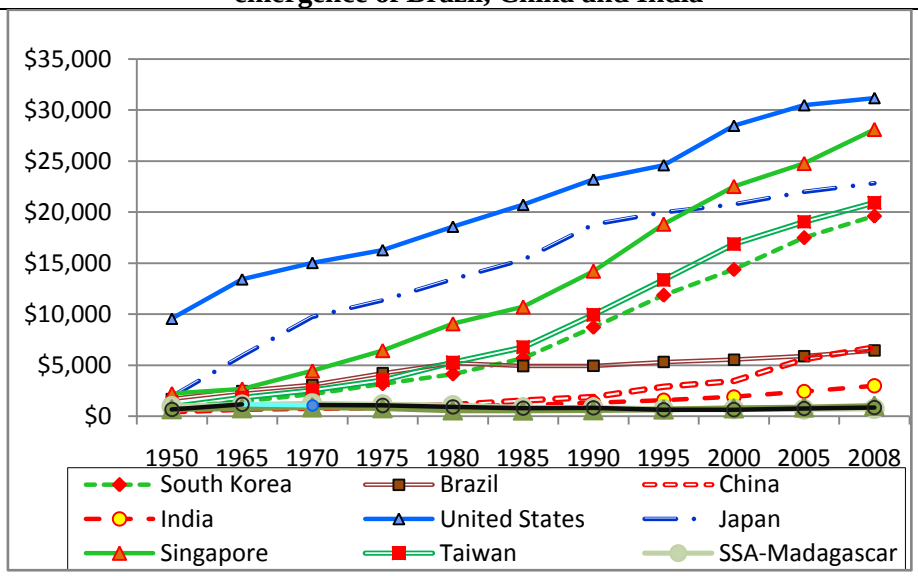
# Part 1. Structural Transformation and Catch-Up

### Section 1.1: Catch-up in a multi-polar world

Sustained and rapid income growth is a modern phenomenon which appeared only after the Industrial Revolution in the 18th century. Before that time, for a long period, almost all countries in the world had agrarian economies and were poor relative to today. The income gap among countries was very small. The richest country's per capita income was about five times greater than the poorest country's per capita income (Maddison 2010). From what was an insignificant difference at the beginning of the 18th century, the Industrial Revolution in England marked the start of a new era in economic history. In the decades that followed, several other countries notably the Western European countries, United States, and other Western offshoots were able to follow in the footsteps of England accelerating growth and catching up with the U.K.

Most other countries failed to do so. As a consequence, there is a great divergence in the income levels between the developed and developing countries, and between developing countries with dynamic growth and those trapped in low-income or middle-income status (Lin 2011 and Figure 1.1). By the end of the 20th century, the gap in per capita income between the industrialized high-income countries and the low-income countries was more than 50 times (Maddison 2010).

**Figure 1.1: Per capita income trends in a multi-polar world - emergence of Brazil, China and India**




*Source: Angus Maddison Data Base (http://www.ggdc.net/maddison/)*

Among the set of developing countries, most raced to close the income gap with the developed countries under the leadership of their respective governments and support of international development agencies in the second half of the twentieth century but only a handful were successful in transforming their aspirations into reality. Among them were Japan and the East Asian Tigers (Hong Kong SAR, China; the Republic of Korea; Singapore; and Taiwan, China) (Figure 1.1).

The growth poles in the past were all high-income countries such as England, US, Japan and Germany. In the last quarter of the twentieth century this changed and for the first time, large developing countries such as China, India, and Brazil become growth poles. If the new growth poles continue to maintain their dynamic growth trends, their industries will upgrade to more capital intensive ones and leave a large space of labor-intensive industries for other low-income countries to enter. This paper tries to explore the implication of this new phenomenon for other developing countries, which still face the daunting challenges of achieving dynamic growth to reduce poverty.

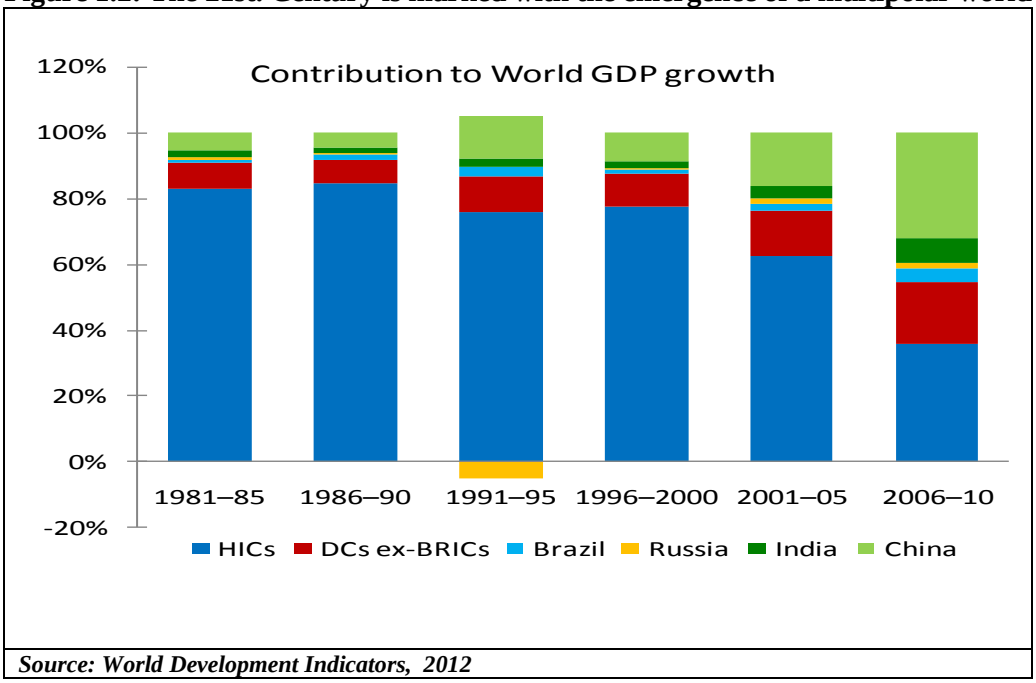
***Multi-polarity and its potential dividends***

Since the last quarter of the twentieth century, developing countries have played an increasingly important role in the global economy lending credence to the idea of multipolar growth being the new economic paradigm. In the 1980s and 1990s, among the top five contributors to global

growth, all but China were G7's industrial countries. By 2009, all except the United States were emerging economies—with China as the top contributor (Figure 1.2).

The replacement of G7 by the G20 as the prime economic forum in the world since the eruption of the global crisis in 2008 has underscored the emergence of a multipolar world. The sheer size of the large emerging economies combined with dynamic and sustained growth has elevated Brazil, Russia, India, and China (BRIC) to the largest contributors to economic growth in the world (Figure 1.2). In 2006-10, almost 45 percent of global GDP was generated in the BRIC. The era of a multi-polar world is firmly established.

**Figure 1.2: The 21st. Century is marked with the emergence of a multipolar world**

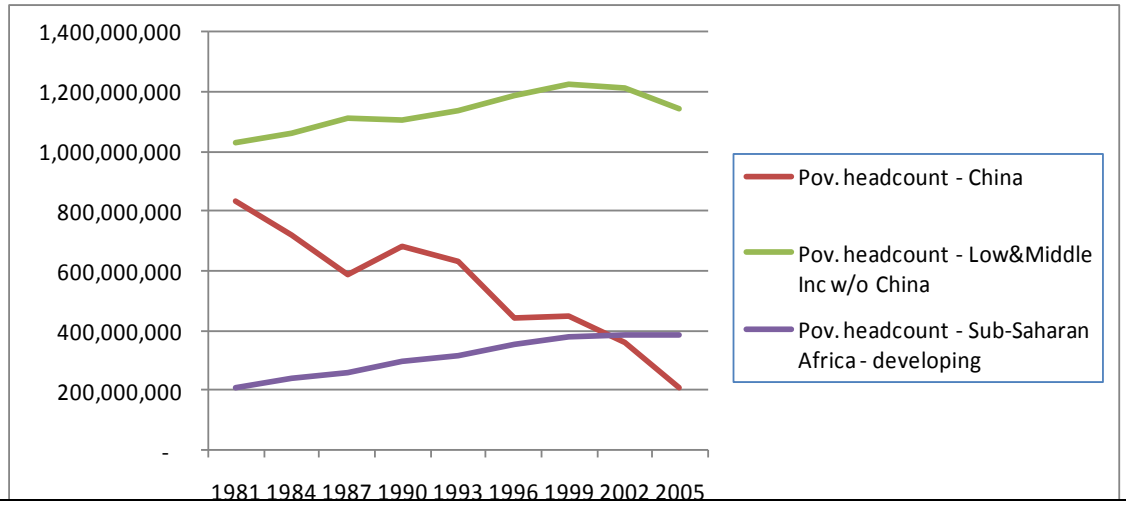



***Source: World Development Indicators, 2012***

### *Catch-up made the world less poor but not in the poorest countries*

The narrowing of the huge income gap with the developed countries conferred on China dividends in the form of absolute poverty reduction (Figure 1.3). In the early 1980s, many African countries were more prosperous than China and India. In 1981 for instance, over 835 million Chinese were below the poverty line of less than $1 a day. In comparison, there were just over 212 million poor in Sub-Saharan Africa. Twenty-five years later, China had turned the income-poverty equation on its head. According to current economic projections, the world remains on track to reduce by half the number of people living in extreme poverty. The number living on less than $1.25 a day is projected to be 883 million in 2015, compared with 1.4 billion in 2005 and 1.8 billion in 1990, but most of this progress reflects rapid catch-up by China (Figure 1.3). Fortunately, as China's expansion continues and its industries create a large space for other developing countries, they too will be able to benefit from industrialization and reduce poverty.

**Figure 1.3: Sub-Saharan Africa remained poor in a multi-polar world**




*Source: WDI 2011*

In 1980, per capita incomes in China were about one-third and in India they were about 50 percent of the developing countries in Sub-Saharan Africa (Table 1.1). And, China had more than 4 times and India more than two times the number of poor people (less than $1.25 a day (PPP 2005 dollars)). By 2005, an eightfold increase in per capita income reduced China's poverty rate to 16 percent compared to 85 percent in 1980. The threefold increase India's income levels had less impressive results. However, in Sub-Saharan Africa, there was virtually no change in the poverty rate. It declined from 53 percent in 1980 to only 51 percent in 2005. Unambiguously, Sub-Saharan Africa had slipped from being more prosperous than China and India in the 1980s to being the poorest region in the world.

**Table 1.1: Emergence of the new growth poles have led to a huge reduction in global poverty but not in the poorest region of the world**

| | China | India | SSA |
|---|---|---|---|
| 1980 - Income per capita, PPP (constant 2005 International dollars) | $524 | $895 | $1789 |
| 2005 - Income per capita, , PPP (constant 2005 International dollars) | $4100 | $2300 | $1759 |
| 1980: % of population below $1.25/day | 85% | 65% | 53% |
| 2005: % of population below $1.25/day | 16% | 41% | 51% |
| 1980: Population below poverty line | 835,062,177 | 462,737,493 | 212,499,751 |
| 2005: Population below poverty line | 207,552,224 | 455,784,361 | 384,212,419 |
| *Source: World Development Indicators, 2011.* | | | |

## Section 1.2: Structural transformation and catch-up

The path to prosperity in the developed countries was marked by a process of structural transformation reflected in the structure of employment and value-added in primary, secondary and tertiary industries. Long term economic trends from the pre-industrial stage of development in a large number of developed countries confirm that at the end of each episode of catch-up, the fast grower's economy had a structure which was closer to that of a developed as opposed to a low-income country (Syrquin 1988, page 206; Chenery 1979, page xvi; Abramowitz 1983, page

85; Lin 2009, 2010 and 2011). Kuznets (1966) identified these trends as the four stylized facts of modern economic growth.

According to the first Kuznets's fact, structural transformation occurs when the share of the nonagricultural sectors in an economy increases. A reconstruction of national accounts from a variety of sources for Western countries shows that such a transformation raised overall productivity and increased the returns to workers and capital. Between 1800-1849 and 1951-1960 for example, as a share of GDP, agriculture declined from 30 to only 5 percent in the U.K., and from 20 to 4 percent in the U.S. And, the share of industry inclusive of manufacturing increased from 23 to 56 percent in the U.K. and from 33 to 43 percent in the U.S. (Kuznets, 1966, Table 3.1). As industrialization progressed, the predominance of manufacturing was replaced by the services sector.

A similar pattern of structural transformation also evolved in the East Asian Tigers (South Korea; Singapore; Hong Kong SAR, China; and Taiwan, China) in the 1960s and 1970s, and the new growth poles – Brazil, China and India starting in the 1980s. Between 1965 and 2009, as a share of GDP, agriculture value-added decreased from 39 to 3 percent, while manufacturing increased from 14 to 28 percent in South Korea. Similar transformation occurred in China, the share of agriculture value added in GDP declined from 38 to 10 percent and manufacturing increased from 29 to 34 percent in the same period. In comparison, the slow pace of structural transformation in Sub-Saharan Africa explains why it lags more prosperous countries by such a huge margin (Table 1.2). In Ghana for example, between 1965 and 2009, as a share of GDP, agriculture value-added decreased from 50 to 32 percent, but the transformation was not in favor of manufacturing which also decreased from 11 to 7 percent. In Tanzania, between 1990 and 2006, the share of agriculture decreased slightly from 46 to 45 percent and of manufacturing declined from 9 to 7 percent (World Development Indicators, 2011). These patterns also corroborate the empirical analysis by McMillan and Rodrik and are elaborated in Lin and Lin and Monga (2011).

Trends in the allocation of labor usually reflect value addition at the sector level as also noted by Kuznets. In the developed countries, in the aftermath of the Industrial Revolution as the share of manufacturing increased, labor moved from agriculture to manufacturing to support growth in the latter. This pattern continued until the 1960s when rising wages in manufacturing dampened the sector's growth and created space for the service sectors. Today, the predominance of services is notable in all Western countries (Figure 1.4).

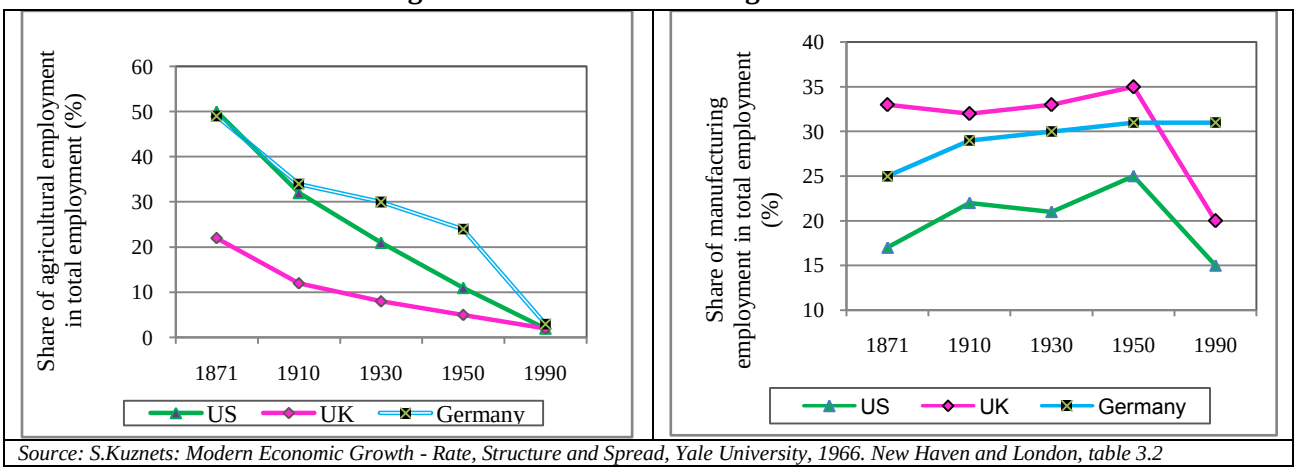
**Table 1.2: Lack of Structural Transformation in Africa**
**Value Added by Sector, 1960-2009**

| | | 1960 | 1970 | 1980 | 1990 | 2000 | 2005 | 2009 |
|---|---|---|---|---|---|---|---|---|
| **Ghana** | Agriculture | | 54 | 60 | 45 | 39 | 41 | 32 |
| | Manufacturing | | 13 | 8 | 10 | 10 | 9 | 7 |
| | Industry | | 8 | 4 | 7 | 18 | 18 | 12 |
| | Services | | 25 | 28 | 38 | 32 | 32 | 49 |
| **Kenya** | Agriculture | 38 | 33 | 33 | 30 | 32 | 27 | 23 |
| | Manufacturing | 9 | 12 | 13 | 12 | 12 | 12 | 9 |
| | Industry | 9 | 8 | 8 | 7 | 5 | 7 | 7 |
| | Services | 44 | 47 | 47 | 51 | 51 | 54 | 62 |
| **South Africa** | Agriculture | 11 | 7 | 6 | 5 | 3 | 3 | 3 |
| | Manufacturing | 20 | 23 | 22 | 24 | 19 | 18 | 15 |
| | Industry | 18 | 15 | 27 | 16 | 13 | 13 | 16 |
| | Services | 51 | 55 | 45 | 55 | 65 | 66 | 66 |
| **Tanzania** | Agriculture | | | | 46 | 33 | 32 | 29 |
| | Manufacturing | | | | 9 | 9 | 9 | 10 |
| | Industry | | | | 8 | 10 | 14 | 15 |
| | Services | | | | 36 | 47 | 46 | 47 |

Note: Industry is the sum of mining, construction, electricity, water, and gas.

