Can Cheetah Beat Tiger? A Comparative Analysis of Chinese Industrial Competitiveness with Sub-Saharan African Countries

EHIZUELEN MICHAEL MITCHELL OMORUYI^{*}

This paper examines Sub-Saharan Africa's industrial competitiveness with China, by employing a statistical methodology for studying competitiveness based on relative unit labour costs. The patterns of bilateral trade between China and SSA, as well as investment and financial aspects of the relationships are examined. The findings show that SSA's relative unit cost levels have generally been higher than that of China. However, in the 2000s, the levels dropped as China's wages increased faster than its productivity, while the reverse is true for SSA countries in the study sample. The study shows that SSA countries are unlikely to be competitive in labour-intensive manufacturing because of high relative unit labour costs and weaknesses in their business climate.

Keywords: China, Industrial, Investment, Labour cost, Sub-Saharan Africa, Trade **JEL Classification:** L16, E01, L600, E24, J3, O15

I. INTRODUCTION

A recent online search found over 51 million articles¹ on China and Africa, making it one of the most well-known and talked about international economic relationships. The relationship is often said to come on the back of colonial aspirations. Numerous newspaper headlines report that Chinese companies, backed by the powerful and deep-pocketed Chinese state, will mop-up sub-Saharan Africa's (SSA's) business opportunities to the detriment of indigenous and western companies. Based on these developments, is it possible for SSA to take advantage of China's increasing investment in the region? Noticing the profusion of "Made in China" products in every SSA marketplace and China's

^{*} Institute of African Studies, Zhejiang Normal University, China.

¹ World Bank (2015).

construction crews apparently on every construction site of SSA countries, one can easily conclude that China is taking over and "colonizing" SSA. But this "colonizing" is obviously "neo-classical," since China does not rest on the historical model involving force to accept trade. This task was successfully made easier by WTO. Ironically, thus, it is not a "colonialist" China, but the WTO that set the playing field in SSA as an attractive opportunity for China.

China and SSA have been trading partners for centuries. The developing tale began during the Han Dynasty (206 BC-AD 220). However, with the exclusion of the Zheng He (1371-1433) naval expeditions to the east coast of Africa early in the Ming Dynasty, imperial China had little direct contact with the region until Chinese labourers were sent to South Africa in the mid-1600s and Chinese traders and labourers migrated to Africa's Indian Ocean islands in the late 1700s. These modest migrations of the Chinese continued through the 1900s. This created the most dramatic change in trade relations between the partners.

Conversely, China's trade with SSA countries does little to foster and may possibly hinder the region's structural transformation as booming exports of traditional primary goods exacerbate SSA's reliance on capital-intensive minerals and fuels whereas China's export of labour-intensive products create robust headwinds for development of SSA's meager industrial base as well as formal job creation. Recently, wages have been soaring in China compared to other regions, potentially creating fresh chances for low-cost manufacturers. Due to the increasing wages in China, most factories are relocating. This paper attempts to answer the questions of whether SSA countries can develop labour-intensive industrial exports.

The purpose of this study is to examine SSA's competitiveness in the industrial sector, centering on SSA's cost competitiveness. The paper also evaluates the competitiveness of SSA's industrial sector in terms of relative unit labour costs compared to China. Following the introduction, the section II briefly examines the trade, foreign direct investment (FDI) and financial connections between SSA and China, emphasising the imbalance in trade in industrial products.

Section III develops and applies the relative unit labour cost (RULC) method to evaluate the competitiveness of SSA's industrial sector with respect to China. This section also examines the dissimilarity in exchange rates, real wage rates and labour productivity which are combined into a single measure of global competitiveness.

Section IV evaluates the RULC for some specific scenarios in a number of SSA countries vis-a-vis China. This section also discusses the implications of the findings for expanding SSA exports of labour-intensive products. Section V concludes the paper with policy implications.

II. EXAMINING TRADE, FDI AND FINANCIAL CONNECTIONS BETWEEN SSA AND CHINA

There is no doubt that China has become a major actor in the development of SSA. China's rapid growth, as well as demand for petroleum and other commodities, has boosted trade, FDI and financial flows to resource-rich countries in SSA. China's external finance to the region reached US\$7.5 billion between 2010 and 2012; these financial flows came in the form of concessional loans, grants and interest-free loans (Information Office of the State Council 2014). Over the past decades, China's loans have been extended to all but a handful of SSA countries, and the country has a sizeable and soaring programme of development finance. Chinese loan finance has expanded rapidly since the early part of the millennium, but it is not as large as most observers seem to believe. From 2000 to 2014, the Chinese regime, contractors, and banks provided US\$86.3 billion worth of loans to state-owned enterprises (SOEs) as well as to the region's regimes. In terms of countries, Angola received the most loans, with US\$21.2 billion in cumulative loans over 15 years, followed by Ethiopia (US\$12.3 billion), Sudan (US\$5.6 billion), Kenya (US\$5.2 billion) and Democratic Republic of Congo (DRC) (US\$4.9 billion). Except for a slight dip in 2010 and a spike in 2013, the yearly amount of loans increased steadily in this period (see Figures 1 and 2).