*Source: World Development Indicators, 2011*

**Figure 1.4: Structural transformation in the developed countries: a reallocation of labor from agriculture to manufacturing industries**




*Source: S.Kuznets: Modern Economic Growth - Rate, Structure and Spread, Yale University, 1966. New Haven and London, table 3.2*

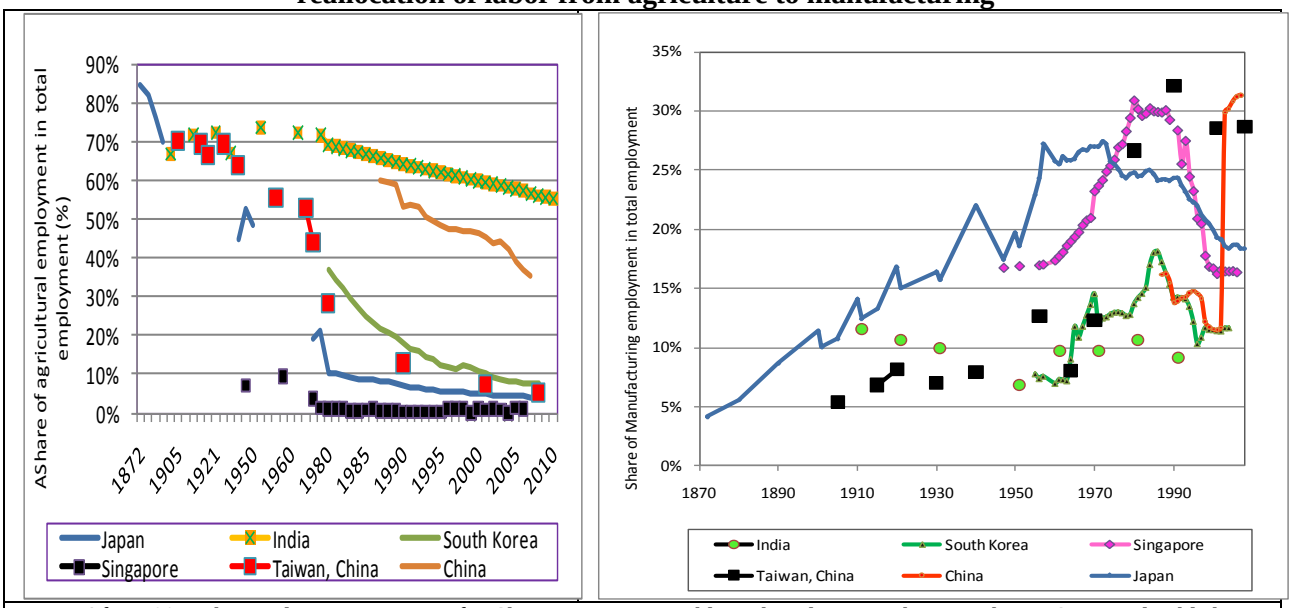
Countries that caught up with the Western countries in the post-World War II period also experienced a reallocation of labor from agriculture to industry. By the end of the 1980s, in

Japan and the Asian Tiger countries, the share of employment in agriculture was near negligible and the dominance of manufacturing had been replaced by service industries.

In China and India, a reallocation of labor from agriculture to manufacturing is ongoing. The crux of the impressive decline in Chinese poverty rates lies in the absorption of large pools of relatively unskilled agricultural workers first in light and then more sophisticated manufacturing industries. In India, the pick-up in manufacturing employment has been slower than in China. Thus far, agricultural labor has been absorbed more by services than manufacturing industries (Figure 1.5).

At least two characteristics make the structural transformation of the Chinese and Indian economies remarkable. First, it is unfolding in a fiercely competitive globalized world where the competitive edge of firms in manufacturing and services is dependent upon wage levels, and the firms' ability to exploit the latecomer advantage by adapting modern technologies innovated by the developed countries. And second, given that the proportion of the labor force engaged in agriculture was as high as 80 percent until the 1960s, the speed of their transformation from agrarian to modern economies is significantly more impressive than richer countries. Both characteristics provide useful pointers for other low-income countries.

**Figure 1.5: Structural transformation in successful developing countries: reallocation of labor from agriculture to manufacturing**

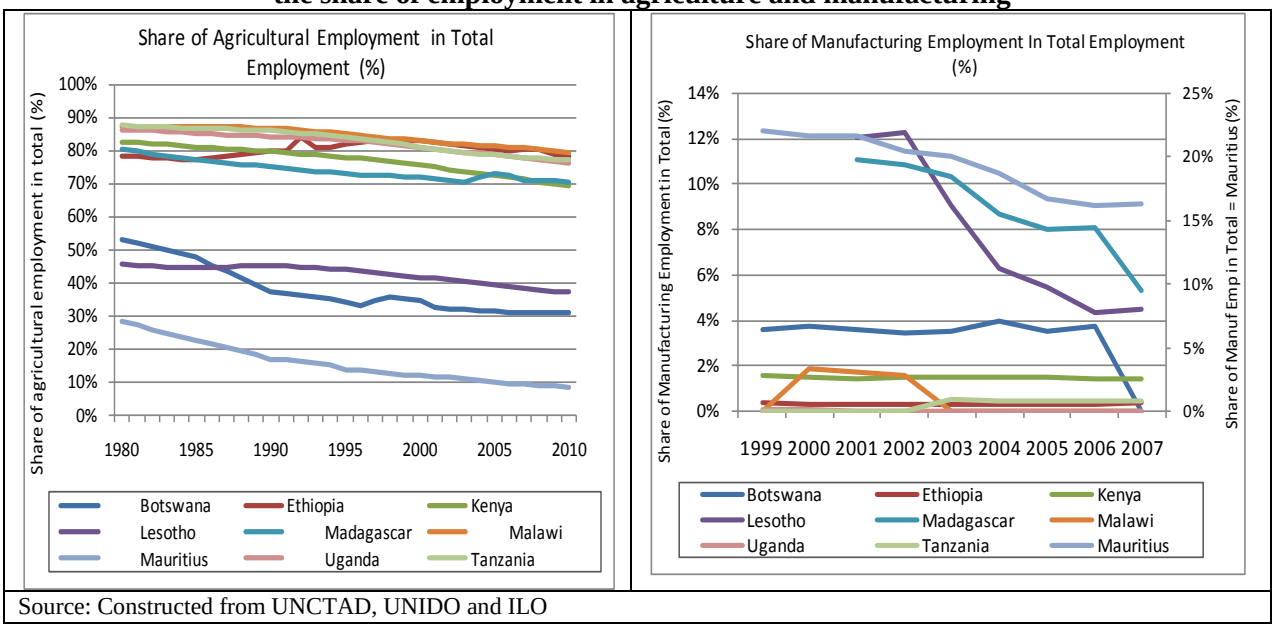



Note: After 2002. The employment statistics for China is not comparable with earlier years because the NBS stopped publishing data for rural employment.
Source: ILO,UNIDO and UNCTAD

In general, the factors that powered structural transformation in the Western, East Asian and emerging market countries have been elusive in Sub-Saharan Africa (excluding South Africa), and suggest that there are no shortcuts to catching up (Figure 1.6). As an example, with the

exception of Mauritius, Botswana and Lesotho, while all six countries displayed in Figure 1.6 had a consistently declined trend in the share of labor employed in the agriculture, the share was still over 70 percent in 2010. When this evidence is combined with the trend in manufacturing, including in Mauritius, Botswana and Lesotho, the absence of structural transformation is striking.

**Figure 1.6: Still to catch – stalling structural transformation in select African countries: trends in the share of employment in agriculture and manufacturing**




Source: Constructed from UNCTAD, UNIDO and ILO

To some, economic growth rates of over 6 – 9 percent in many mineral-rich Sub-Saharan African countries in the decade preceding the current financial crisis seem to suggest that structural transformation is not necessary for catch-up. This contention is erroneous. Typically, agricultural workers earn only subsistence wages and are the poorest. If the share of agricultural employment is any indicator, then the case for structural transformation seems the strongest for resource-rich countries where the predominance of mining stymies the shift of labor from agriculture to manufacturing and services. As an example, until 2000, in the copper-dominated Zambian economy, only 28 percent of the labor force was employed in industry and services; the remaining 72 percent was in agriculture. In the minerals and cocoa-dominated Ghanaian economy, in 1990, the share of employment in manufacturing was merely 9 percent; in 2009, it had declined to 8 percent (UNSTAT 2011). Although data limitations do not permit better comparisons, it is clear that the agricultural sector continues to host an overwhelming majority of the labor force in resource-rich Sub-Saharan African countries.

In what is often termed the third Kuznets's fact, structural transformation is characterized by a redistribution of the population from rural to urban areas during. Growth in both manufacturing and services, which are invariably in urban locations, leads to a decline in the share of the rural

population. Global settlement patterns show that with the exception of the Western countries, this phenomeon has been slow to emerge in most other countries. In most developing countries, until the 1960s, at least 70 percent of the population resided in the rural areas. By the 1990s, in Brazil, Russia and the Asian Tigers, the share of the rural population had declined to about 30 percent. However, as late as 2010, at 70 percent in India, it indicated the enormous challenges to structural transformation when the industrial sectors are not competitive.

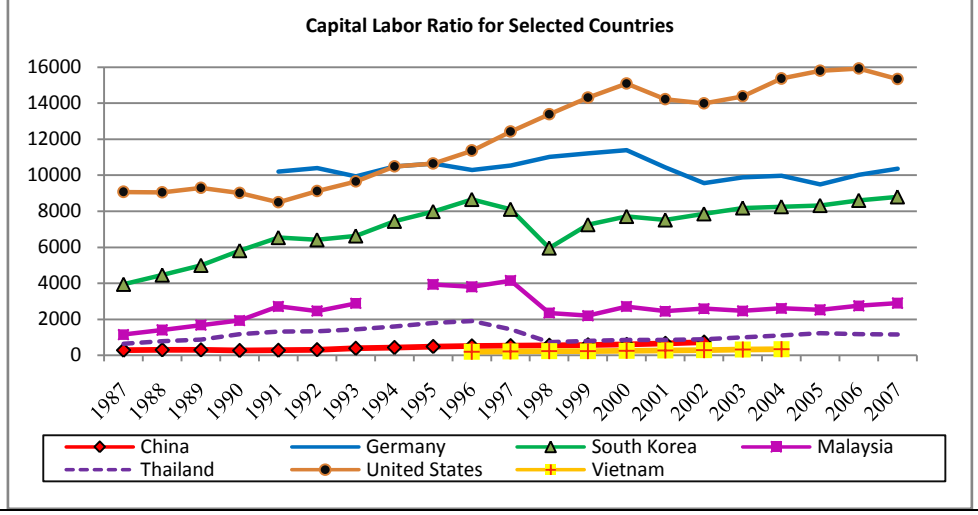
Like other indicators of structural transformation, Table 1.3 shows a persistence in the share of the rural population in Sub-Saharan Africa.

**Table 1.3: Kuznets fact 3 – structural change can be measured by the decline in the share of the rural population in total population (%)**

| | 1980 | 1990 | 2010 |
|---|---|---|---|
| Burundi | 98 | 92 | 89 |
| Uganda | 98 | 88 | 87 |
| Niger | 96 | 84 | 83 |
| Ethiopia | 94 | 85 | 82 |
| Rwanda | 98 | 86 | 81 |
| Malawi | 96 | 85 | 80 |
| Burkina Faso | 95 | 83 | 80 |
| Eritrea | 90 | 82 | 78 |
| Kenya | 93 | 83 | 78 |
| *Source: WDI* | | | |

Another characteristic of structural transformation, called the fourth Kuznets fact, is that manufacturing expands because of productivity growth powered by an increasing capital-labor ratio in the sector. Productivity growth prompts labor to shift out of agriculture and into manufacturing. Until the mid-1990s, with the highest capital-labor ratio, the U.S. was leading by a huge margin countries like Germany, Korea and Malaysia. In the last decade, China's capital-labor ratio has begun picking up as it strives to catch up with the East Asian countries (Figure 1.7).

**Figure 1.7: As per Kuznets, structural transformation is driven by a rising capital -labor ratio**




*Sources: ILO, UNIDO and WDI- authors calculations*

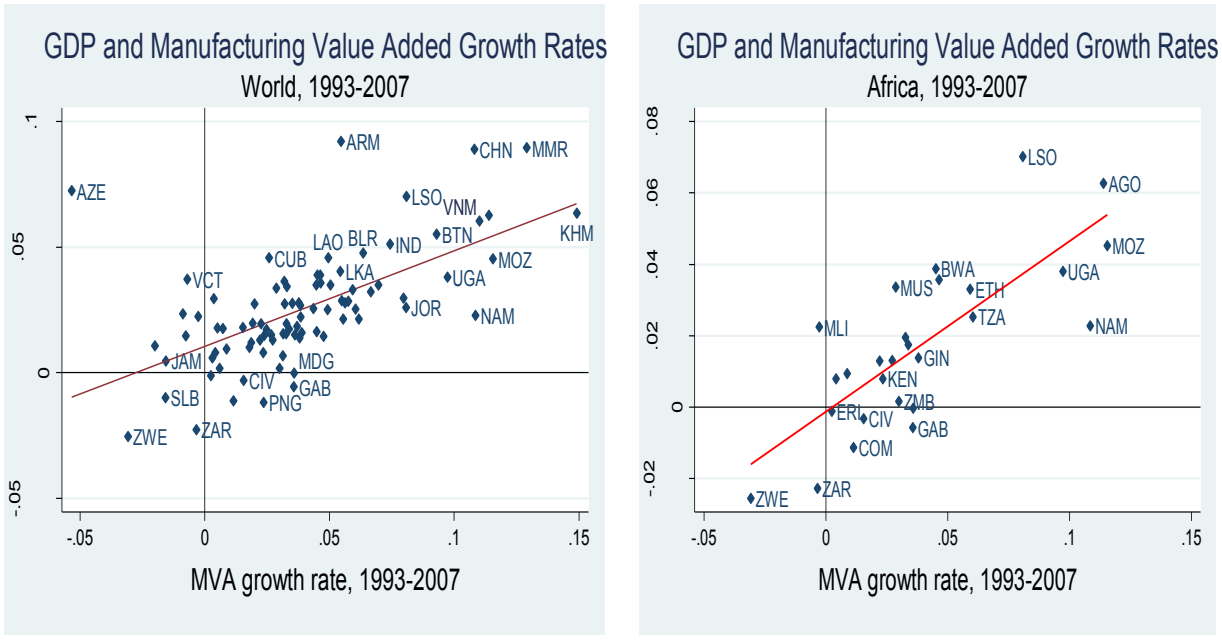
## Section 1.3: Industrialization – The key to modern economic growth and catch-up

The Industrial Revolution drew attention to the critical role that continuous technological innovation and upgrading play in the development of an efficient manufacturing sector. The latter offers new and boundless possibilities for the production of *tradable goods* including technology itself which enable countries to import what they do not produce. It demonstrated that in the first stage of catch-up (Lall, 2005; Gault and Zhang, 2010),[2] in their role as the primary financiers of R&D for technological innovation, manufacturing firms can also be instrumental in the transfer of new technologies to non-manufacturing sectors of the economy (Shen, Dunn and Shen, 2007). Fittingly, manufacturing is credited for the modernization of the agricultural and mining sectors that provide raw materials for it through backward linkages, as well as for spawning ancillary activities, particularly services, through forward linkages.

There are several other advantages in fostering a manufacturing sector. Manufacturing can serve as an indirect source of demand and spur catch-up. Because there is a tight nexus between it and the services sector, technological progress and growth in manufacturing leads to a larger demand for services and propels overall economic growth.

[2] Later, as a country becomes more prosperous, the primacy of manufacturing is replaced by the services sectors as noted by Kuznets's fact 1.

**Figure 1.8: Industrialization as an Engine of Growth: Manufacturing and Income Growth, 1993–2007**




Source: WDI, 2011

Except for a few oil exporting countries, no country has achieved high-income status without industrializing and dynamic industrial upgrading. In general, a change in GDP per capita is strongly and positively correlated with growth in value added in the manufacturing sector (Figure 1.8). If natural resources- or land-rich countries have achieved a middle income status without a large manufacturing sector, they have rarely succeeded in sustaining growth. More importantly, the growth in resources sector will not create much employment.

***Sub-Saharan Africa – Failure to industrialize explains failure to catch up***

The failure to catch up in Sub-Saharan African countries is largely a failure to industrialize and is illustrated by two statistics: a relatively small share of manufacturing value added (MVA) in GDP (Table 1.4), and a GDP growth rate that averaged only 3 percent per annum during 1970 and 2000 (Figure 1.9). At least two factors explain these disappointing outcomes.

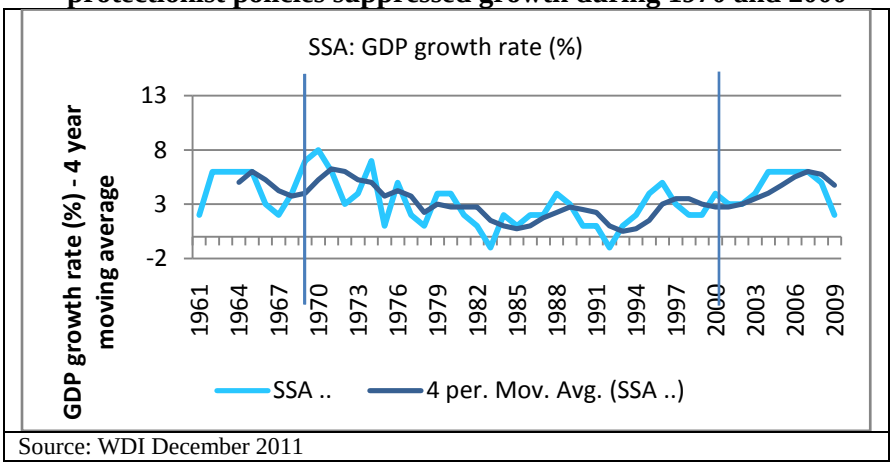
**Table 1.4: Relative to other developing countries, Africa's manufacturing sector is small**

| Share of manufacturing in GDP (%) | | | | | | |
|---|---|---|---|---|---|---|
| | **1970** | **1980** | **1990** | **2000** | **2005** | **2008** |
| World | 26.7 | 24.4 | 21.7 | 19.2 | 17.8 | 18.1 |
| Developing countries | 17.6 | 20.2 | 22.4 | 22.6 | 23.3 | 23.7 |
| African countries | 6.3 | 11.9 | 15.3 | 12.8 | 11.6 | 10.5 |
| *Source: Economic Development in Africa Report, UNIDO, 2011. Chp 2, Table 1.* | | | | | | |

First, most African countries failed to develop manufacturing industries. In 1970, the share of manufacturing in Africa's GDP was only 6 percent. In the two decades that followed, African governments employed state-owned enterprises and import substitution policies to expand the manufacturing sector. Although the share of MVA in GDP increased to 15 percent by 1990, it could not be sustained primarily because protectionism favored industries that were 'comparative advantage defying' (CAD). The reforms of the late 1990s fostered liberalization, privatization of public enterprises and competition which led private firms to naturally engage in resource-intensive sectors in which Africa had a comparative advantage. Consequently, by 2008, the share of manufacturing in GDP had shrunk to about 10 percent and was, relative to 1990, a sign of de-industrialization.[3]

In comparison to Sub-Saharan Africa, manufacturing was the source of Asian industrialization mirrored earlier in the East Asian miracle and more recently by the emergence of China as the second largest global power. In Asia, the share of MVA in GDP increased from 22 percent in 2000 to 35 percent in 2008.

**Figure 1.9: GDP growth in Sub-Saharan Africa – protectionist policies suppressed growth during 1970 and 2000**




Source: WDI December 2011

Second, between 1970 and 2008, Africa's mining sector expanded its contribution from 5 to 26 percent of GDP. This was two and a half times the average for developing countries and another signal that the region had regressed in transforming its economic structure from a natural resource based to a modern economy. In recent years, GDP growth has averaged about 5 percent per annum bolstered by a natural resources price boom but it masks the vulnerability of the economy in the absence of a strong manufacturing sector that fosters structural transformation.

[3] In 1990, 6 of the 52 African countries for which data are available had MVA per capita of at least $200 and in 2010 the number of countries with an MVA per capita of at least $200 was 9. In terms of manufacturing growth, 23 African countries had negative MVA per capita growth over the period 1990–2010 and 5 countries had an MVA per capita growth above 4 percent.

## Part 2: Industrialization, the Flying Geese Pattern and Catching up in a Historical Perspective

History shows that following comparative advantage to tap the late-comer advantage is the best way for developing countries to start and sustain a dynamic growth path for diversification and industrialization (Lin 2009a, Lin and Monga 2010). The spread of industrialization in Western Europe in the 19th century, rapid catch-up in the post WWII period, and the East Asian miracle in the 1980-2000 are all reminiscent of the flying geese pattern.

In the 1930s, economists researching "catch-up growth models" argued that catch-up was not random- Kuznets and Akamatsu explored the conditions under which the industrial revolution occurred in Great Britain, and how it spread only to those countries with sufficient accumulation of capital, skilled labor and other conditions. Why was Great Britain overtaken by some of the late-comers but not by others? Simon Kuznets observed that

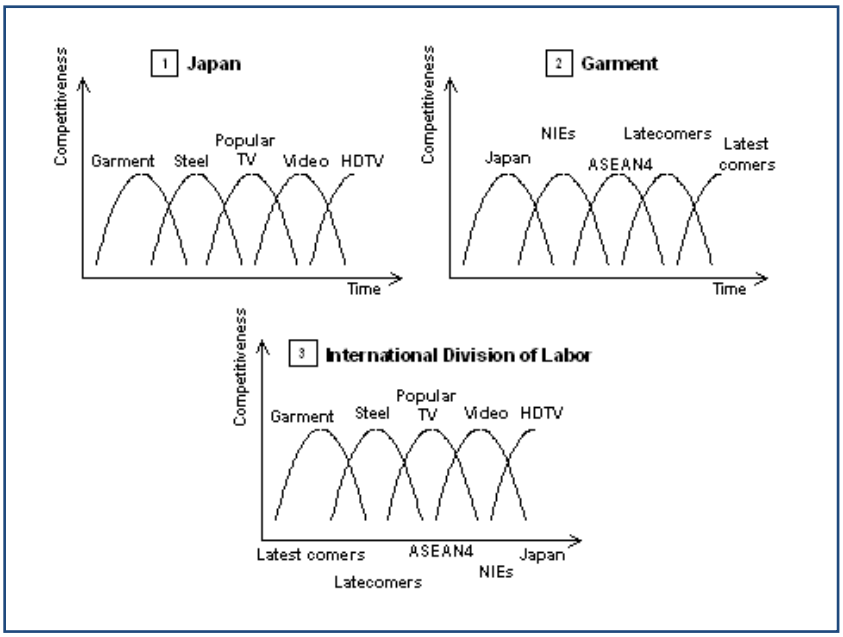
"Some nations seem to have led the world at one time, others at another. Some industries were developing most rapidly at the beginning of the century, others at the end. ….Great Britain has relinquished the lead in the world economy. She has been overtaken by rapidly developing Germany and the United States. The textile industries … ceded first place to pig iron, then to steel," (Kuznets 1930 pp. 3-4)[4] …while, in turn, the electrical industries assumed the leadership in the 1980s and 1990s.

The focus on structural transformation, industrial upgrading (Rostow 1960, 1990) and cross-country catch-up (Gerschenkron 1962) is to be found in Akamatsu's work on Japan, a country starting from a much lower level of income than the Western European countries. In a seminal paper in the 1930s Akamatsu documented what he called the "wild-geese-flying pattern" in economic development,[5] and noted that "Wild geese fly in orderly ranks forming an inverse V, just as airplanes fly in formation".[6]

The "flying geese" pattern describes the sequential order of the catching-up process of industrialization of latecomer economies. It focuses on three dimensions or stages: (1) the intra-industry dimension; (2) the inter-industry dimension; and (3) the international division of labor dimension. The first dimension /stage involves the product cycle within a particular developing country, whereby a country initially imports the good; it later moves to production mixed with imports; and finally moves to exporting the good (and even may achieve *net* exporter status).

[4] Simon Kuznets. 1930. *Secular Movements in Production and Prices.*
[5] See K. Akamatsu, "A Historical Pattern of Economic Growth in Developing Countries," in *The Development Economies*, Tokyo, Preliminary Issue No. 1, 1962, pp. 3-25.
[6] K. Akamatsu, op. cit., p. 11.

**Figure 2.1: The International Dimensions:**
**Asian Wild-Geese Flying Pattern**




Source: GRIPS, http://www.grips.ac.jp/module/prsp/FGeese.htm

The second dimension /stage involves the sequential appearance and development of industries in a particular developing country, with industries being diversified and upgraded from consumer goods to capital goods and/or from simple to more sophisticated products. The third element /stage involves the process of relocation of industries across countries, from advanced to developing countries during the latter's process of convergence. A prominent feature in this stage is that exports of consumer goods start declining and capital goods start being exported. In this stage a group of economies advance together through emulation and learning-by-doing.

The second and third dimensions, the focus of this paper, are illustrated in Figure 2.1.

Akamatsu only described the flying geese pattern without linking it to a country's endowment structure and comparative advantage. He did not recognize that the market mechanism is a necessary condition for a country to follow its comparative advantage successfully. However, he noted that the accumulation of capital, technological adaptability of people and government's protection policy to promote the consumer goods industries matter for the flying geese pattern (Akamatsu 1962, page 13).

There is a fundamental difference between the traditional Structuralist views and the New Structural Economics (NSE). The NSE contends that the flying geese model can be used by latecomers to catch up successfully *only* if the latecomers follow the comparative advantage of

their country to move up the value chain when its endowment structure upgrades. This is called the "comparative advantage following" or CAF approach. In other words, with the CAF, the latecomers can follow the lead goose whose income levels and endowment structure are not too far apart, and can tap into the latecomer's comparative advantage and reduce their risk and cost of innovation. As long as the industrialization is CAF, there is no need for government to adopt protectionist policies as the firms are able to withstand market competition. Rather the government's role is limited to facilitate the firms' entry into new industries where the country has latent comparative advantage by overcoming the externalities and coordination issues inherent in the industrial upgrading and diversification process.[7]

## Section 2.1 The spread of industrial revolution: Leaders and late comers

The Industrial Revolution started in Great Britain in the 1730-1780s, although at that time, Belgium and Netherland were more industrialized than Britain.[8] And for about 50 years it did not spread because the British government forbade the export of machinery, manufacturing techniques, and skilled workers to other countries. Eventually in the 19th century, it gradually spread to other countries in Western Europe, the United States, Russia, and Japan. The earliest center of industrial production in continental Europe was Belgium, where the production of coal, iron, textile, glass, and armaments flourished. By 1830 French firms had employed many skilled British workers to help establish the textile industry, and railroad lines began to appear across Western Europe. Germany was a latecomer in developing industry, mainly because no centralized government existed there.

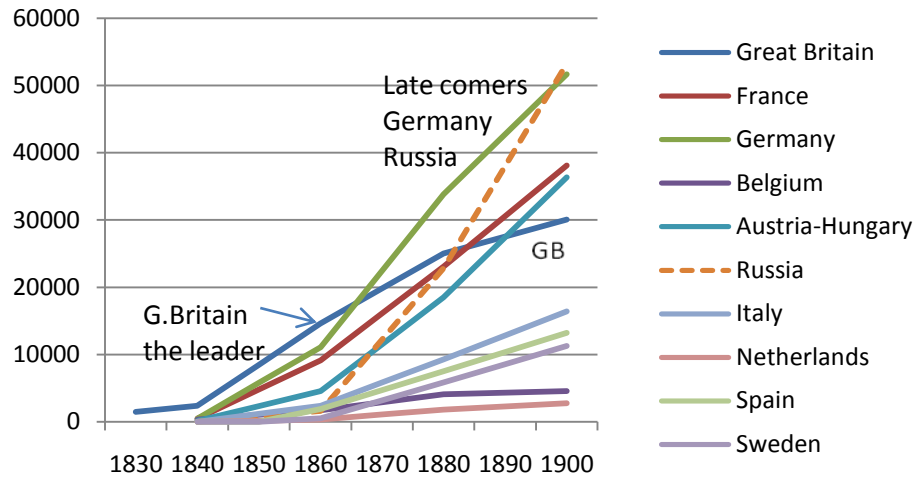
The first steam locomotive was invented in Britain in 1804, but other European countries did not start railroad building until the 1830s. Germany for example, produced its first locomotive in 1835 but railway construction lagged for the lack of an integrated central government. After the 1840s, German coal and iron production skyrocketed, and by the 1850s construction began on a rail network. After German political unification in 1871, Germany exceeded Great Britain in terms of the length of new railroads, and there was a rapid catch-up process in the production of pig iron and other industries (Figure 2.2).

[7] An industry is an economy's latent comparative advantage if, based on the factor costs of production, which are determined by the economy's endowment structure, the economy should be competitive in this industry. However, due to high transaction costs, which are determined by infrastructure, logistics, and other business condition, the economy is not yet competitive in the global market in this industry.

[8] Britain was a latecomer- in the 16th and 17th century, Britain was an export of raw wool to the Netherlands. It targeted the Netherlands' industries for catching up when its per capita income was about 70% of the Netherlands'.

**Figure 2.2 Spread of the Industrial Revolution: Late Comers Catching Up (1800-1914)**

Length of Railroad Lines open in kilometers (1km=5/8 mile)




Source: Compilation based on the statistical appendices in the Fontana Economic History of Europe Vol 4, accessible on the web, *Modern History Sourcebook*.

Relative to the Britain, industrialization was delayed in the United States because the country lacked the basic factor endowments, labor and capital to invest in business. When it finally began in the 1820s after the country had enough capital and labor, relative to continental Europe, its growth was "explosive." Both laborers and capital came from Europe where political revolutions sent immigrants to the U.S. The first locomotive emerged in 1826, the first railroad started in 1827, and the length of railroad surpassed Britain in 1850, reaching 9,021 miles; and then expanding rapidly to the west in 1890, reaching 129,774 miles,[9] longer than the length of railroads in the entire continental Europe. Rapid industrialization and structural transformation then followed. In 1800, 85 percent of the US population was comprised of farmers, but in 1860 this had declined to 50 percent.

Gerschenkron observed that rapid industrialization could start from vastly different levels of "economic backwardness". In fact, "the more backward a country's economy, the greater was the part played by special institutional factors (*government agencies, banks*) designed to increase the supply of capital to the nascent industries," (Gerschenkron 1962, p. 354). Like Akamatsu, a weakness of Gerschenkron's theory is that he did *not* stress that for the latecomer to be competitive, the latecomer must identify industries that are consistent with its comparative

[9] Source: Chauncey Depew (ed.), *One Hundred Years of American Commerce 1795-1895* p 111.

advantage or CAF. Industrialization can start from a low level of economic development. However, if the level of development is too low, industries that are too advanced will be comparative advantage defying (CAD) and require heavy subsidies and protection from the state. With government support, it is possible to set up advanced industries but as long as they are CAD, they will be neither viable nor competitive.

## Section 2.2 Japan's catch-up in the Meiji Period: Learning by importing then exporting

Starting with an income level which was only one-third of the West in 1850s, Japan achieved rapid catch-up in 50 years to become the first industrial country in Asia by 1904. After opening up trade in 1854[10], its government encouraged learning from Western technology and institutions by sending high level missions including about half of the ministers to America and Europe for nearly two years (Shimposha, 2000, p.48). [11]

"Japan at the time did not receive any direct investment…. Factory construction in the early Meiji period was mainly achieved through public works or financed from domestic savings, private capital or joint stock companies. Japan adopted technology from abroad enthusiastically, but funding for the most part was self-generated." (Shimposa 2000, p. 38)

After signing the *Ansei Treaty* in 1858, Japan lost control of its tariff policy but the government provided facilitation by building Japan's modern infrastructure and by encouraging learning by doing. Telegraph services between Tokyo and Yokohama began in 1870. The first Japanese railroad connecting Yokohama and Shinbashi was built in 1872, and by 1900 Japan had 3,875 miles of railroad (Ito 1992). The government also actively introduced foreign technology by importing modern machines and hiring thousands of foreign experts to instruct Japanese workers and managers in the late 1800s. Throughout the Meiji period (1868-1912) Japan's top exports were raw silk yarn, tea, and marine products and the main market was America. As Japan's cotton industry grew, its imports *fell* steadily, and in 1890, it began to *export* large quantities of cotton yarn and cloth to neighboring Asian countries (intra-sector upgrading as in Akamatsu 1962). On the institutional side, a banking system was organized and a central bank was established in 1882; the gold acquired from China as a indemnity of the war of 1894-95 was used as a part of the gold reserve, and enabled a well–functioning gold standard system that was established in 1897 (Ito 1992 p. 21).

[10] In 1853 the United States dispatched Commodore Matthew Perry to force Japan to open a port for free trading in order to supply ships to and from China. From 1854-1858 a series of treaties were signed and in 1859 three ports were open: Kanagawa, Nagasaki, and Hakodate. (p. 11, The Japanese Economy, by Takatoshi Ito 1992, The MIT Press).

[11] Toyo Keizai Shimposha, 2000. Chapter 5 in "Globalization of Developing Countries: Is Autonomous Development Possible?" (*Tojokoku no Globalization: Jiritsutechi Hatten wa Kanoka*). The book won the Suntory Prize for Social Sciences and Humanities and the Osaragi Jiro Award for Critical Works in 2001.

In sum, historical experiences of the industrial revolution offer several insights. First, countries that are on the technological frontier can play the role of the "lead geese" as the U.K. did. Second, late comers have the economic advantage of "backwardness," and under certain conditions, can catch up quickly and even overtake the lead geese. Third, capital accumulation was necessary but not sufficient for success. Political stability, openness to trade, and labor mobility were also important for the country to acquire the new technology and develop new industries. Fourth, the government was required to play a facilitating role, as in the case of Germany, the US, and Japan. Without the existence of a centralized state in Germany before 1871, there would have been no railroad or industrial revolution.

**Table 2.1: The Catch-Up in the Pre-War, and Post War Era: Countries can catch up if their per capita income levels are not too far apart (per capita GDP by 1990 International GK dollars)**

| | Europe targeted the UK, gaps were small | | Japan targeted Germany during Meiji Restoration | | | Japan targeted the US after the WWII | | |
|---|---|---|---|---|---|---|---|---|
| | 1870 | % of UK | 1890 | 1900 | % of Germany | 1950 | 1960 | % of the US |
| France | 1,876 | 59% | 2,376 | 2,876 | | 5,186 | 7,398 | |
| Germany | 1,839 | 58% | 2,428 | 2,985 | 100% | 3,881 | 7,705 | |
| U.K. | 3,190 | 100% | 4,009 | 4,492 | | 6,939 | 8,645 | |
| United States | 2,445 | 77% | 3,392 | 4,091 | | 9,561 | 11,328 | 100% |
| Japan | 737 | | 1,012 | 1,180 | 40% | 1,921 | 3,986 | 35% |

| | The East Asia NIEs (4 dragons) incl S.Korea targeted Japan in the 1960-80s | | | China targeted the East Asian NIEs including S. Korea | | | Late comers started to target China after the 2000 | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1960 | 1970 | % of Japan | 1980 | 1990 | % of Korea | 2000 | 2008 | % of China |
| U.K. | 8,645 | 10,767 | | 12,931 | 16,430 | | 20,353 | 23,742 | |
| United States | 11,328 | 15,030 | | 18,577 | 23,201 | | 28,467 | 31,178 | |
| Japan | 3,986 | 9,714 | 100% | 13,428 | 18,789 | | 20,738 | 22,816 | |
| South Korea | 1,226 | 2,167 | 25% | 4,114 | 8,704 | 100% | 14,375 | 19,614 | |
| China | 662 | 778 | | 1,061 | 1,871 | 23% | 3,421 | 6,725 | 100% |
| India | 753 | 868 | | 938 | 1,309 | | 1,892 | 2,975 | 44% |
| Vietnam | 799 | 735 | | 757 | 1,025 | | 1,809 | 2,970 | 44% |

Source: Authors calculation based on Maddison dataset.

Fifth, some European countries could catch up with Britain relatively quickly because their stage of development was not too far apart (Table 2.1). According to Maddison's estimate, the per capita incomes of Germany, France, and the United States were about 60 to 75 percent of Britain in 1870.[12] Sixth, during the Meiji restoration, Japan targeted Prussia's industries and its per capita income was about 40 percent of Germany's. Thus it was realistic for Japan to target Germany rather than Great Britain or the United States which were too far ahead of Japan in term of their development stage. Even though many nation states tried to catch up, Japan

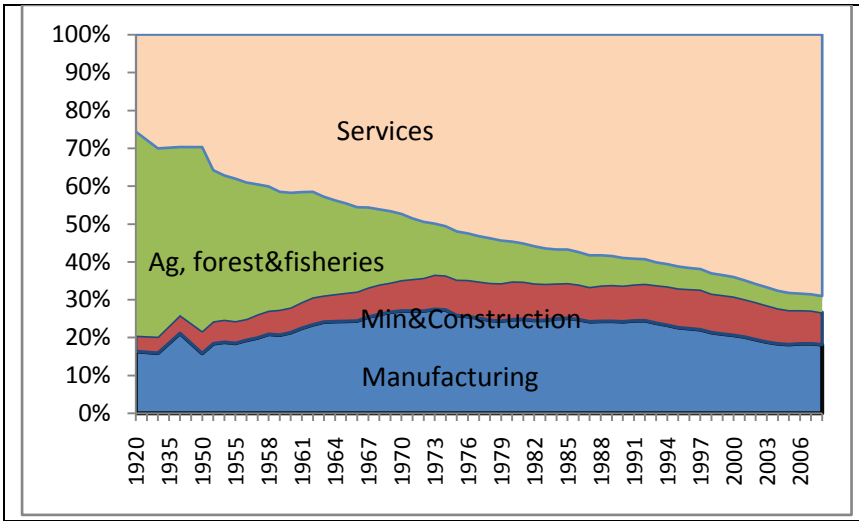
[12] Britain's per capita income in 1830 was 3,190 in 1990 International Geary-Khamis dollars, and those of most countries in the Western Europe were in the range of 1,500 to 2500 IGK dollars.

succeeded and became the first industrialized nation from the East because of the right choice of targeting countries.