Source: John Hopkins University, 2016.



Figure 2: Chinese Loans to Africa by Financier, 2000-2014

Source: John Hopkins University SAIS, 2016.

FDI, which the Chinese also call OFDI (Overseas Foreign Direct Investment), has also augmented speedily. According to data from Heritage Foundation and American Enterprise Institute, FDI rose from US\$9 billion in 2006 to US\$29 billion in 2013. As Figure 3 shows, China's direct investment to SSA soared during this period. The upsurge is due to the fact that the Chinese investment has been mostly earmarked for infrastructure and the natural resources sectors. According to the current white paper on China-Africa Trade and Economic Cooperation, between 2009 and 2012, China's direct investment in the region grew at a yearly rate of 20.5 per cent. Flows peaked in 2008 at US\$5.5 billion (although this was a function of the purchase of 20 per cent of the shares of Standard Bank in South Africa) (John Hopkins University SAIS 2016). The top five destinations of Chinese FDI in 2014 were Nigeria, Republic of Congo, Kenya, Zambia and Algeria. In 2012, Chinese enterprises completed project contracts worth around US\$40 billion with SSA partners for construction, ports, bridges, roads, water conservation and electricity (John Hopkins University SAIS 2016). Additionally, China has fostered manufacturing clustering in six special economic zones of four countries in SSA (one each for Ethiopia and Mauritius and two each in Zambia and Nigeria respectively).





Source: Author's calculations using data from the Heritage Foundation.

For several SSA countries, China has become the top destination for exports and top source of imports. Figures 4 and 5 illustrate the speedy growth of this bilateral trade from SSA and China's viewpoints. Both partners have seen significant growth in trade faster than global trade. This growth is motivated partly by China's snowballing demand for natural resources (particularly metals and energy) (Derek *et al.* 2015, Dollar 2016) (see Figure 6). At the same time, SSA exports to China have trebled from around 2.4 per cent to 6.5 per cent of SSA's GDP. Petroleum dominated exports; however, other sectors grew significantly as well on average by 30 per cent per year (Derek *et al.* 2015). In order to foster bilateral trade, China has exempted 60 per cent of goods imported from 30 African countries from tariffs since 2012. On the other hand, SSA too has augmented its share in total Chinese imports to nearly 6 per cent from below 2 per cent (see Figures 7 and 8); for China, exports to the region rose by almost 4 per cent in 2015.¹





Source: Author's calculations using UN COMTRADE database.

¹ Mail & Guardian Africa (2016).





Source: Author's calculations using UN COMTRADE database.





Source: Dollar (2016).



Figure 7: Sub-Saharan Africa's Exports to China, % of SSA GDP

Source: IMF, Director of Trade Statistics and World Economic Outlook databases.



Figure 8: Percentage of Total Chinese Imports

Source: IMF, Director of Trade Statistics and World Economic Outlook databases.

Throughout the 2000s, the demand for primary commodities such as zinc, oil, copper and iron assisted SSA in alleviating poverty. With growth moving away from manufacturing towards consumption, China's appetite for primary commodities will continue to diminish. In 2015, due to low commodity prices and slowing growth in China's economy, the country's import from the SSA region dropped to almost 40 per cent.² China's slowdown likewise contributed to the recent economic slowdown in SSA, where growth fell from 5 per cent in 2014 to 3 per cent in 2016 (Dollar 2016). However, GDP growth in SSA has been good enough in the last two years, as shown in Figure 9. As a result, the region needs to develop its domestic capacity to withstand global volatility, including increasing its manufacturing capacity. Africa commands a mere 1.5 per cent share of the world's total manufacturing output as compared with 21 per cent share of the Asia-Pacific region, 17.2 per cent of East Asia and 22.4 per cent of North America (see Figure 10).





Source: Dollar (2016).

² Ibid.





Source: UNIDO (2015).