## Section 2.3 The post WWII era: The US showed the way to Japan and other geese

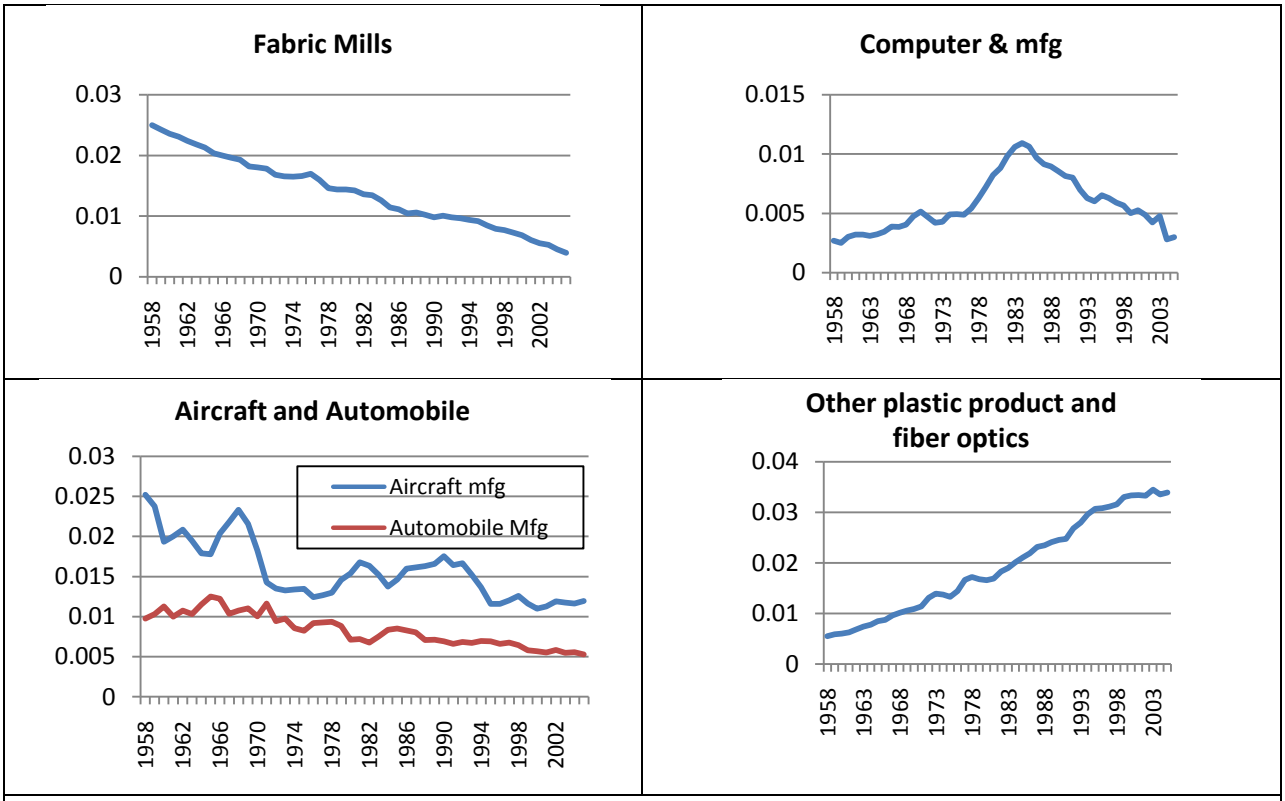
The economies of Western Europe and Japan have enjoyed unprecedented growth and technological upgrading in the decades since World War II, or, the so-called Golden Age of Capitalism (1950-1974). During this period, nearly all developing countries pursued "*dirigiste* capitalism" but except for Japan, Korea and other East Asian Tigers, they did not succeed. *Why?* The NSE contends that the crux of Japan and East Asia's success was that their development followed closely their comparative advantage or was CAF and their governments played the facilitation role (Lin 2010, Lin and Monga 2010, Lin and Monga 2011). Just before WWII, textiles and other light industrial goods accounted for 60 – 75 percent of all Japanese exports. Japan's textile industry was at its peak before the Second World War (Ito 1992, p. 24). In the 1960s, when its per capita GDP was about 40 percent of that of the US and it had established a strong industrial base, Japan targeted U.S.'s industries (Table 2.1). Japan's historical labor statistics record that a rising share of labor in Japan's manufacturing sector coincided with a declining share of labor in the US's manufacturing sectors. In the 1960s-1970s, Japan supported its heavy manufacturing sectors including machinery and automobiles. In the 1980s-1990s, just as the US was upgrading its industrial base, Japan acquired shares in the home appliances, electronics and computer markets (Figure 2.3-2.5).

**Figure 2.3 Structural transformation in Japan: employment in manufacturing increased during 1920-1973, followed by a slow decline as the services sector expanded**




Source: Historical Statistics of Japan, shares of employment by sector. Detailed data by subsectors is available at http://www.stat.go.jp/english/data/chouki/index.htm

**Figure 2.4 The United States as the Leader of transformation : Shares in total employment for selected subsectors ranked by capital-labor ratio,1958-2005 (selected from the 99 industrial sectors)**




Labor –intensive sector: (industry 313210: Broadwoven Fabric Mills); Mid level labor/capital intensity (industry 334111: Electronic Computer Manufacturing). High capital intensity: (336411: Aircraft 336111: Automobile). High technical intensity (Industry 326199: Other plastic products mfg including fiber lens, windshield and optics).

Source: J. Ju, J.Y. Lin, and Y. Wang, "Endowment Structure, Industrial Dynamics, and Economic Growth," manuscript, based on the NBER-CES Manufacturing Industry Data for the period 1958-2005 in two versions. The 1997 6-digit NAICS codes (473 industries) was used.

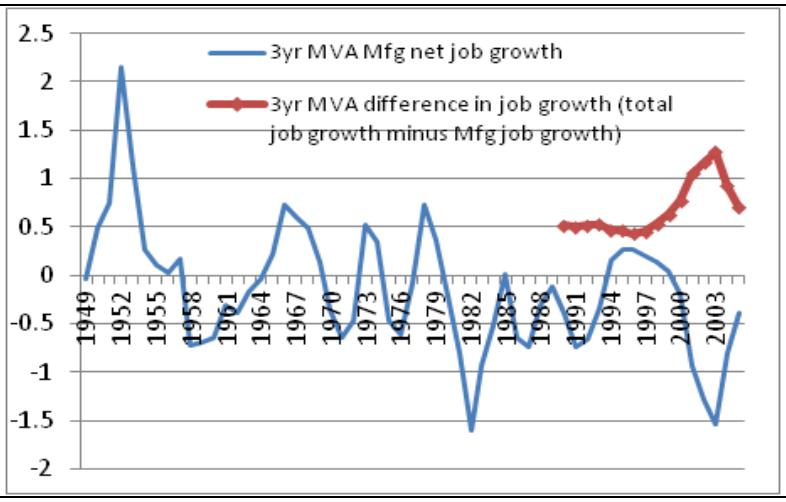
Figure 2.4 below shows the employment shares in the United States during 1958-2005 for five subsectors selected from 99 manufacturing industries, ranked from most labor-intensive to most capital intensive. Overall, as the capital labor (K/L) ratio increases over time, the industrial and employment structures change dramatically. Specifically,

- The share of labor employed in the most labor-intensive sectors such as fabrics declined monotonically in the period.
- In sectors such as computer manufacturing whose capital-labor ratio was mid-range, the share of labor employed first increased and then declined, showing a hump or inverse V-shape.
- In industries such as aircraft and automobile manufacturing that are capital-intensive but subject to labor-saving scale economies, the share of labor showed a slow and declining trend.

- In the most technology-intensive sectors such as plastics including fiber optics and lens, the share of employment shows a monotonic increase indicating that the US still maintains a comparative advantage in these industries.

- In general, the manufacturing sectors started to shed labor in the 1970s, and the services sector created more jobs throughout the period. This process accelerated in the 1990s (Figure 2.5).

**Figure 2.5 The United States has been losing manufacturing jobs since the 1970s, and this trend accelerated in the 1990s**




Source: Authors' estimates based on data from Davis, Faberman and Haltiwanger 2006, NBER website. This database shows that the US has been losing manufacturing jobs since the 1970s (blue line), and net job growth has been stronger in sectors other than manufacturing (red line), especially after the 2000s.

Why is the employment structure in the US changing so rapidly? First, the simultaneous improvements in education, financial, and legal institutions, and in hard infrastructure has allowed firms to constantly innovate and create new industries and exhaust the set of production possibilities (Harrison and Rodriguez-Clare 2010). Second, this process has been accelerated by globalization. Because the US maintained an open trade regime and a liberal investment policy, industrial transformation that started in the 1970s-1980s, is faster in the US than in other countries (Rodrik and Harrison 2010, McMillian et al 2011). Third, the behavior of the multinational corporations (MNCs) has played an important role. Using firm level data from the MITI and the US related to outward FDI, Lipsey (1999) and his coauthors (Lipsey, Ramstetter and Blomstrom 2000) found that:

- "A Japanese parent's employment, given the level of its production, tends to be *higher*, the greater the production abroad by the firm's foreign affiliates." This is similar to that of Swedish firms, but contrasts with that of U.S. firms.

- U.S. firms appear to *reduce* employment at home by allocating labor-intensive parts of their production to affiliates in developing countries. "Among U.S. firms, production in developing countries is associated with *lower* parent employment at home, given the level of parent output." (page 18)[13] This could be interpreted as the U.S. multinationals are "footloose", allocating the more labor-intensive parts of their output to developing countries and keeping the more capital intensive or skill intensive parts in the home or parent facilities.

Why was economic growth in Japan not sustained after the 1970s? From mid-1950s to 1973, for a variety of reasons, Japan was able to sustain rapid growth for nearly 20 years. Domestic investment accounted for 30-35 percent of Japan's GNP throughout the 1960s. The World Bank (1993) study on "the East Asian Miracle" documents in detail the Japanese government's policy of importing technology for the development of key industries, and the provision of institutional arrangements between the government, banks and the businesses. In addition, the government *created contests*[14] that combined competition with the benefits of cooperation among firms and banks, so individual firms endeavored to choose, adapt, and then perfect imported technologies, including the world renowned "just-in-time" automobile assembly lines. In our view, Japan's success is mainly attributable to its identification of the right target countries in both pre- and post-war periods, and selection of industries that were consistent with its comparative advantage or were CAF: textiles in the Meiji period, heavy manufacturing including automobiles in the 1960-1970s, and electronics in the 1980s-1990s.

In 1973, Japan's rapid growth started declining for three reasons: oil crises, decrease in investment, and the slowdown in technological progress. It is reasonable to suggest that "Japan finally caught up with the U.S. and the Western European countries technologically in the mid-1970s. Since it was harder to develop a country's own new technology compared to merely obtaining a license, Japan's growth rate then had to fall" (Ito 1992, p. 72). In other words, Japan's "advantage of backwardness" had been exhausted. The Japanese economy was then constrained mainly by the speed of indigenous innovations on the global technology frontier. Japan had to relocate some of its production base to Korea; Taiwan, China; and other NIEs due to rising labor cost domestically leading to the loss of its comparative advantage in the labor intensive sectors.

### Section 2.4: The flying geese pattern in East Asia

It has been well documented that several generations of lead geese played significant roles in the rapid development of the East Asian economies. From 1965 to 1990, Japan emerged as the

[13] Lipsey, Robert E., Eric D. Ramstetter and Mangus Blomstrom. "Outward FDI And Apparel Exports And Employment: Japan, The United States, And Sweden," Global Economy Journal, 2000, v1(4,Oct), Article 1.

[14] Recent studies by Aghion, Dewatripont, Du, Harrison and Legros (2011) have provided a theoretical model and empirical evidence to confirm that "targeted sectoral policies if combined with competition could be growth and welfare enhancing." This is consistent with the experiences in Japan by the World Bank 1993 study.

world's biggest exporter of manufactured goods, increasing its share of the world market from about 8 to almost 12 percent. Japan's success was followed in the 1970s by a second generation of economies (Hong Kong SAR, China; South Korea; Singapore; and Taiwan, China), in the 1980s by a third generation (Indonesia, Malaysia, the Philippines and Thailand (ASEAN4)), and in the 1990s by a fourth generation (China and Vietnam), (Gill and Kharas 2007, p.81).

What is less well studied, however, is how this flying geese pattern evolved at the subsector level, and how the "jumping" of an industry from one country to another evolved, and how Korea has ceded its dominance in labor–intensive sub-sectors to the third generation of geese—ASEAN4, and China and Vietnam. Using COMTRADE data we show graphically that:

- There is an inverse U shape in some subsectors where the lead goose loses comparative advantage to its followers (as in Akamatsu 1961 and 1962). Since Akamatsu's transformation cycle can last for over 100 years, the inverse U shape emerges only when simple measures such as share of exports in the sector are used to illustrate the pattern. Each specific sector may have several generations of countries playing the role of lead goose *sequentially* in different periods as the country's endowment structure changes. This is reminiscent of Akamatsu's theory on the international dimensions of the flying geese model (Figure 2.1).

- In textiles, an upstream but labor-intensive industry, five generations emerged sequentially. Japan ceded to Korea in the 1980s, then China emerged in the 1990s but now its textile exports are losing steam as labor costs are rising and employment shares are declining. ASEAN4, in particular, Indonesia and Vietnam, and countries which can expand market share rapidly would have a better chance to benefit by following China (fig 2.6a).

- In the apparel and clothing sector, long ago in the 1970s, Japan lost its leading position to Korea, whose clothing exports show *a clear hump shape* as it ceded its leading position to China in 1989. China emerged later than ASEAN4, but its low wages and efficient industrial clusters in many provinces enabled it to gain dominance. After many years in the dominant position, China is now losing its comparative advantage due to rising wages and will gradually cede its market shares to ASEAN4, Vietnam, and countries which can seize the opportunity to rapidly expand exports (fig 2.6b).

- In footwear and toys, China is recently losing market shares in the EU and the US markets (UBS investment), and their shares in total exports have been declining (fig 2.6c and 2.6d). This is consistent with what other studies found but these shares vacated by China have not yet been taken up by African countries (Maswana 2011, UBS 2011). There are large opportunities for other low-income countries to benefit from China's graduation from these labor-intensive industries.

**Share of sectoral exports in total merchandise exports: several generations of flying geese**

**Figures 2.6a Shares of Textile exports in total merchandise exports: Five generations: Japan, Korea, China, Indonesia and Vietnam.**

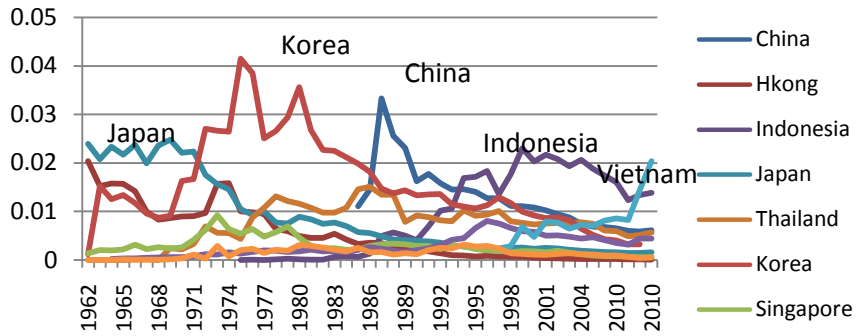



**Figure2.6b Share of Clothing exports in total merchandise exports, two generations**

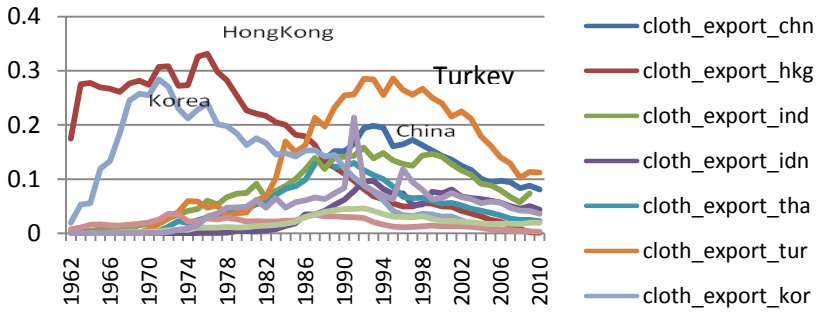



**Figure 2.6c Shares of Footwear exports in total merchandise exports, three generations**

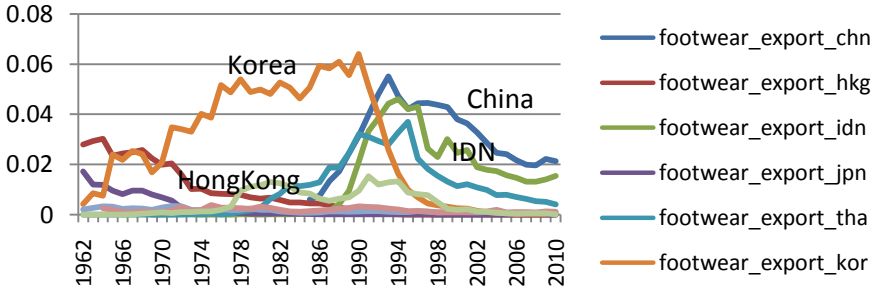
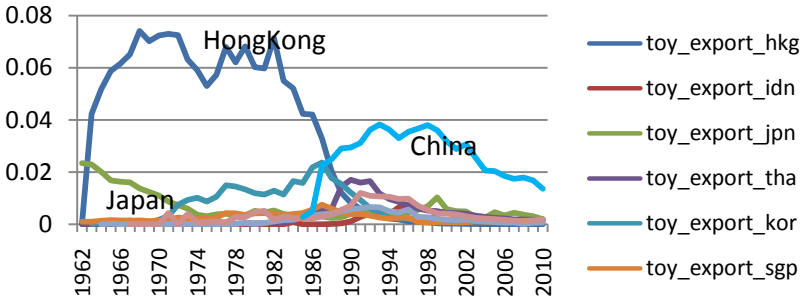



**Figure 2.6d Shares of toys exports in total merchandise exports, two generations**



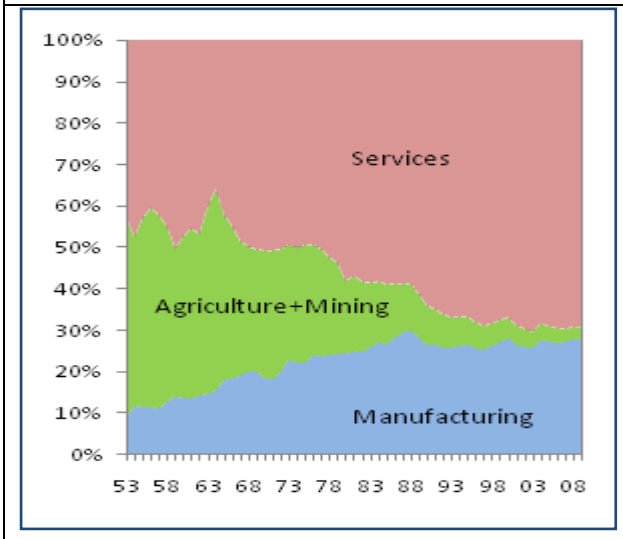

Source: calculated based on COMTRADE data, SITC Rev 1, 3-4 digits, extracted from WITS.