2.1 Assessing China-Africa Sectoral Pattern of Investment and Trade

China's trade and investment patterns with SSA have made China the focal point of new anti-Chinese resistance there. Five causal factors overwhelmingly determine China-SSA trade and investment: China's competitive advantage in both labour-intensive and capital-intensive production; SSA's abundant natural resource endowments; China's rapid economic growth; China's emphasis on infrastructure building at home and in SSA; and the emergence of economies of scale in China's shipping and light manufacturing sectors. These five causal factors signify that there is a large compositional difference between their imports and exports. These compositional dissimilarities have geographical implications. While a small number of countries account for a significant share of SSA exports to China, reflecting the dominance of petroleum and minerals in China's bilateral imports,³ exports from China to SSA are less geographically concentrated.

Note: N.A.=North America; A&P=Asia & the Pacific; E.A.= East Asia; L.A.= Latin America.

³Angola accounted for almost half of China's total imports from SSA in 2012, up from 9 per cent in 1992. South Africa was second, accounting for 21 per cent of China's imports from the region in 2012.

In order to comprehend the nature of this bilateral trade, this section categorises trade flows between SSA and China, by employing the factorintensity technique developed by the International Trade Centre (Maswana 2011, van Marrewijk and Hu 2013). The products are divided into five categories: technology-intensive products, natural resource-intensive products, humancapital intensive products, and unskilled labour-intensive products. The individual products, including for each category, are shown in the Appendix.

Figures 11 and 12 give a picture of the overall composition of bilateral trade between SSA and China by factory intensity for the periods 1996-2005 and 2006-2012 respectively. periods. bilateral In both SSA's exports comprise overwhelmingly of primary goods (Figure 11). In addition, the small share of manufacturing goods has turn out to be progressively concentrated in natural resource-intensive products, with the share of human capital-intensive and technology products actually declining. Most importantly, there are virtually no labour-intensive products from SSA exported to China. On the contrary, SSA's imports from China are overwhelmingly dominated by manufacturing products, with a small and decreasing share of primary goods (Figure 12). Mirroring China's soaring sophistication in production, the shares of technology and human capital-intensive goods in China's exports to SSA have increased, whereas those of unskilled-labour intensive goods have dropped.



Figure 11: Total SSA Exports to China, by Sector

Source: Author's calculations using UN COMTRADE database. **Note:** N.R.I.=Natural Resource Intensive; P.P.=Primary Products; H.C.I.=Human Capital

Intensive; U.L.I.=Unskilled Labour Intensive; T.I.= Technology Intensive.



Figure 12: Total SSA Imports from China, by Sector

Note: N.R.I.=Natural Resource Intensive; P.P.=Primary Products; H.C.I.=Human Capital Intensive; U.L.I.=Unskilled Labour Intensive; T.I.=Technology Intensive.

Table I shows bilateral Chinese trade with some chosen SSA countries as well as SSA as a whole, with and without South Africa, by product classification, and as a share of each group or respective country's total bilateral trade with China. In general, for each country, primary products account for the large majority of exports to China, with the share exceeding 90 per cent in most situations, and soaring between 1999-2005 and 2006-2012 (see Table Ia). Kenya is a notable exception; over the two periods, the country's share of primary goods dropped to 71 per cent from 89 per cent. Even Mauritius, which is referred to as the most successful exporter of manufacturing products in SSA, exports only primary goods to China.

The large imbalance in labour-intensive products is shown in Table Ib. In general, the share of labour-intensive products in exports to China is negligible for all the SSA countries. With or without South Africa, this is a mere 0.1 per cent for the SSA countries. On the contrary, imports of unskilled labour-intensive goods was large for all the countries, accounting for around 45 per cent of SSA's

Source: Author's calculations using UN COMTRADE database.

total imports from China in 1999-2005, and 32 per cent in 2006-2012.⁴ Moreover, Tables Ic and Id show the soaring proportion of SSA's bilateral imports in the technology and human capital-intensive classification and the low, and generally, decreasing share of SSA's exports to China in a similar classification. On the part of South Africa, the country particularly experienced a large decrease in both classifications.

TABLE Ia
SUB-SAHARAN BILATERAL TRADE WITH CHINA BY SECTOR
(average share of a country's total exports to or imports from China)
Primary Products

	Imp	orts	Exports	
	(% of total in Chi	mports from na)	(% of total Chi	exports to ina)
	1999-2005	2006-2012	1999-2005	2006-2012
Nigeria	2.2	3.8	99.0	95.6
Tanzania	3.4	1.0	99.0	90.8
Senegal	27.6	34.8	99.4	96.8
Ethiopia	0.8	0.8	75.3	90.3
South Africa	27.6	34.8	38.1	61.5
Cameroon	2.6	5.2	97.9	93.9
Angola	6.4	2.7	99.8	99.0
Benin	0.9	2.3	99.8	92.3
Kenya	1.6	1.2	89.5	70.8
Ghana	6.7	5.9	99.5	98.6
Mauritius	15.0	13.1	98.3	99.3
Total Sub-Saharan Africa below South Africa	6.2	3.9	97.1	91.3
Total Sub-Saharan Africa	6.7	3.8	85.1	84.7

Source: Author's calculations using UN Comtrade database.

⁴Benin's share of these imports is particularly large and Nigeria's low, reflecting Benin's role as a smuggling entry port into Nigeria (Golub 2012). Ethiopia's low share probably mirror its effect of fostering domestic industry with high import barriers.

	Imp (% of total imp	Imports (% of total imports from China)		oorts rts to China)		
	1999-2005	99-2005 2006-2012 1999-2005		2006-2012		
Nigeria	30.9	16.2	0.1	0.0		
Tanzania	38.1	34.0	0.0	0.2		
Senegal	47.9	24.5	0.5	0.0		
Ethiopia	30.8	12.8	0.7	0.6		
South Africa	46.0	38.6	0.2	0.0		
Cameroon	47.4	28.1	0.0	0.0		
Angola	31.0	19.7	0.0	0.0		
Benin	62.4	66.5	0.0	0.3		
Kenya	46.8	35.9	1.1	0.4		
Ghana	43.8	34.3	0.0	0.0		
Mauritius	55.1	57.7	0.3	0.4		
Total Sub-Saharan Africa below South Africa	44.3	32.1	0.1	0.1		
Total Sub-Saharan Africa	44.6	33.9	0.1	0.1		

TABLE Ib
UNSKILLED LABOUR INTENSIVE PRODUCT

Source: Author's calculations using UN Comtrade database.

TABLE Ic

SUB-SAHARAN BILATERAL EXPORTS TO AND IMPORTS FROM CHINA BY SECTOR

(Share of Country total respective bilateral exports and imports) Technology Intensive

	Imports (% of total imports from China)		Exports (% of exports to China)	
	1999-2005	2006-2012	1999-2005	2006-2012
Nigeria	44.6	50.1	0.3	1.3
Tanzania	37.6	39.2	0.6	1.6
Senegal	13.8	24.2	0.1	0.2
Ethiopia	46.2	64.7	0.0	0.1
South Africa	32.7	40.2	10.3	3.3
Cameroon	25.7	37.7	0.0	4.1
Angola	41.5	44.0	0.0	0.0
Benin	23.1	17.2	0.2	0.0
Kenya	33.3	39.5	2.9	10.6
Ghana	30.4	35.1	0.0	0.1
Mauritius	12.7	13.0	1.2	0.2
Total Sub-Saharan Africa below South Africa	32.6	40.1	0.4	0.6
Total Sub-Saharan Africa	32.4	40.1	2.5	1.2

Source: Author's calculations using UN Comtrade database.

	Imports (% of total imports from China)		Exports (% of exports to China)	
	1999-2005	2006-2012	1999-2005	2006-2012
Nigeria	19.5	21.7	0.0	0.0
Tanzania	19.3	21.3	0.0	0.0
Senegal	8.8	12.4	0.0	0.0
Ethiopia	20.9	19.0	0.0	0.0
South Africa	11.7	14.4	14.5	2.4
Cameroon	19.9	21.9	0.0	0.1
Angola	16.3	21.1	0.0	0.0
Benin	13.0	12.8	0.0	0.0
Kenya	16.7	19.7	2.4	0.1
Ghana	16.3	20.4	0.0	0.1
Mauritius	12.6	12.1	0.1	0.1
Total Sub-Saharan Africa below South Africa	14.1	17.6	0.1	0.0
Total Sub-Saharan Africa	14.9	18.8	0.1	0.0

TABLE Id HUMAN CAPITAL INTENSIVE

Source: Author's calculations using UN Comtrade database.

Table Ie shows that natural resource-intensive goods join the only improving sector for SSA's manufacturing exports to China. However, these remain small for several countries, with the largest upsurge seen in Nigeria and Angola. Figure 13 shows that Chinese overseas investment rests heavily on primary goods, with energy and metals accounting for half of the value of FDI inflows into SSA over 2006-2014. Another significant sector for Chinese overseas investment is infrastructure, particularly transport. On the other hand, there is no significant Chinese investment in labour-intensive manufacturing.