### 2.4 South Korea[15] - an example of successful industrial upgrading

The industrial upgrading of Korea since 1962[16] is often described as a good example of 'Flying Geese catch-up." The share of manufactures in GDP rose from merely 9 percent in 1953 to 30.1 percent in 1988, while that of agriculture and mining sector shrank to single digits in the 1990s (Figure 2.7.1).

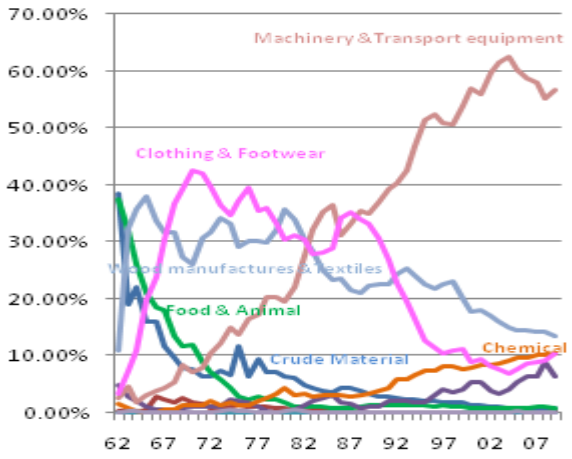
During this phase of industrial upgrading which was guided by export-oriented industrialization, the benefits of "economic backwardness" were exploited with sequential structural transformation from labor-intensive industries (i.e. wood manufactures and clothing) to capital-intensive industries (i.e. machinery and transport equipment). Until the early 1980s, labor-intensive products, primarily wood manufactures and clothing had a combined share of about 60 percent and accounted for the majority of total exports. Since 1983, capital intensive machinery and transport equipment products have accounted for the majority of exports; after the mid of the 1990s, their share exceeded half of total exports (Figure 2.7.2).

**Figure 2.7.1 Sectoral shares in Korea's GDP**




Source: The Bank of Korea

**Figure 2.7.2 Shares of Korea's exports**




Source: based on COMTRADE data, SITC Rev1, 1 digit, extracted from WITS

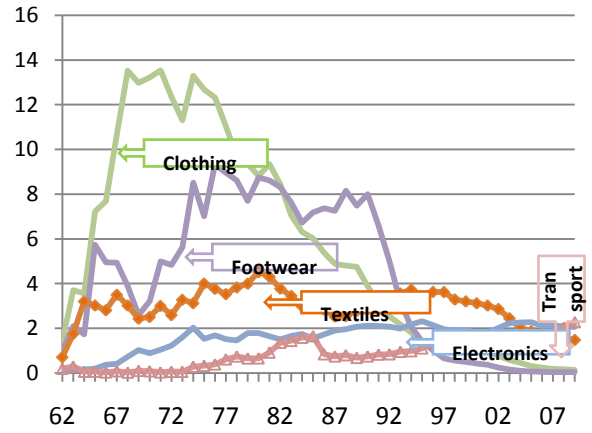
We argue that Korea's success was due in part to its adherence to its *comparative advantages* which evolve in corresponding to changes in its factor endowments, suggesting "Flying Geese

[15] The Authors thank Kwang Park for this section on Korean experience.

[16] The Korea's industrial upgrading process between the 1960s and the 1980s can be roughly divided into 3 phases: i) the "takeoff" phase (1962-1973) ii) the Heavy and Chemical Industry (HCI) drive phase (1973-1979) and iii) the liberalization phase (1980-) (World Bank, 1987). For the details of Korea's industry policies, see World Bank (1987), Krueger (1997), Suh (2007) and Lim (2011).

catch-up" patterns.[17] For example, Figure 2.7.3 shows the intra-industrial and inter-industrial dimension of "Flying Geese catch-up" patterns. Along the value chain to high value added products, Korea moved from exports of clothing to those of textiles and to production of synthetic fibers (Lim, 2011). In the electronics industry, a comparative advantage recorded by the net trade index reveals industrial upgrading from simple goods to more sophisticated goods (Lin & Chang, 2009). While Korea had a dominant comparative advantage in the home appliance electronics industry which started with the *assembly of radios* from imported components (World Bank, 1987), it started to *gain* a comparative advantage in electronic parts (i.e. transistor and semiconductor) in the mid of the 1980s, and in information communication & industrial electronics in the 1990s (Figure 2.7.4).

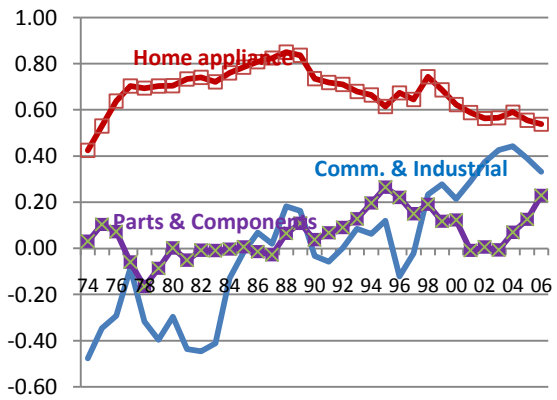
**Figure 2.7.3 Revealed Comparative Advantage of Korea's industries**




Source: based on COMTRADE data, SITC Rev1, 2 digits, extracted from WITS

Note: RCA=the share of an industry in the economy's exports /its share in global exports

**Figure 2.7.4 Trade Specialization Index of Korea's electronics**




Source: Korea Electronic Association

Note: TSI=(export-import) / (export + import) for each industry

In terms of the inter-industrial dimension, Korea's maintained high revealed comparative advantage (RCA) in clothing exports until the end of the 1960s, followed by the footwear until the 1980s. In the 1990s, it rapidly developed a high RCA in electronics exports which was replaced by transport equipment exports more recently.

Korea's 'Flying Geese catch-up" model also had an international dimension which involves the relocation of an industry from one country to another. For example, it gained a sharp increase in RCA in footwear in the mid of the 1960s partly as a result of manufacturing alliances and

[17] For the debate on whether the HCI drive in the 1970s is "comparative advantage following" or "comparative advantage defying", see Lin & Chang (2009).

technology cooperation among firms from Korea and Japan prompted by increasing wages in Japan which were weakening the latter's competitiveness in the sector. A steep decrease in its RCA in the mid of 1990s indicates that higher wages in Korea have led to a relocation of factories to China, Indonesia and Vietnam (The Committee for the Sixty Year History of the Korean Economy, 2010). Since the end of the 1980s when a liberal policy on outward foreign investment was adopted, outward foreign investment of Korea's labor-intensive industries has increased and its main destination has been Asian countries (See Section 4 on FDI).

## Part 3: Heavy Industrialization, Import Substitution and Structural Transformation

In the post WWII period, most developing countries were keenly aware of the role that industrialization played in accelerating structural transformation and catch-up in the U.S., Europe and Japan. Keen to emulate them, developing countries adopted the prevailing Structuralist paradigm which advocated an import substitution-led (IS) industrialization strategy to develop advanced industries similar to those in the industrial countries. Examples include heavy industries such as iron and steel, chemicals, machinery and transport equipment in countries as diverse as India, Brazil, Ghana, Egypt, and South Korea. As this section will show, in spite of a large variety of protectionist measures including high tariffs, even the most well intended policy interventions failed in sustaining comparative advantage defying (CAD) industries. We argue that the defining characteristic of countries that succeeded in sustaining industrialization was the dominance of comparative advantage following (CAF) industries that facilitated the upgrading and diversification of industries that were the country's latent comparative advantage. In fact, governments in the successful catching up countries even provided subsidies or protection to their pioneer firms. Some subsidies or protection to pioneer firms are desirable as (i) they help the pioneers to offset the asymmetry in losses associated with failure and gains related with success, and (ii) compensate for the information externalities that they generate.

Most developing countries adopted IS strategies in the belief that "the market encompassed insurmountable defects and the state was a powerful supplementary means to accelerate the pace of economic development. Many development economists at that time advocated that the state should overcome market failures by playing a leading role in the industrialization push, directly allocating the resources for investment, and setting up public enterprises in the large heavy industries to control the commanding heights" (Hirschman 1958; Nurkse 1953; Rosenstein-Rodan 1943). As an example, in Latin America which was overly dependent on primary commodity exports, a temporary deterioration in the terms of trade was perceived as a secular trend by political leaders and social elites. They believed that it would lead to a transfer of income from resource-intensive developing countries to capital-intensive developed countries and the only way to end exploitation was to develop domestic manufacturing industries through IS (Lin 2010, page 7).

In the 1960s and 1970s, well-intended governments across Latin America, Africa and South Asia implemented IS-led development strategies comprised of a variety of administrative measures and trade barriers focused on identifying priority sectors and leveraged large state owned enterprises to deliver capital-intensive products. They also devised administrative measures such as granting the nonviable enterprises in the priority sectors a market monopoly, suppressing interest rates, overvaluing domestic currency, and controlling prices for raw materials to reduce the costs of investment and operation of the non-viable enterprises. Such interventions caused widespread shortages in funds, foreign exchange, and raw materials. Consequently, these governments had to bypass the market mechanism and allocate resources directly to these enterprises through administrative channels, including national planning in the socialist countries and credit rationing, investment and entry licensing in non-socialist developing countries (Lin 2009a; Lin and Li 2009; NSE, WPS 5197, 2010). Because of limited fiscal resources, small taxable bases and limited tax collection capacity, large-scale subsidies and other administrative measures could not be sustained in the medium term and the industrialization strategy failed.

In their endeavor to develop CAD capital-intensive industries, governments in Latin America, Africa and South Asia imposed high rates of protection. Typically, the latter is motivated by high cost structures which would make domestic firms unviable without protection. The low level of competition in the domestic market was the result of the non-viability of firms in those CAD industries.

**Table 3.1: Indicators of Trade Strategy and Effective Rates of Protection**

| | Period | Trade Strategy | Avg. ERP for Manufacturing | Range of ERPs |
|---|---|---|---|---|
| Brazil | 1958 | IS | 106 | 17 – 502 |
| | 1963 | IS | 184 | 60 – 687 |
| | 1967 | MIS | 63 | 4 - 252 |
| Chile | 1967 | IS | 175 | -23 – 1140 |
| Colombia | 1969 | MIS | 19 | -8 – 140 |
| Indonesia | 1971 | MIS | 33 | -19 – 5400 |
| Ivory Coast | 1973 | EP | 41 | -25 – 278 |
| Pakistan | 1963- 64 | IS | 356 | -6 – 595 |
| | 1970 - 71 | IS | 200 | 36 - 595 |
| South Korea | 1968 | EP | -1 | -15 – 82 |
| Thailand | 1973 | MIS | 27 | -43 - 236 |
| Tunisia | 1972 | IS | 250 | 1 – 737 |
| Uruguay | 1965 | IS | 384 | 17 – 1014 |
| Note: EP – export promotion; IS – import substitution; MIS – moderate import substitution. | | | | |
| Source: Anne Krueger, (1983) Chapter 3, Table 3.1, page 34 | | | | |

Most tariffs on manufactures led to effective rates of protection (ERP) well in excess of 100 percent in most countries (Table 3.1). In a sample of 10 countries chosen for a special study, Krueger (1983) found that all except the Ivory Coast and South Korea were pursuing IS strategies in the 1960s and 1970s. The average ERP on manufactured products varied from 356 percent in Pakistan to 384 percent in Uruguay. In contrast, in the same period, South Korea followed an export promotion strategy.

Governments following CAD were not indifferent to the type of industries they were protecting. The range of the ERPs indicates further distortions in the government's policy stance which favored certain industries more than others. Brazil is notable for starting out with high ERPs in the late 1950s but gradually shifting to a moderately IS strategy (MIS) by 1967. The ERPs on manufactures varied significantly, indicating that domestic firms could produce some products better than others. Between 1963 and 1966, the ERP on mining was reduced from 34 to 24 percent, on machinery from 68 to 30 percent, on chemicals from 146 to 56 percent, transport equipment from 147 to 103 percent and electrical equipment from 169 to 112 percent. After the reform, although ERP levels of around 100 percent or less were relatively high, their reduction was a signal that the industries they protected were Brazil's comparative advantage following (CAF) industries. In comparison, when ERPs were high and remained so pre and post reform, the protected industries were invariably CAD, i.e., not Brazil's competitive edge. Examples are the plastics industry where the ERP declined from 489 to 332 percent, textiles where it declined from 298 to 232 percent, and clothing where it changed from 481 to 321 percent (Fishlow summary, pp 58a, Table X.1). While tariffs were the main instrument of protection, zealous governments also leveraged other protectionist policies tailored to a specific CAD industry. As an example, in Brazil, firms importing goods that were available in the domestic market were not eligible to receive government contracts. In general, there were few offsetting export subsidies.

In Brazil and Pakistan, protection was first granted to consumer goods and later to capital goods to protect consumer goods industries. In Pakistan, during 1970-71, the ERPs on most consumer and intermediate goods were between 100-200 percent except for motor vehicles which had an ERP of 595 percent and were CAD products (Guisinger, 1978).

In Colombia, the pattern of protection also reflected the difference in industries that were CAF and CAD. In 1969, when Colombia was pursuing an IS strategy, the ERP on agricultural products, simple consumer goods and simple machinery were in the range of 2 – 25 percent (Hutcheson and Schydlowsky, 1976, Appendix Table 4.A.1). However, the fact that at the same time the ERP of transport equipment was 135 percent suggested that it was a CAD industry that required special protection to survive.

The Indian government had an elaborate brand of IS. At the start of the second five year plan (1957 – 62), policymakers in India envisioned a country that was not dependent on imports of either consumer or producer goods. This was achieved by using IS to "make machines to make machines," as well as to make consumer products, i.e., imposing import licensing requirements

and tariffs on capital and consumer goods. As late as 1991, the Indian economy was one of the most heavily protected economies globally with ERPs averaging 125 percent; the highest was 355 percent (Krueger, 2002). A classic example of the government's commitment to drive industrialization was that goods such as cereals, metals, petroleum, ores and fertilizer could be imported by only the government of India (Joshi and Little, 1996, 63).

It is curious that during the 1950 – 1970s, nearly all developing countries pursued "*dirigiste* capitalism" but except for Japan,[18] Korea and other East Asian Tigers, they did not succeed. *Why?*

The NSE contends that the crux of Japan and East Asia's success was that their development followed closely their comparative advantage or was CAF and their governments played the facilitation role (Lin 2009, Lin and Monga 2010, Lin and Monga 2011). In contrast, in the 1960s and 1970s, across Latin America, Africa and South Asia well-intended governments adopted IS and protection to achieve dynamic growth in industries that were CAD according to their endowment structures. They assigned a high priority to the development of capital-intensive heavy industries when, in fact, capital was scarce. To compensate for the absence of private firms in capital-intensive sectors, governments identified them and leveraged large state owned enterprises to produce capital-intensive products.

**Table 3.2: Examples of developing countries that followed IS to achieve CAD industrialization**

| Country | Industry | Time | Main producer at that time | Real GDP per capita latecomer country | Real GDP per capita leading country | Income ratio – follower versus leader |
|---|---|---|---|---|---|---|
| **China** | Automobile | 1950s | USA | 577 | 10,897 | 5% |
| **DRC** | Automobile | 1970s | USA | 761 | 16,284 | 5% |
| **Egypt** | Iron, steel, chemicals | 1950s | USA | 885 | 10,897 | 8% |
| **India** | Automobile | 1950s | USA | 676 | 10,897 | 6% |
| **Indonesia** | Ships | 1960s | Netherlands | 983 | 9798 | 10% |
| **Senegal** | Trucks | 1960s | USA | 1511 | 13,419 | 11% |
| **Turkey** | Automobile | 1950s | USA | 2093 | 10,897 | 19% |
| **Zambia** | Automobile | 1970s | USA | 1041 | 16,284 | 6% |
| Source: J.Lin, 2011, Table 3.1. | | | | | | |

[18] Japan's system of administered protection was very opaque and its distribution system was heavily biased against imports ((H. Hughes and A.O. Krueger, 1983 – Effects of Protection in Developed Countries in Developing countries' Exports of Manufactures pp 17).

A simple metric of a CAD policy was protection for products that were produced by countries whose income levels were significantly higher than the protecting country (Table 3.2). Examples of such strategies include Indonesia launching a ship building industry in the 1960s when its GDP per capita was only 10 percent of its main competitor, the Netherlands; and Zaire's (now the Democratic Republic of Congo) attempt to build an auto industry in the 1970s when the country's GDP per capita was only 5 percent of the U.S., the industry leader (Lin 2011).

The case of South Korea suggests that because its government was actively fostering CAF industries through an export promotion (EP) strategy, it could afford to keep protection rates lower than governments fostering CAD industries. In 1968, Korea's ERP on agriculture was 18 percent, on mining 3 percent and on average on manufacturing minus 1 percent pointing to the fact that manufacturing industries were clearly CAF. Krueger (1983) notes that even so, the average ERP on import-competing industries was still 92 percent while that on export industries and non-competing industries was minus 10 percent.

The Korean case, together with Japan's and other East Asian Tigers' discussed earlier suggest that developing country governments had two options to accelerate industrialization after World War II. They could adopt an IS strategy to foster CAD industries or they could pursue export promotion to nurture CAF industries. As noted above, CAD industrialization through IS strategies not only failed but it also diverted governments' attention and resources away from CAF, export-oriented industrialization. Would EP strategies have failed anyway because of Western protectionism aimed at limiting developing country exports? Given the empirical evidence, Hughes and Krueger note that "it seems reasonable to conclude that at least in the 1970s, protectionist actions were not sufficient to prevent those developing countries with open economies from significantly increasing their share of world markets," (Hughes and Krueger, 1983, page 38). In spite of protectionism in the Western countries, growth in world trade accelerated to 30 percent per annum in the 1970s offering many export opportunities to developing countries who had a comparative advantage in labor-intensive exports which corresponded with lower wage levels or were CAF. When developing country exports to the Western Countries grew from US$ 21 to US$ 151 billion between 1970 and 1980, East Asia was the only region that increased its share from 15 to 25 percent while Latin America that fostered CAD industries lost its share from 35 to 27 percent (Hughes and Krueger 1983, page 25). In the 1970s, when higher wages prompted the garments and textiles industry to relocate first from the Western countries to Hong Kong SAR, China and Taiwan, China, and then from the latter group to countries such as Thailand and Malaysia, it was an opportune time for India and some countries in Latin America that already had these traditional industries to seize the export opportunities and accelerate industrialization. Unfortunately, preoccupation with IS distracted them from filling even the basic export quotas of garments and textiles to the Western countries.