Natural Resource Intensive						
	Imp	orts	Exports			
	(% of total i	mports from	(% of total	exports to		
	Chi	ina)	Chi	ina)		
	1999-2005	2006-2012	1999-2005	2006-2012		
Nigeria	2.8	8.3	1.6	6.1		
Tanzania	1.7	4.4	1.5	3.0		
Senegal	2.0	4.1	0.5	3.6		
Ethiopia	1.3	2.6	0.6	2.0		
South Africa	2.7	3.2	2.2	3.4		
Cameroon	4.4	7.1	2.6	5.7		
Angola	4.8	11.5	0.4	8.1		
Benin	0.5	1.2	0.2	0.9		
Kenya	1.6	3.6	0.9	2.4		
Ghana	2.7	4.2	1.2	3.8		
Mauritius	4.6	4.1	0.0	0.0		
Total Sub-Saharan Africa	2.0	5.1	1.0	3.7		
below South Africa						
Total Sub-Saharan Africa	2.2	4.6	1.2	3.6		

TABLE Ie SUB-SAHARAN BILATERAL EXPORTS TO AND IMPORTS FROM CHINA BY SECTOR

(Share of Country total respective bilateral exports and imports)

Source: Author's calculations using UN Comtrade database.

Figure 13: Cumulative Chinese FDI in SSA, 2006-2014 ((\$ billion)
---	--------------



There are diverse arguments on the effects of China's overseas investment in SSA. Mentioning the "Beijing Consensus," some experts claim that there is no similarity between Western FDI and Chinese FDI, in that the Chinese FDI is driven by political considerations. Alden and Alves (2009) observe that economic and political consideration can as well coincide, insofar as China's trade with SSA is looking for resources security. According to Eisenman (2012), proponents of non-economic drivers assert that shared ideals of liberalism have made China turn towards SSA, which is home to numerous authoritarian governments. Some experts (e.g., de Grauwe et al. 2012 and Asongu and Aminkeng 2013) opined that China prefers to have more import reliance on SSA countries with poorer governance records. On the other hand, Lin (2012) asserts that China's state-sponsored capitalist model makes it problematic to distinguish between political and economic motivations for investment and trade. Irrespective of these debates, China's trade is frequently viewed as in line with the Heckscher-Ohlin theory, which predicts that bilateral trade hinges on the relative factor abundance between trade cohorts.

With respect to the Heckscher-Ohlin theory, van Marrewijk and Hu (2013) assert that the composition of China-SSA bilateral trade mirrors China's comparative advantage in labour-intensive manufactures. Golub and Hayat (2015) believe that factor endowment-based explanations of China-SSA trade are not consistent with the fact that a significant number of SSA countries have few natural resources, and several countries have a large reservoir of underemployed workers with very low earnings. Therefore, despite the fact that Chinese demand for natural resources has profited SSA countries (Jacobs 2012), the question remains why SSA is not able to compete with China in manufacturing in spite of soaring wages in China and abundance of underemployed labour in SSA. To address this question the study proposes a framework based on relative unit labour costs technique.

III. METHODOLOGY AND DATA

3.1 Model Specification

In a globalised context, a nation's global competitiveness in the industrial sector hinges on its cost of production relative to competitors. This section discusses the model specifications to examine SSA industrial competitiveness with China. The models specified are estimated by applying a statistical approach, for examining competitiveness based on relative unit labour costs.

where α signifies the unit labour requirement (that is, the inverse of output) in manufacturing, \mathcal{L} is labour employment, and \mathbb{Q} is *value* added.

Assuming marginal productivity, and a to be constant with regard to variations in \mathcal{L} .

$$a = \frac{\mathcal{L}}{Q} \tag{1}$$

where w signifies the average labour compensation per worker in manufacturing.

Let's assume labour is taken as the only factor of production (or other factor costs are not varying across nations), average costs of manufacture are equal to unit labour costs, the product of the unit labour prerequisite and average compensation, αw .

The following expressions are in domestic currency, foreign unit labour costs which are a *w *e and are described below:

where* denotes the foreign nation, and *e* denotes the exchange rate (domestic currency per unit of foreign currency).

A nation's global competitiveness in the industrial sector hinges on its relative unit labour cost:

Relative Unit Labour Cost =
$$\frac{aw}{a^*w^*e} = \left(\frac{a}{a_*}\right)\left(\frac{w}{w^*e}\right)$$
 (2)

Following the above expression, equation (2) shows that relative unit labour costs will be able to decompose into relative wages and relative productivity, measured in a common currency. The host nation will have a comparative advantage in manufacturing, when relative unit labour cost is less than 1, that is to say, its unit labour cost is less than those of its trading cohorts.