Pursuit of CAF industrialization through EP also enabled the East Asian Tigers to upgrade their industries according to the changes in their endowments structures.[19] Some countries used direct interventions to accelerate upgrading. In Taiwan, China private initiative to upgrade the industrial structure by developing more technologically sophisticated industries was supported by public liberalization measures (Hughes and Krueger, 1983, page 35). In Korea the government and private sectors worked together to identify and develop industries that were the country's latent comparative advantages (Lim 2011).

In general, where governments pursued IS to support CAD industries, the outcomes were unsustainable and took a heavy toll on exports and growth. Even though they were abandoned when governments finally liberalized trade, IS came at the cost of EP. Based on findings from his empirical research which were also corroborated by Krueger and others, Balassa (1978) reported that "the increase in Korea's GDP would have been 37 percent smaller if its export growth rate equaled the average for all countries concerned. The corresponding proportion is 25 percent for Taiwan, China. At the other extreme, In Chile, India and Mexico respectively, the increase in GNP would have been 14, 12 and 8 percent greater if those countries had average export growth rates. [p. 187]".

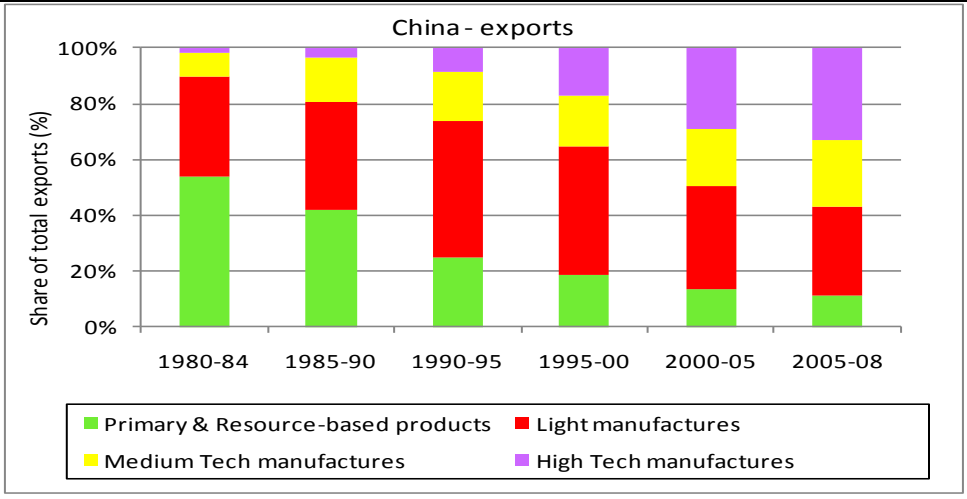
### 3.1 Industrialization in China and India led to deindustrialization in Africa

Starting in the 1980s, China's and to some extent India's industrialization caused many developing countries to become resource providers to these two countries and importers of manufactured products from these countries. This is attributable first to rapid economic growth in China which required large amounts of energy and raw materials to support its development, and in the process, pushed upward pressure on the prices of these resources. Many developing countries, particularly in Africa, are resources providers today. Secondly, China became the world's factory producing and exporting the majority of global light manufactured exports.

In the last quarter of the twentieth century, Chinese exports transformed from predominantly primary and resource-based (export share of 55 percent) to manufactured products that accounted for 90 percent of total exports (Figure 3.1). In particular, light manufactures grew from a share of 30 percent of total exports in 1980-85 to nearly 43 percent in 1995-00 before being overtaken by medium and high tech manufactures. In transitioning from light to higher tech manufactures, China was fostering CAF industries which explain why it experienced sustained industrialization and export growth throughout the last quarter of the last century.

[19] The upgrading of endowment structure is a consequence of the accumulation of capital at a faster pace than the growth of labor. The private firms will not target the upgrading of endowment structure. However, to remain competitive, the private firms need to upgrade their industries in accordance with the changes in comparative advantages due to the changes in endowment structure.

**Figure 3.1: Industrialization in China led to a transformation of exports from primary and resource-based products to manufactures which Africa imports from China**

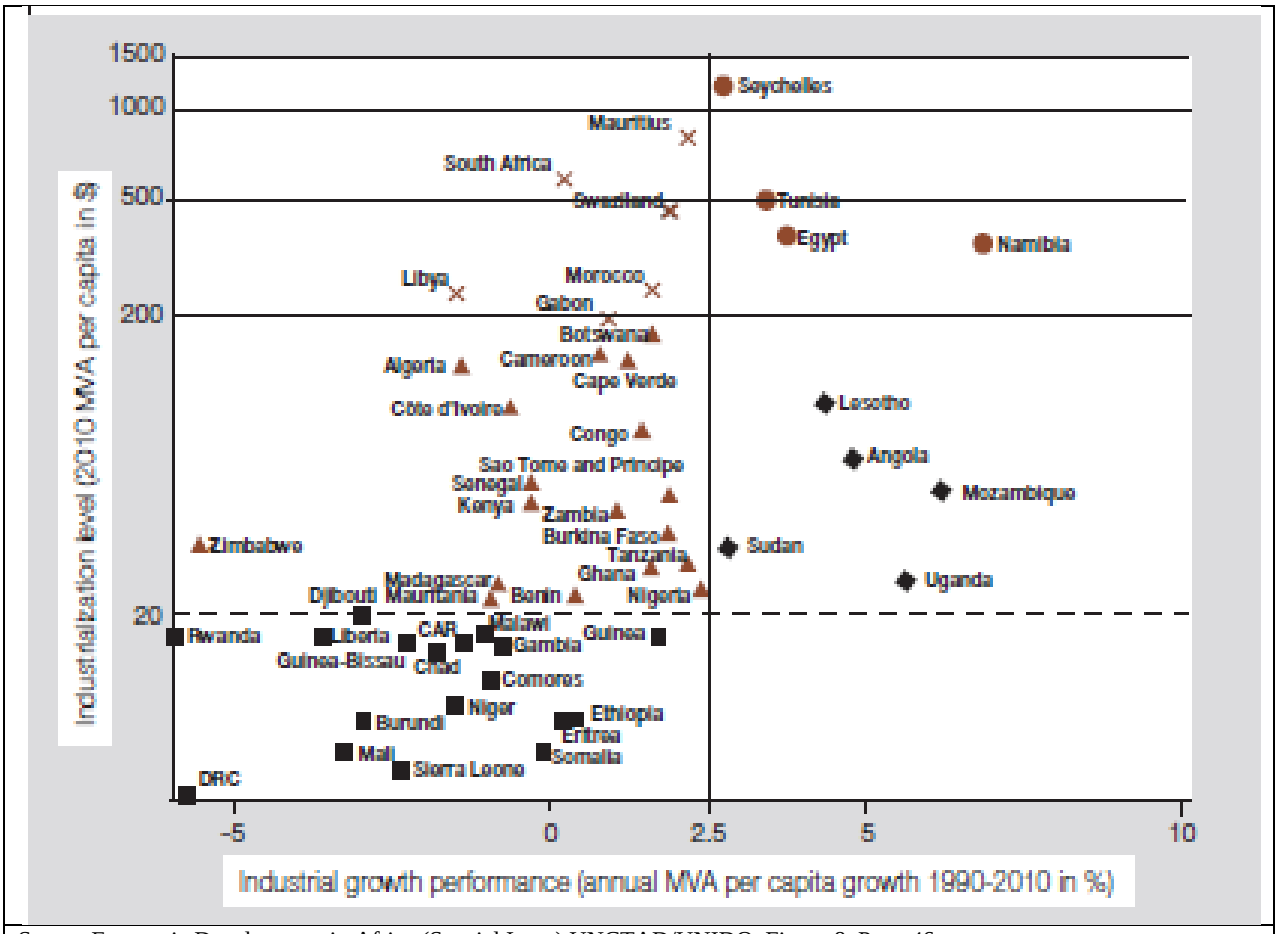



Source: COMTRADE, 2010

There are several signs to mark slow de-industrialization in Africa in the last quarter of the last century when China and India were emerging as large industrial countries and the African countries were undertaking structural reforms, liberalizing and integrating with global markets. An overview of Africa's industrial performance between 1990 and 2010 indicates that 40 out of 45 countries had a manufacturing value added (MVA) per capita of less than $200 and almost half had experienced negative growth in MVA per capita during 1990-2010 (Figure 3.2). The correlation between per capita income and MVA was unmistakable and underscored the centrality of industrialization in Africa's catch-up.

The negative growth in MVA per capita leading to de-industrialization occurred for two reasons. One, the removal of protection to the old IS industries causing their collapse established that they were CAD industries that were unviable without protection. And two, the lack of facilitation in the form of the provision of public goods by African governments to the entry of industries in which Africa has a comparative advantage. As in the case of most other developing countries in trying to prop up CAD industries through IS, African governments failed to nurture the emergence of CAF industries. Today, most African countries import even the simplest of consumer goods they once produced.

**Figure 3.2: De-industrialization in Africa: 1990-2010**




Source:Economic Development in Africa (Special Issue),UNCTAD/UNIDO, Figure 8, Page 46.

Examples of de-industrialization are most evident at the industry-specific level in Africa today and suggest that in the few countries where growth in MVA per capita was positive during 2009-2010, it was driven primarily by growth in natural resource processing which is almost entirely for export markets. Export data is helpful in shedding light on what underlies the three components of MVA - resource-based MVA, Light Manufacturing and Medium and High Tech industries in Table 3.1. Of course, an important part of MVA is composed of processed food and beverages for domestic markets and is not included in export statistics but the overall values of MVA from this sector are small relative to MVA from processed resources such as minerals and petroleum in most countries. In Angola, exports of petroleum and diamond processing comprise a large share of MVA, and in the Central African Republic, diamonds and timber processing dominate. In Cameroon, timber and aluminum ores accounted for most of 75 percent of the MVA content and cocoa and cocoa butter production accounted for a large part of the light manufacturing. In Ethiopia, exports of processed gold dominate but the production of hides and skins is also an important light manufacturing export industry. In Ghana, the MVA from exports

of timber and fish processing industries pale in comparison to the MVA content from gold processing. Lesotho is an exception. Its garments manufacturing industry accounts for 55 percent of total MVA and has been the key driver of the 4.3 percent growth rate in per capita MVA. However, an upcoming diamond exports sector is likely to overcome the dominance of MVA from this sector in the future (Table 3.3).

**Table 3.3: Africa's manufacturing sector is dominated by natural resource processing industries which are the divers of growth today**

| Manufacturing Performance of Countries in Sub-Saharan Africa | | | | | | |
|---|---|---|---|---|---|---|
| **Country** | **MVA per capita US $ (1990)** | **MVA per capita US $ (2010)** | **MVA per capita [compound annual growth rate (%) 1990-2010)]** | **Resource-based manufacturing share of MVA in 2009** | **Low tech manufacturing share of MVA in 2009** | **Medium & High tech manufacturing share of MVA in 2009** |
| Angola | 26 | 66 | 4.8% | 46% | 41% | 12% |
| Benin | 21 | 23 | 0.4% | | | |
| Burkina Faso | 26 | 37 | 1.9% | | | |
| Burundi | 16 | 9 | -2.9% | | | |
| Cameroon | 126 | 148 | 0.8% | 75% | 24% | 2% |
| Cape Verde | 108 | 139 | 1.2% | | | |
| Central African Republic | 21 | 16 | -1.3% | 76% | 16% | 8% |
| Chad | 22 | 15 | -1.8% | | | |
| Comoros | 14 | 12 | -0.9% | | | |
| Congo | 62 | 83 | 15% | 81% | 6% | 13% |
| Cote d'Ivoire | 112 | 99 | -0.6% | 70% | 13% | 17% |
| Dem. Rep. of the Congo | 16 | 5 | -5.7% | | | |
| Eritrea | 9 | 9 | 0.2% | | | |
| Ethiopia | 8 | 9 | 0.3% | 67% | 20% | 13% |
| Gabon | 163 | 200 | 1% | 76% | 16% | 8% |
| Gambia | 19 | 16 | -0.7% | | | |
| Ghana | 20 | 23 | 1.6% | 86% | 7% | 6% |
| Guinea | 12 | 17 | 1.7% | | | |
| Guinea- Bissau | 26 | 16 | -2.2% | | | |
| Kenya | 49 | 47 | -0.3% | 68% | 19% | 13% |
| Lesotho | 44 | 103 | 4.3% | 36% | 55% | 9% |
| Liberia | 34 | 17 | -3.6% | | | |

Note: MVA = Manufacturing Value Added

*Source: Economic Development in Africa, Report 2011 – Special Issue (UNCTAD/UNIDO), Chapter 2, page 27.*

Source: UNCTAD/UNIDO Report: 2011

The direct impact of the emergence of China as the global manufacturing dynamo has been the decline in manufacturing sector jobs in the non-resource processing industries such as light manufacturing. Resource processing industries are capital intensive and do not create many jobs

even when they grow rapidly. Unfortunately, in virtually every country in Figure 1.6, the share of labor in the manufacturing sector declined which suggests that employment in light manufacturing industries (e.g. textiles, apparel and leather products) which are labor intensive declined. Evidently, a large part of the employment losses is due to a decline in the share of textiles, from about 7 percent in 2000 to 5 percent in 2009. Nearly all textiles today are imported from China (UNIDO 2011).

Many developing countries in other regions of the world have managed to experience significant growth through exporting light manufactures. In comparison, although Africa's exports and imports of light manufactures were balanced in 2000, the region had a trade deficit in light manufactures in 2008. The fact that Africa is increasingly dependent on other regions for light manufactures is significant for three reasons. First, the trade deficit indicates that African economies have a sizeable domestic market for light manufactures products which could form the basis for the expansion of a light manufacturing sector in at least some African countries. Second, light manufacturing sectors are a stepping stone towards more sophisticated technologically sophisticated manufacturing industries (UNIDO, 2011). Third, given the size of global demand for light manufactures, there is significant potential for African exports of light manufactures which can stimulate capital deepening and facilitate structural transformation into more advanced sectors.

Some may argue that in comparison to light manufactures, resource-based processing industries can contribute equally to growth in Africa. This hypothesis implies that Africa's de-industrialization is not necessarily inimical to growth. We argue that light manufacturing is a prerequisite for Africa's industrialization and catch up with richer countries. Both the low-employment intensity and high vulnerability of resource processing industries to external price shocks are constraints to sustained labor-reallocation necessary for the structural transformation of natural resource-based African economies. Moreover, resource-based sectors exhibit lower productivity growth and have few linkages with the rest of the economy (Lall, 2004c). In sum, resource-based manufactures show only very limited product differentiation and thus share several characteristics of commodities (UNIDO, 2011).

### 3.2 China as a following goose: learning and industrial upgrading

China's success over the past three decades is the result of a two-pillar strategy: first, adopting a dual-track approach to reforms, giving transitory protection to old comparative advantage-defying, capital-intensive sectors and liberalizing entry to comparative advantage-following, labor-intensive sectors, and thereby achieving both stability and dynamic transformation simultaneously; second, as a latecomer, choosing an economic development strategy that taps into the potential advantage of backwardness along the lines of the flying-geese pattern.[20]

[20] For further discussions of these two points, see Justin Yifu Lin, "China Miracle Demystified," *Econometrica* (forthcoming), and *Demystifying the Chinese Economy*, Cambridge University Press.

The industrial development in China after the reform in 1979 is basically following China's comparative advantage or is CAF. In the late 1970s and early 1980s, China's per capita income was less than one-third of the average in Sub-Saharan African countries and Chinese exports were concentrated in resource-intensive raw materials and primary products, such as crude oil, minerals, and food and vegetables. Until 1984 nearly 50 percent of China's exports were crude oil and agricultural products (Figure 3.3 below). It had some manufactured exports of which machinery exports accounted for 5 percent or the total. This was a result of many years of a Soviet-type CAD strategy which was costly and ineffective.

- The first industrial upgrade from resources to labor-intensive products happened in 1986, when exports of textiles and clothing exceeded crude oil. This point in history signified China's transition from exporting resource-intensive products to labor-intensive textile and clothing products.

- The second upgrade happened in 1995, when China's exports of machinery and electronics exceeded textiles and clothing. This indicated that China has started the transition from exporting traditional labor-intensive exports to non-traditional labor-intensive products with higher value added, a fact also shown in Figure 3.3.

- 2001-present, the third upgrade happened after China's accession to the WTO, locking-in liberalization of trade in goods and services, and making Chinese laws and regulations conform to international standards. Regulatory reforms led to rapidly rising FDI inflows bringing new technologies and processes, and as a result, the level of product sophistication increased. Many exporters have become an integral part of the global supply chains of multinationals in automobiles and computers. [21]

[21] There is, however, a myth on the level of export sophistication, which was discussed at length in Koopman, Wang and Wei (2008), and Lin and Wang 2008. In fact, over 50% of the export in value added were foreign value added, ie. Goods and services produced by Foreign invested enterprises. Among high-technology goods, over 80% were exported by foreign invested firms.