On the other hand, equation (2) can be expressed as:

Relative Unit Labour Cost =
$$\frac{aw}{a^*w^*e} = \frac{a}{a^*} \div \frac{w}{w^*e} \div = \frac{a_i}{a^*} \div \frac{w_i}{we^{ppp}} \div \frac{e^{ppp}}{e}$$
 (3)

where e^{ppp} denotes the purchasing power parity (ppp) exchange rate for manufacturing; this is well-defined as the ratio of the domestic to foreign price levels for manufactured products, p and, p^* correspondingly, that is to say, $e^{ppp} = \frac{p}{p^*}$ has been substituted by the definition of e^{ppp} ; this is then placed into the middle term of the right-hand side of equation (3). This produces the following equation:

Relative Unit Labour Cost =
$$\frac{a}{a^*} \div \frac{w/\mathcal{P}}{w^*/\mathcal{P}^*} \div \frac{e^{\mathcal{P}\mathcal{P}\mathcal{P}}}{e} \div$$
 (4)

The competitiveness of any nation in relation to other nations hinge on the three terms in equation (4):

The first term is based on the labour productivity of the host nation in relation to other nations;

The second term is based on real labour compensation in the host nation in relation to those of other nations.⁵ or equivalently, the nation's relative nominal labour compensation assessed at e^{ppp} ;

The third term is based on the level of the bilateral exchange rate in relation to its purchasing power parity (ppp) level.

3.2 Variables Description and Data Sources

In order to assess SSA Industrial Competitiveness with China, the study develops the relative unit labour cost technique, which is constructed in two steps. The construction of the complete data set includes the relative labour costs for individual SSA nations and China in relation to the United States. The purpose of the study is to compare the relative unit costs of individual SSA countries to the relative unit labour costs of China, and to evaluate their relative competitiveness in manufacturing. Data were collected in order to calculate exchange rates and manufacturing output. The output is calculated as manufacturing value added per worker, deflated by a manufacturing value-added deflator, converted to US dollars at PPP exchange rates.

Wage rate is defined as total labour compensation per worker, converted to US dollars at the market exchange rate. Deviations of exchange rates from PPP do affect relative labour costs, so it is appropriate to use the market exchange rate in converting wages. The depreciation of currency consequently tends to improve international competitiveness by lessening labour costs in relation to labour productivity. For this study, primary data on wage rate and manufacturing output are from the United Nations Industrial Development Organisation (UNIDO) Industrial Statistics database. This database reports labour compensation, employment and nominal value added for various countries through 2010, comprising some African countries and China.

⁵ Labour compensation is deflated by producer prices for manufacturing in equation (4) rather than consumer prices, so it is not an indicator of workers' welfare

Data from the Industrial Statistics database were supplemented with national data for Senegal and the United States. The study further employs data in the World Bank's *World Development Indicators* to calculate the series for nominal value added in manufacturing. This calculation was done by converting to real terms and deflating by manufacturing value added deflators derived from measures of nominal and real manufacturing value added.⁶

This paper uses two sources for the PPP exchange rate: the Conference Board manufacturing purchasing power parities/University of Groningen, and the International Comparison Project (ICP) purchasing power parities (PPPs) for traded products. Although manufacturing-specific PPPs are ideal, and are available for China, with the exclusion of South Africa, they are not available for numerous SSA countries.

IV. COMPARING SSA AND CHINA UNIT LABOUR COSTS, MANUFACTURING PRODUCTIVITY, AND WAGES

This section compares unit labour costs, manufacturing productivity, and wages in a selection of SSA countries with China.⁷ When compared to other numerous nations, manufacturing wages are very high in SSA in relation to per capita GDP (see Table II). Furthermore, the study shows that, in 2010, China and many other Asian countries had a ratio of manufacturing wages to per capita GDP at or less than 1.0.

⁶The World Bank measures of manufacturing value added differ from UNIDO's, as the former are based on a national accounts concept and the latter are census-based. See Ceglowski and Golub (2007, 2012) for further discussion. However, the ratios of nominal to real value added are likely to be less dissimilar across countries than the levels of the two alternative measures.

⁷Countries are selected based on data availability.

	20	000	2010		
	Level in US\$	Relative to Per Capita GDP	Level in US\$	Relative to Per Capita GDP	
Asia					
Malaysia	4405	1.1	6548	0.7	
India	1356	3.0	2619	1.8	
Vietnam	NA	NA	1727	1.3	
Bangladesh	NA	NA	680	1.6	
Indonesia	929	1.2	1897	0.6	
China	1016	1.1	4770	1.1	
North Africa					
Morocco	4123	3.2	6654	2.4	
Tunisia	4066	1.8	5455	1.3	
Egypt	2028	1.3	3453	1.2	
Eastern Europe					
Poland	5829	1.1	10162	0.8	
Czech Republic	3964	0.7	12673	0.7	
Latvia	3689	1.1	9191	0.8	
Latin America					
Mexico	8048	1.2	7310	0.8	
Brazil	5822	1.6	10918	1.0	
Colombia	4096	1.6	4680	0.8	
Sub-Saharan Africa					
Tanzania	2296	7.5	1581	3.0	
Mauritius	3254	0.8	6285	0.8	
Senegal	3680	7.8	6450	6.5	
Burundi	NA	NA	3261	14.9	
South Africa	7981	2.6	12331	1.7	
Ghana	1832	4.9	NA	NA	
Malawi	436	2.8	2045	5.7	
Cameroon	3088	5.3	NA	NA	
Kenya	2118	5.2	2854	3.6	
Ethiopia	771	6.3	807	2.4	

TABLE II ANNUAL MANUFACTURING WAGES SELECTED COUNTRIES IN AFRICA AND OTHER REGIONS, CURRENT US\$

Source: Per Capita GDP from World Bank World Development Indicators.

That is to say, the average twelve-month manufacturing wages are approximately equal to per capita income in numerous Asian countries. This is similar in Latin America and Eastern Europe. However, this is different in SSA, where wages are typically several times higher than the per capita GDP. Mauritius, and, to a lesser extent South Africa being the two exceptions. Since 2000, the ratio of wages to per capita GDP has dropped in SSA, but still remained very high as of 2010.

Figure 14 and Table III compare the unit labour costs in the manufacturing of individual SSA nations to China's unit labour costs. This study shows two sets of relative unit labour cost measures, based on the two alternative estimates of purchasing power parity exchange rates.⁸ ICP-based is labeled as the first set, which is based on tradable-products, i.e. PPP (exports and imports) from the International Comparison Project (ICP). The International Comparison of Output and Productivity (ICOP) is labeled as the second set of estimates; it employs manufacturing PPP values, derived from the University of Groningen International Comparison of Output and Productivity project for those countries for which such data are accessible (South Africa and China), as well as the ICP traded product values for other nations. The second estimates show higher values; these are chiefly a result of the fact that the US-China PPP exchange rate in ICOP is considerably lower than that of the ICP.

Figure 14: Relative Unit Labour Cost in relation to China, 2003-2010, a. ICP-based measures



Note: S.A. stands for South Africa.

⁸The purchasing power parity exchange rates are used in constructing relative productivity.





In both sets of estimates, relative unit labour costs with regard to China were very high in key SSA countries in the early 2000s (see Figure 14). However, since the 2000s, this has reduced for all countries although still very high as of 2010. The majority have relative unit labour costs exceeding 1, signifying their unit labour costs in manufacturing, surpassing those in China; however, there were two exceptions, Tanzania and Ethiopia. According to the ICOP-based measures, as of 2010, the unit labour costs for Tanzania and Ethiopia were at rough parity with China, and substantially below China as per the ICP-based measures (Table III).

RELATIVE UNIT LABOUR COST IN RELATION TO CHINA, 2010						
	ICP-based measures	ICOP-based measures				
Tanzania	0.56	0.94				
South Africa	1.52	3.01				
Senegal	1.38	2.30				
Kenya	1.21	2.01				
Ethiopia	0.61	1.01				
Mauritius	1.61	2.68				
Malawi	1.75	2.92				

TABLE III RELATIVE UNIT LABOUR COST IN RELATION TO CHINA, 2010

Source: Author's calculations using United Nations Industrial Development Organization (UNIDO) Industrial Statistics database.

Note: Relative Unit Labour Cost > 1.0 means African countries have higher unit labour costs than China.

Table IV shows that both wages and productivity growth in China were robust, with wage growth outpacing productivity growth and pushing up China's unit labour costs. In most cases, manufacturing productivity growth in SSA economies was substantially slower than in China.

	Productivity Growth	Real Wage Growth	Real Appreciation vis-à-vis US dollar	Relative Unit Labour Cost vis-à-vis USA	Relative Unit Labour Cost vis-à- vis China
Tanzania	8.4	0.6	1.8	-4.2	-12.0
Mauritius	5.2	4.8	3.1	4.7	-3.1
South Africa	3.0	2.0	4.6	5.6	-2.2
Kenya	1.5	-0.7	5.0	4.7	-3.1
Mauritius	5.2	4.8	3.1	4.7	-3.1
China	11.7	12.9	4.7	7.8	N.A
Senegal	2.2	0.3	6.7	6.8	-1.0

TABLE IV PRODUCTIVITY, REAL WAGES, REAL EXCHANGE RATES, AND RELATIVE UNIT COSTS, ANNUAL PER CENT CHANGES, 2000-2010

Source: Author's calculations using United Nations Industrial Development Organization (UNIDO) Industrial Statistics database.