**Fig 3.3a China's rapid transformation in export Structure: following the Comparative Advantage**

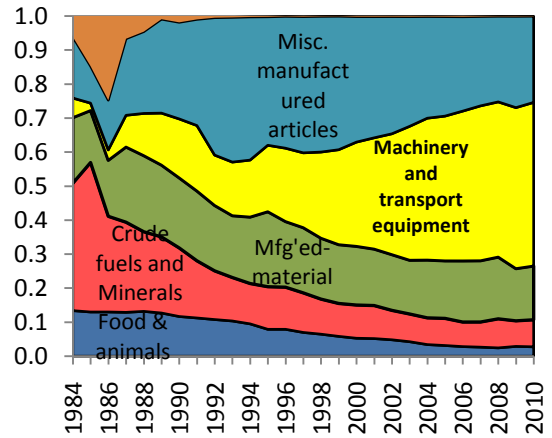
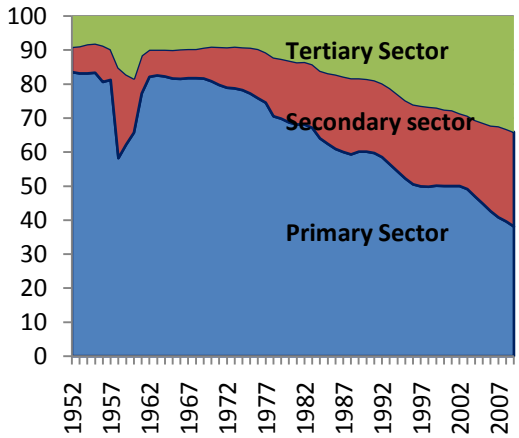



**Fig 3.3b …. But slow transformation of the employment structure**




*Source*: Justin Lin and Yan Wang 2008 and updated based on UN COMTRADE data

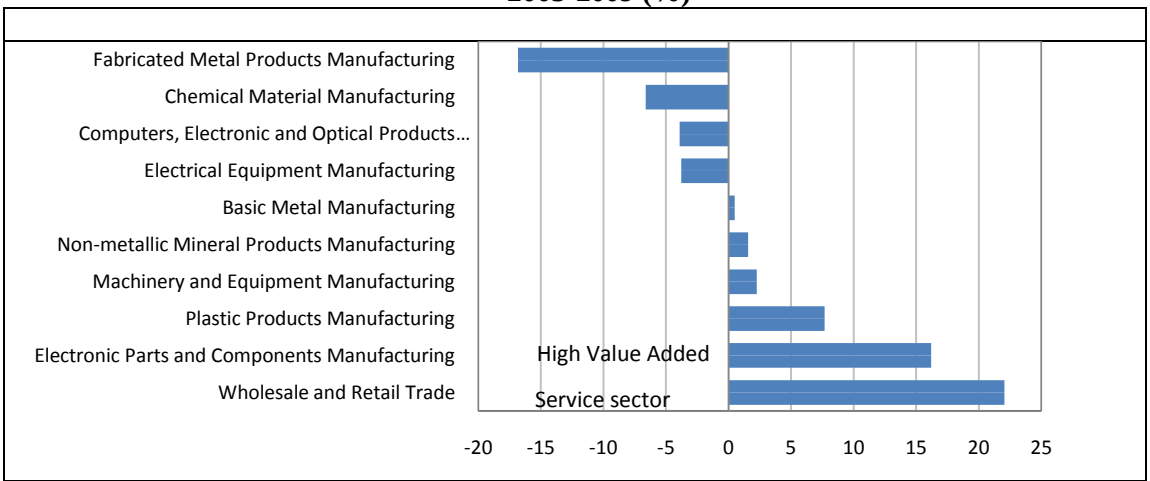
The evolution of China's export structure in the last three decades reflects the significant structural transformation in flying geese style that enabled the country to graduate from an exporter of labor-intensive products such as apparel, textiles and leather to more sophisticated ones such as home appliances, office machines and electric machinery (Figure 3.3). Such a transition from low- to middle and high value-added products could not have been possible had the original endowments of the Chinese economy remained unchanged during the last three decades. With annual savings of around 40 percent of GDP and dramatic improvement in education, its endowments of human, physical and financial capital have evolved significantly- a topic covered by many studies. Most importantly, its stock of technological capabilities has benefited from importing and adapting foreign technologies of production and mastering their use. Unlike the case of Korea where the channel of technology transfer was mainly through import of equipment and purchasing of licenses, foreign capital (FDI) played a critical role in China's industrial upgrading.

- **Inward FDI helps the industrial upgrading**. Many studies have provided evidence on the spill-over effect of inward FDI through 1) horizontal spillovers, and 2) vertical (forward and backward) linkages. Others pointed out that foreign investors are quick to identify a country's comparative advantage, and served as the most dynamic forces in the industrial development and upgrading (Harrison, 2010, Aghion, Dewatripont, Du, Harrison and Legros 2011). Although the amount of FDI is not huge, it accounted for 4-5% of China's Gross National Investment, and the composition matters a great deal because, first, foreign investors serve as *"identifiers of growth sectors"*; and (2) they provide advanced technology helping to reduce first-mover risks and transaction costs when firms

attempt to enter a new product or a new market. Through contractual arrangement, Original Equipment Manufacturer (OEM), or Original Design Manufacturer (ODM), and joint ventures, foreign investors allowed China to utilize the advantage of backwardness through learning by emulating, and eliminate the risks for innovation. Between 1993 and 2005, 70-80 percent of FDI inflows were concentrated in manufacturing which helped capital deepening as China's capital-labor ratio increased from 0.4 in 1985 to nearly 4.0 in the manufacturing sector. *"Foreign Invested enterprises (FIEs) created about 20 percent of tax revenue, 55% of import and export, and over 80% of high-tech product export"* (MOFCOM 2010).

- In the last five years (2005-09), **FDI inflows are** shifting toward higher value added sectors including services, as showed by Figure 3.4. Taiwanese investors have also provided much needed technology and managerial skills that Chinese firms need in electronics and information technology. Wholesale and retailing have shown the fastest growth rate in recent years as China moves more toward promoting domestic consumption.
- The process of 3-stage upgrading shows the importance of learning by importing, to learning by exporting; from lower end manufacturing goods to higher value added goods, and then to services. Initial learning activities were within sectors, and gradually spilled over horizontally to other new sectors, and eventually diversified through outward FDI to other countries (Lin and Yan Wang 2008).

**Figure 3.4. Changing Structure of FDI flows to China: from Manufacturing to services: Growth of approved Taiwanese outward foreign direct investment into China by Industry, 2005-2009 (%)**




Source: Rosen and Zhi Wang, 2011. Page 35 based on data from the MOEA, Taiwan (China), approved direct investment to mainland China- rapid growth of service sectors.

In sum, in this section we have argued that industrialization failed in many parts of the world for various reasons. Import substitution and protectionism in the 1970s and 1980s played an

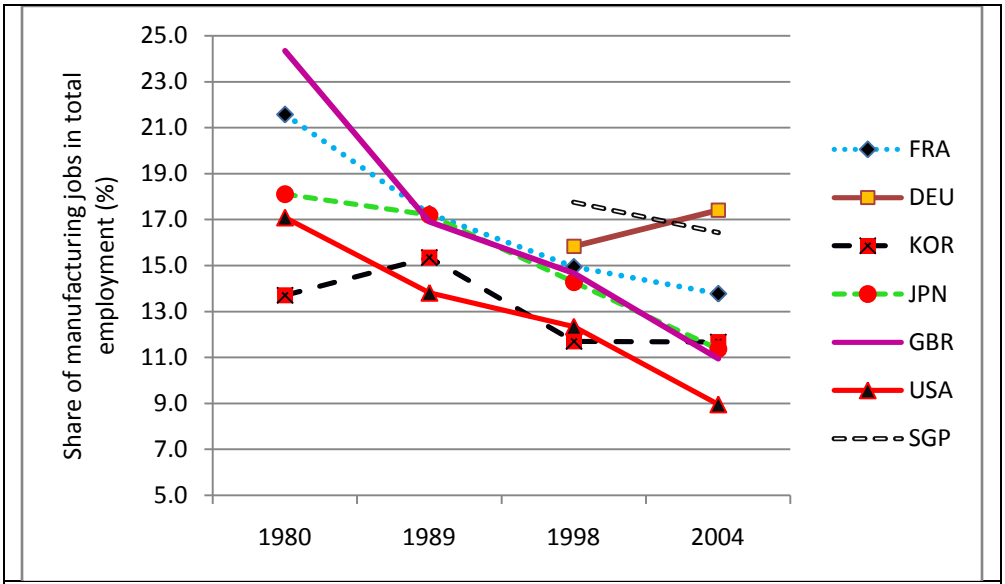
important role in delaying it. Trade liberalization occurred eventually but had two unintended results that further stymied industrialization. One, countries lost competitiveness in old CAD capital intensive industries and experienced de-industrialization. Second, without adequate government facilitation in the form of critical public goods, new CAF industries that were appropriate for the liberalizing countries did not emerge. Through opening and learning by doing, China has been following its comparative advantage by following the lead geese in East Asia. But because of the advantage of a large economy, China absorbed almost all the labor-intensive industries that the lead geese left behind. The local governments played a proactive role in attracting foreign investments which helped to identify the growth poles and reduce first-mover risks. Moreover, with government's facilitation and as a large economy, China can specialize and develop industrial agglomerations or zones quickly in many internationally competitive labor-intensive sectors such as textile, clothing, footwear and toys. Many of the labor-intensive industries in Japan and in the East Asian Tigers have relocated to China. Moreover, the industries that are relocating to China have been upgrading, from low-end labor intensive sectors to higher value added and more sophisticate products and services, as shown in Figure 3.4. In addition, rapid growth in China and later, India has created a huge demand for resources. These factors have in the recent years contributed to de-industrialization in some developing countries. However, all these factors will change as China continues to grow dynamically in the coming years.

# Part 4: The Emergence of Leading Dragons: Potential Relocation of the Labor Intensive Industries from China and India

## 4.1 The Leading Dragon Phenomenon

China is at a stage where the Western countries and Japan were in the 1970s, and Korea; Taiwan, China; Hong Kong SAR, China; and Singapore were in the 1980s. As labor intensive industries matured, wages increased and firms moved into more technologically sophisticated industries, in accordance with the upgrading in the underlying endowment structure. In the Western countries and the Asian Tigers, the shift to service sector as the increase in the capital intensity of production in manufacturing led to an overall contraction in manufacturing jobs (Figure 4.1). When labor intensive industries in the high wage countries shut down, their jobs relocated to other lower wage countries such as the East Asian Tigers. If labor costs in China were to increase significantly in the next few years, triggering a growing trend for upgrading to higher value-added, capital-intensive industries, structural transformation would accelerate rather than slowing down, but with a critical *difference*. The *number of jobs* East Asia relocated in China was a fraction of those China may relocate to other developing countries.

**Figure 4.1: As labor intensive industries matured, wages rose and low skill manufacturing jobs relocated to other lower wage countries**




Source: UNIDO, 2011

China's spectacular display of structural transformation in flying geese style shares many common characteristics with successful East Asian countries but it has at least three several distinctive ones. One is the *sheer size* of China's relatively unskilled labor pool that absorbed *nearly all* the labor intensive jobs shed by the successful but much smaller East Asian economies when rising wages pushed them into more sophisticated industries which were aligned better with their upgraded endowment structure. Another is how China took advantage of its large labor force to become the world's largest producer and exporter of labor-intensive manufactures. And yet another is the speed with which China achieved entry into labor-intensive manufactures and, in the last 4 – 5 years, into more technologically sophisticated manufactures. All three factors bode well for low-income countries in general, but especially for those in Sub-Saharan Africa which de-industrialized after liberalization.

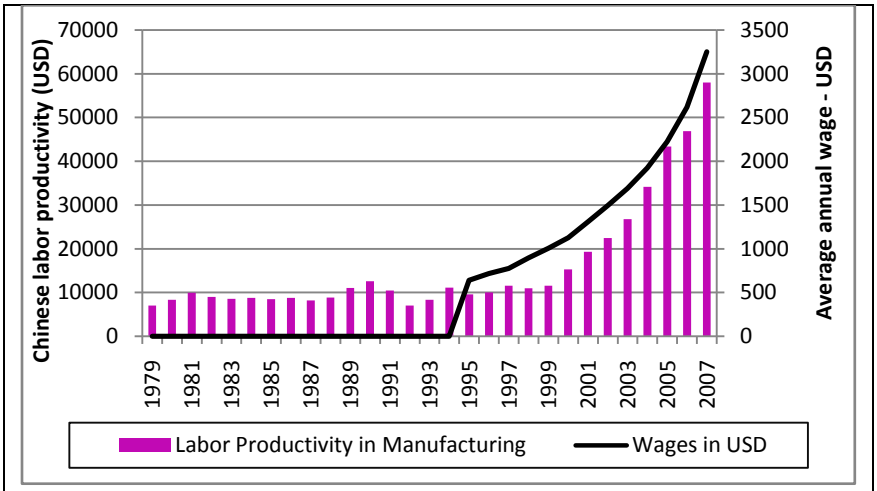
China's large labor-intensive manufacturing sector and its export orientation have had two effects: One, they have *nearly exhausted China's relatively unskilled labor surplus* while the global demand for these products is rising with certainty. East Asia's size is near-negligible relative to China's labor force in labor intensive industries with non-trivial implications. Two, they have potentially *created enormous employment spillovers for poorer, labor-abundant developing countries*. Rising wages in the near future will force China to graduate from labor-intensive industries and move up the ladder to more capital-intensive and technology-intensive industries. China's upgrading will leave a huge space, much larger than the leading geese, for many low-income countries to enter a labor-intensive industrialization phase. We will refer to this pattern as the ***Leading Dragon Phenomenon***. If India, Brazil, Indonesia and other large

emerging market countries maintain their current pace of growth, a similar pattern and opportunity will arise.

### 4.2 Significant changes in wages

China's labor cost is rising rapidly, and the structure of its industries, exports and employment is changing. Many Chinese economists argue that China has absorbed its surplus labor, and approached the *Lewisian* turning point (Cai, et al 2009, Huang and Jiang 2010). Recent data indicates that wages in China's manufacturing sector grew rapidly, rising from just over 150 dollars per month in 2005 to around 350 dollars in 2010 (about $4,200 per year—see Figure 4.1).[22] More precisely, the wage gap between China and other high middle-income countries is closing and likely to continue with certainty over the coming decade.[23] China's 12th Five-Year Plan projects that during the period 2011-2015, the Chinese economy will grow on average at 7 percent per year. It also proposes that real wages will grow as fast as GDP. Both growth rates are likely to be achieved and imply that real monthly wages will double from around $350 per month to $700 per month over the next decade. When combined with continued currency appreciation, China's real wages could *approach $1,000 per month* within a decade or the level of some of the higher middle-income countries (Turkey, Brazil), and $2,000 per month by 2030 or the level of Korea, and Taiwan, China today.

**Figure 4.2: Labor Productivity and Average Wage Rates in Chinese Manufacturing (USD)**




***Sources: UNIDO and China Statistical Yearbook 2010.***

[22] Source: Oxford Analytica, March 28, 2011. In 2010-2011, China's minimum wage for 30 municipalities rose by 25% or more.

[23] One study puts China's hourly labor compensation costs in manufacturing at only 4 percent of those in the United States (Banister and Cook 2011). However another study, incorporated the rising social insurance cost, has put China's total labor cost on par with that of Thailand. Source: Chris Devonshire-Ellis, "China now has the third highest labor cost in Emerging Asia," January 19, 2011.

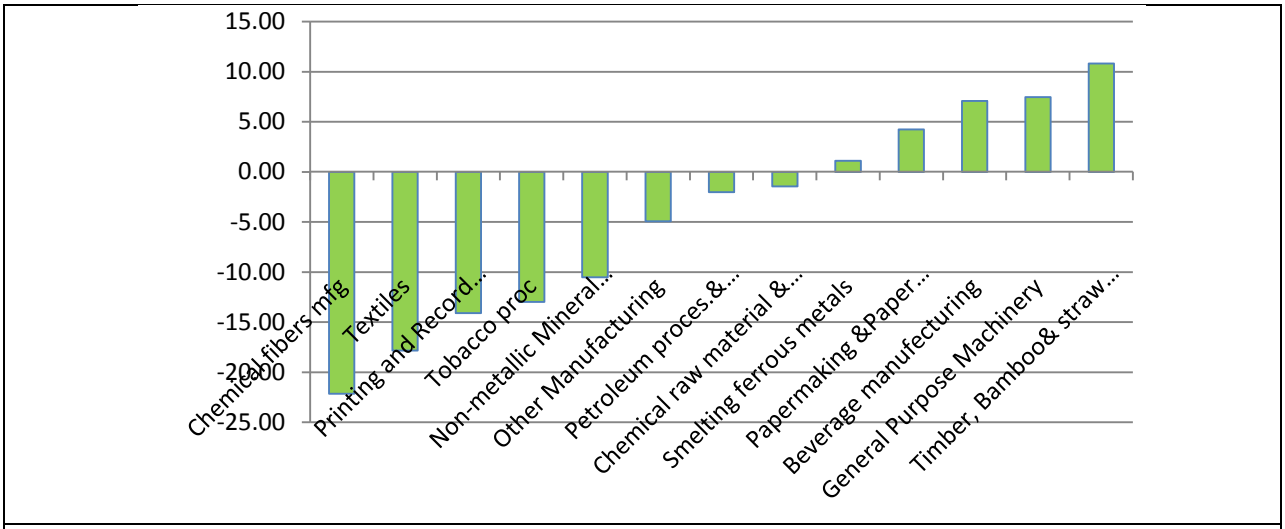
### 4.3 Significant changes in employment patterns and locations

As Chinese wages rise, the spillovers from the leading dragon phenomenon are already helping to relocating its labor intensive jobs to other lower wage countries. This is ensuing in several ways.

- The most evident is the ongoing transformation in China's manufacturing sector. Following the flying-geese pattern of development, *China is transitioning from labor-intensive industries towards more advanced ones*, with machinery becoming increasingly dominant in manufactured exports. New evidence shows that between 2002 and 2009, China's urban manufacturing industries restructured. As a result, the largest decline in manufacturing employment is unfolding in textiles, chemical fibers, printing and record medium, tobacco processing, non-metallic mineral products industries (Figure 4.3a and 4.3b and Annex 1).

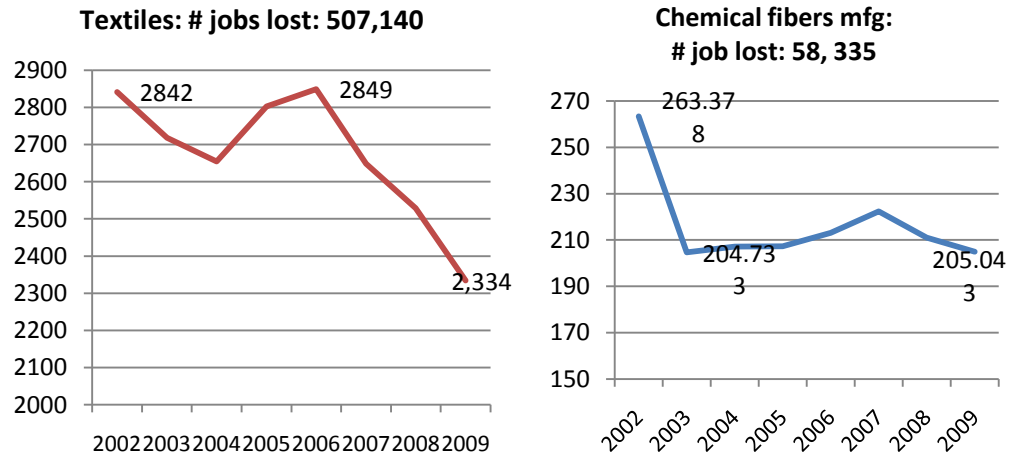
- China's restructuring could be accelerated. First, as rapid urbanization, expansion of tertiary education and labor market flexibility ensue, young workers are unwillingness to stay locked in low-skill manufacturing jobs and are seeking upward mobility. Although it will remain a "labor surplus" economy until 2014, the growing demand for service sector employees will gradually stretch China's job market (McMillan 2011). Second, with gross domestic savings as high as 45 percent for over 25 years, and gross capital formation over 50 percent, capital availability increased substantially. Channels for exporting this capital are largely open. The government encourages enterprises in labor-intensive sectors to "go out" and "go global," by providing guidance and incentives including, but not limited to, setting up 19 industrial zones outside China.

**Figure 4.3a Sunset manufacturing sectors in China: Percentage change in employment by subsector, 2002-09, %**




Note: This chart shows only those subsectors where employment is declining or rising slower than the average for urban manufacturing sector in China. See Annex 1.

**Figure 4.3b. Urban employment declined in Textile and Chemical Fibers and other 8 manufacturing sectors**




Source: Banister and Cook, Monthly Labor Review March 2011, and NBS, China Labor Statistical Yearbook 2010 (for 2009 data). See Annex 1.

- Evidently, rising wages in labor intensive industries have *already triggered relocation of low wage jobs overseas*. Many lower wage countries in China's neighborhood such as Vietnam, Laos, Cambodia, and even Bangladesh are emerging as the new growth nodes of the garments, footwear and other labor intensive industries. How many jobs each country can attract depends on the incentives package it offers to investors.

- Perhaps the most critical channel presently is OFDI flows from China and other emerging market countries to the manufacturing sectors in lower wage countries. This is unsurprising. OFDI from South Korea and Hong Kong SAR, China fuelled much of the early investments in China's labor intensive industries when their wages increased and China followed them as flying geese. Now it is the turn for nearly all lower income labor abundant countries to fly after the leading dragon. Currently, the relocation of jobs from China's labor intensive sectors to Vietnam and other neighboring countries are financed by both transnational corporations including those from China, as well as local entrepreneurs given the high savings rates in East Asian countries. In low wage countries where local capital is scarce, the majority of the investors will invariably be foreign as apparent from Bangladesh's flourishing garments industry which is largely financed initially by FDI. It is notable that *the Leading Dragon Phenomenon is neutral with respect to the source of investment capital*. What is of essence is the number of labor intensive jobs that currently exist and will soon become redundant in China and can be relocated in some other country. The world demand for labor intensive products that China presently produces and exports can be satisfied by any country whose wage levels

are lower than China's. *The origin of the investors does not matter though it will become increasing critical for regions such as SSA where investment capital is scarce.*

### 4.4 Significant potential for relocation of jobs to low wage countries

Due to the sheer size of its labor market, the number of jobs China's ongoing industrialization will potentially create for low-income countries is huge. Several factors will matter.

As employment statistics for manufacturing is extremely sparse and tentative, we cannot provide any estimates of potential job relocation. However, rough calculations are informative and sufficient. Currently, China employs about 85 million workers in its manufacturing sector nationwide. Going forward, rising wages will force China to upgrade to higher value-added, more capital/technological intensive sectors and relocate the jobs in the existing sectors to countries that have lower wage rate than China's. India currently employs about 9 million workers and Brazil about 13 million (Table 4.1). These emerging market countries employ about 120 million workers whose jobs could be relocated to other developing countries in the coming years. Notably, India still has significant surplus labor which implies that its labor intensive industries will expand before they contract and relocate jobs. Its younger population will provide more workers for Indian industries in the future but also more potential jobs for lower wage countries.

**Table 4.1: Employment in Manufacturing, Potential Dragons, 2009/10**

| | Brazil | China | India | Indonesia | Total |
|---|---|---|---|---|---|
| Employment share in Manufacturing (million) | **13.1** | **85** | **8.7** | **12.5** | **119.3** |
| Population (million) | 192 | 1,324 | 1,140 | 277 | 2,934 |
| Outward FDI (USD billion) | 11.5 | 68 | 14.6 | 2.7 | 96.8 |

Source: ILO, Penn World Tables and UNCTAD, 2011

The employment of labor intensive jobs in low wage countries currently is also large but pales in comparison to the numbers in either China or the emerging market countries (Brazil, China and India) collectively. As an example, in 2009, all developing countries in Sub-Saharan Africa collectively had a labor force of 338 million. Most of it was employed in subsistence agriculture that fetches below poverty level wages. Assuming that about 3 percent are in manufacturing suggests that the sector employs about 10 million African workers. To achieve employment in manufacturing equivalent to about 20 percent of total employment implies that Sub-Saharan Africa needs a total of about 70 million jobs. In most industrial countries, the share of

manufacturing in total employment reached about 20 percent before it declined due to industrial upgrading and wage increases.

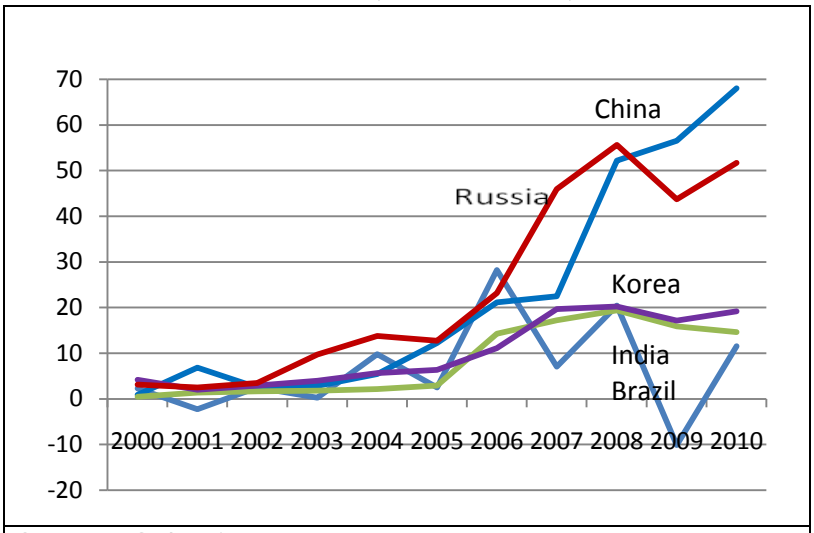
It seems reasonable to suggest that the Leading Dragon Phenomenon alone can create sufficient labor intensive manufacturing jobs for developing Sub-Saharan African countries to bring them to par with most industrial countries. Even if China's manufacturing sector sheds 10 percent of its total employment in the next few years, a pool of 8.5 million jobs will be ready to relocate overseas. The number could almost double employment in manufacturing in African countries in a few years, jumpstarting its process of industrialization. Similarly, in the medium term, India's manufacturing sector will prepare a large pool of labor intensive manufacturing jobs for relocation. Evidently, the sheer number of jobs the Leading Dragon Phenomenon can create is unprecedented and will be adequate to industrialize not only Sub-Saharan Africa but also other lower wage countries in the medium term.

### 4.5: Outward Foreign Direct Investment in the Manufacturing Sector will accelerate the leading dragon phenomenon in Sub-Saharan Africa

SSA countries are not alone in competing for the millions of jobs relocating from China. The scarcity of local entrepreneurial skills and investment capital are invariably the top two constraints for a competitive manufacturing sector. Evidently, the availability of OFDI can enable SSA to overcome these constraints and take advantage of the Leading Dragon phenomenon to finally participate in the global production of labor-intensive products. Outward FDI from developing and transition economies reached $388 billion in 2010 with China at the helm and Brazil, Russia, India and Korea (BRICK) the other key sources of FDI (UNCTAD data) (Figure 4.4). 60 percent of the OFDI from developing countries went into other developing countries, mostly in the form of Greenfield investments which can typically open the door for South-South relocation of various industries from China and other BRICSs (M&A and Greenfield data).

**Figure 4.4 Outward FDI (OFDI) from BRICK Countries,**

**2000-2010 (in USD billions)**




Source: UNCTAD 2011.

A large share of China's outward FDI is flowing to Africa[24] and had grown from a few hundred million dollars in 2002 to a cumulated amount of US$13 billion by the end of 2010, accounting for 4 percent of total OFDI stock (MOFCOM). About 22 percent of China's OFDI is presently concentrated in the manufacturing sectors, second only to 29% in mining. In 2010, Chinese firms also increased the number of jobs created overseas by 10 percent and capital investment by 2.5 percent. China ranked eighth in the world according to job creation overseas. (FDIintelligence, Special Report 2011). Two recent papers found that China's outward FDI has played a significant role in the growth of African countries (Weisbrod and Whalley 2011, and Mlachila and Takebe 2011).

Alternative sources note that:

- "Manufacturing accounted for 26% of global projects, 48% of the global capital investment and 55% of global jobs creation in 2010," (*fDIintellingence*, Financial Times unit).
- "Indian, South Korean, Japanese and Chinese companies were among the fastest growing investors overseas in 2010" (*fDIintellingence).*

[24] Assessing the country/regional allocation of FDI is known to be difficult and alternative data sources must be used for cross-check.The official data underestimate the FDI in Africa because a large proportion of China's OFDI flows to Hong Kong SAR, China and several "tax havens", and then being re-directed to various regions. Another part of this outflow constitutes the so called "round-tripping" investment back to China. The database by Heritage Foundation addressed this problem by tracing investments from these tax havens to its ultimate destination. For details see Derek Scissors (2010).

- "Four of the major economies in Asia (China, India, South Korea and Australia) recorded the largest increases in greenfield FDI overseas in 2010" (p.26, Annual Report, *fDIintellingence*).

- Information on Greenfield investment at the project level shows that India which has a long tradition of investing overseas since the 1950s, currently invests over 40% of its OFDI in manufacturing. In the early 1990s, post liberalization reforms, India's large and booming economy and unprecedented access to capital have facilitated the global spread of Indian firms (Prema-chandra Athukorala, 2009, p146).

In essence, the Leading Dragon phenomenon is already unfolding and given the speed of China's transition to more advanced industries, its acceleration is imminent. How many of the millions of Chinese labor intensive jobs will relocate to a specific lower income country will be contingent on which ones offer the most attractive investment climate to investors. The availability of significant OFDI can accelerate the process of industrial relocation in SSA but other developing countries with wages lower than China's will also be competing fiercely for them.

## Part 5. Summary and Implications

The emergence of large middle income countries such as China, and India and Brazil as new growth poles in the world, and their dynamic growth and ascent up the industrial ladder offer an unprecedented opportunity to all lower income developing economies especially in Sub-Saharan Africa to accelerate industrialization and catch-up. This paper tried to explain why.

In addition, this paper argues that:

1. Economic development is a process of continuous industrial and technological upgrading, and modern economic development is accompanied by the structural transformation. Empirical evidence indicates that those developing countries that either failed to catch up or are trapped in a low-income and middle-income status did not experience structural transformation from an agrarian to an industrial economy.

2. Nearly all countries that industrialized successfully, adopted 'comparative advantage following' or CAF strategies to tap the late-comer advantage in a flying geese pattern. Successful industrialization in Japan before 1900, the "passing of torch" from the US to Japan after the WWII, the rapid catch-up of East Asian NIEs, the ASEAN 4 and late comers such as China and Vietnam have all followed the flying geese pattern, albeit to varying degrees.

3. The flying geese pattern failed in Latin America and South Asia because their governments adopted the prevailing structuralist paradigm that advocated an import substitution-driven industrialization strategy which encouraged them to develop 'comparative advantage defying' or CAD industries similar to those in the high-income industrialized countries. The East Asian successful countries also leveraged import substitution-driven industrialization but ensured that the industries they protected were their latent comparative advantage. This enabled them to leverage an export-led growth strategy of industrialization that helped them to start closing the income gap with the developed countries.

4. This paper provide evidence that not only industries are jumping across borders, they industries that are "jumping" are also upgrading. In the late 1970s and 1980s, for China, the lead geese were the East Asian Tigers. When wages increased, East Asia's labor intensive industries relocated many jobs to China. However, China's pattern of development has several distinctive features. Its significantly larger economy was able to absorb nearly all labor-intensive jobs that the lead East Asian geese shed and become the world's largest producer and exporter of labor-intensive products. Moreover, as Korea and Taiwan are upgrading, the industries that are relocating to China are also ascending to higher-end products. In a fraction of the time it took Japan and the East Asian Tigers, China has been able to replace simple labor intensive products with more sophisticated ones.[25] This is enabled by a government that fosters CAF industries.

5. The dynamic growth, high savings and substantial investments in education have triggered a rapid upgrading of China's factor endowments for more technologically advanced industries. This is pushing up wages at an amazing rate since 2002 and causing labor intensive industries to contract. China has an estimated 85-100 million workers in manufacturing, with most of them in labor intensive industries or labor-intensive segments of capital-intensive industries. As these industries shed labor, they will create a huge opportunity for lower wage countries to start labor intensive manufacturing products. This process, which we call the Leading Dragon Phenomenon, will offer millions of labor intensive job opportunities to many developing countries. Prevailing thinking purports that China's dominance in global labor intensive product markets constrains the development of similar industries in poor countries. We argue that the Leading Dragon Phenomenon provides an extraordinary opportunity for many lower wage countries to embark on a labor-

[25] In those sophisticated industries, China's production concentrates mostly in the labor-intensive processing segments. The possibility for China to enter those sophisticated industries is because of the emergence of global production network as a result of reduction in information and transportation costs.

intensive industrialization phase. If India, Brazil, Indonesia and other large MICs maintain their current pace of growth, a similar pattern and employment space will arise. The Leading Dragon Phenomenon alone is almost sufficient to double the total manufacturing employment of 10 million workers in Sub-Saharan Africa when only 10 percent of Chinese jobs relocate to the Continent. If Brazil and India follow suit, the total will be sufficient for Africa and other low wage countries.

6. How likely is the Leading Dragon phenomenon? Evidently, Chinese labor intensive industries are already scaling back and many have had negative employment growth in recent years. More than half of China's export basket is comprised of medium and high tech technology and skill intensive products. Several lower wage countries in East and South Asia have already been successful in attracting some of the industries from China, much as it did from East Asia. These industries have been financed through a combination of local and foreign investment.

7. The Leading Dragon phenomenon holds the greatest promise of industrialization for low wage countries of SSA where the industrial sector is largely underdeveloped, and investment capital and entrepreneurial skills are the leading constraints to manufacturing. Recent and fairly significant OFDI flows from mostly large developing countries such as China, India and Brazil are increasingly flowing into the manufacturing sectors of other developing countries, including some to SSA. We argue that SSA governments have a unique opportunity to attract larger volumes of OFDI which has the vantage of resolving speedily both the investment capital and entrepreneurial skills constraints, and seize some of the jobs created by the Leading Dragon phenomenon. Of course, other lower wage countries in other regions will be vying to do the same.

8. Low-income countries must compete to gain access to capital, technology and capacity development opportunities. If they have the right policy framework, the industrial upgrading in large emerging market economies, especially China, would provide them a golden opportunity for a dynamic manufacturing sector-led growth in the years to come.

In an increasingly globalized world, opportunities for economic transformation abound. The emergence of a multipolar world is a blessing for even the most backward economies- because it provides them the opportunities to enter a new age of rapid industrialization and structural transformation. Clearly, the opportunities ahead for African labor-intensive economies, which

are currently exporting mostly minerals, are enormous—provided that they quickly formulate and implement credible economic development strategies that are consistent with their comparative advantage. However, the actual benefit for countries and regions depends very much on the right policy environment, institutions and implementation capacities. Countries must compete to gain access to capital, technology and capacity development opportunities.

# Annex 1:

**China: Structural Change in Urban Manufacturing Employment, by Subsector, 2002-2009: Sunset subsectors identified.**

| unit 1000 persons | 2002 | 2009 | Differences | % change |
|---|---|---|---|---|
| **Total Manufacturing in urban units** | **29807.5** | **34919.0** | **5111.5** | **17.1** |
| **Subsectors sorted by % change in employment** | | | | |
| **Sunset sectors** | | | | |
| Chemical fibers manufacturing | 263.4 | 205.0 | -58.3 | -22.1 |
| Textiles | 2841.6 | 2334.4 | -507.1 | -17.8 |
| Printing and Record Medium reproduction | 493.5 | 423.8 | -69.7 | -14.1 |
| Tobacco processing | 233.5 | 203.2 | -30.3 | -13.0 |
| Non-metallic Mineral Products | 2116.0 | 1893.1 | -222.9 | -10.5 |
| Other Manufacturing | 601.4 | 571.7 | -29.7 | -4.9 |
| Petroleum processing and coking products | 565.5 | 553.9 | -11.6 | -2.0 |
| Chemical raw material and products | 2213.3 | 2180.9 | -32.4 | -1.5 |
| Smelting and pressing of ferrous metals | 1900.6 | 1921.3 | 20.7 | 1.1 |
| Papermaking and Paper Products | 592.4 | 617.5 | 25.1 | 4.2 |
| Beverage manufacturing | 740.3 | 792.7 | 52.5 | 7.1 |
| General Purpose Machinery | 1921.3 | 2064.7 | 143.4 | 7.5 |
| Timber, Wood, Bamboo, and straw products | 267.7 | 296.6 | 28.9 | 10.8 |
| **Growing sectors** | | | | |
| Medical and pharmaceutical products | 844.9 | 980.1 | 135.2 | 16.0 |
| Metal Products | 897.5 | 1065.1 | 167.6 | 18.7 |
| Rubber products | 377.6 | 453.4 | 75.8 | 20.1 |
| Food processing | 977.4 | 1187.4 | 210.0 | 21.5 |
| Special Purpose Machinery | 1400.6 | 1718.9 | 318.3 | 22.7 |
| Transport Equipment mfg | 2319.4 | 2962.4 | 643.0 | 27.7 |
| Food product manufacturing | 621.8 | 811.0 | 189.2 | 30.4 |
| Smelting and pressing of non-ferrous metals | 755.6 | 1001.9 | 246.3 | 32.6 |
| Plastic products | 606.8 | 807.1 | 200.3 | 33.0 |
| Machinery for cultural activity and office work | 464.8 | 666.5 | 201.8 | 43.4 |
| Electrical Machinery & Equipment | 1441.4 | 2131.1 | 689.7 | 47.8 |
| Stationary and educational and sporting goods | 294.6 | 451.8 | 157.1 | 53.3 |
| Garments, other fiber products, footwear | 1336.2 | 2064.9 | 728.7 | 54.5 |
| Leather, Fur, Feather & related products | 578.6 | 906.5 | 327.9 | 56.7 |
| Electrics and Telecommunications | 1623.8 | 3250.8 | 1627.0 | 100.2 |
| Furniture Manufacturing | 180.5 | 364.4 | 183.9 | 101.9 |

Source: Banister and Cook, Monthly Labor Review March 2011, and NBS, China Labor Statistical Yearbook 2010 (for 2009 data). Sectors marked in yellow are sunset sectors. The NBS stopped publishing statistics on rural enterprises in 2002, thus decomposition of employment by subsector for the entire economy is not available.

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