However, in the SSA economies, the real wage growth was even slower, pushing down unit labour costs. This implies that the development of SSA manufacturing competitiveness mirrors both productivity growth in SSA countries and China's unit labour cost that outpaced wages. The factors underpinning the bilateral relative unit labour cost levels with respect to China over 2000-2010 are plotted in Figures 15a-15f. It consists of the real wages and the real bilateral exchange rate of the study sample of SSA countries in relation to China, as well as relative productivity. These figures show that relative productivity and relative real wages in the SSA economies are both high and generally decreasing, with relative real wages consistently surpassing relative productivity.



Figure 15A: Levels of Productivity, Real Wages and the Real Bilateral Exchange Rate Relative to China, ICP-based measures

Note: P.R=Productivity ratio; R.E.R.=Real exchange ratio; R.W.R.=Real wage ratio.

Figure 15B: Levels of Productivity, Real Wages and the Real Bilateral Exchange Rate Relative to China, ICP-based measures Kenya



Note: P.R.=Productivity ratio; R.E.R.=Real exchange ratio; R.W.R.=Real wage ratio.

Figure 15c: Levels of Productivity, Real Wages and the Real Bilateral Exchange Rate Relative to China, ICP-based measures Mauritius



Note: P.R.=Productivity ratio; R.E.R.=Real exchange ratio; R.W.R.=Real wage ratio.





Note: P.R.=Productivity ratio; R.E.R.=Real exchange ratio; R.W.R.=Real wage ratio.



Figure 15e: Levels of Productivity, Real Wages and the Real Bilateral Exchange Rate Relative to China, ICP-based measures South Africa



Figure 15f: Levels of Productivity, Real Wages and the Real Bilateral Exchange Rate Relative to China, ICP-based measures Tanzania



Note: P.R.=Productivity ratio; R.E.R.=Real exchange ratio; R.W.R.=Real wage ratio.

Notably, there is no clear trend in the real bilateral exchange rate between China and SSA over 2000-2010. But, there are alterations in the exchange rate that contributed to the decreasing relative unit labour costs for Tanzania, Ethiopia, and Mauritius; all these countries experienced real appreciation that was less than the real appreciation of China's currency, effectively resulting in a real depreciation against the Renminbi. The study found numerous key results. One of the first findings shows that SSA manufacturing wages are very high in relation to per capita GDP. The second finding shows that SSA manufacturing productivity and real wages have been both well above China's levels, with the real wage differential surpassing the productivity differential.

Thus, the study also finds that the unit labour costs in this sample of SSA countries have been significantly higher than in China. African competitiveness has been affected by high labour costs, implying, to a certain extent, Africa's inability to develop its labour-intensive manufacturing. The third finding shows that, in recent years, the growth of real wages and productivity in SSA manufacturing has lagged behind the growth in that of their Chinese counterparts. The fourth finding shows that relative real wages have decreased more speedily than relative output for the study sample of SSA economies, which can boost their relative competitiveness. Unit labour costs (such as in Tanzania and Ethiopia) are currently at or even less than in China. The case is different for other SSA countries because the relative unit labour costs continue to remain elevated.

4.1 Can Sub-Saharan African Countries Compete?

The preceding section specifies that relative unit labour costs have dropped considerably in SSA in relation to China as a result of both productivity growth that surpassed wage growth and soaring wages in China. Wages are rising fast in China– many economists believe that China has hit a stage in its development, at which demand for labour starts to grow faster than supply, creating labour shortages, and pushing up the price of labour (something economists refer to as a Lewis Turning Point). This refers to the gradual shift of a manufacturing sector toward higher-value output, that is affected by the cost of production, surpassing gains in productivity. The long-term trend of offshoring China's low-end labourintensive manufacturing sector is thus starting to emerge. While China will remain a very competitive manufacturing economy at least over the medium term, rising production costs will encourage and force Chinese firms to relocate their operations abroad. A part of this offshoring could find its way to SSA (Davies *et al.* 2014). Have SSA economies been able to take advantage of the rising Chinese costs?

Although there are some reports of snowballing FDI in manufacturing, these investments are oriented towards the domestic market and are small, with the exclusion of Ethiopia (Dinh *et al.* 2012). SSA's potential competitiveness in light manufacturing is based on two advantages. The first is a labour cost advantage. In Ethiopia, for example, labour productivity in some well-managed firms can approach levels in China and Vietnam. At the same time, Ethiopia's wages are only a quarter of China's and a half of Vietnam's, and its overall labour costs are lower still. SSA's second advantage is an abundance of natural resources that supply raw materials such as skins for the footwear industry, hard and soft timber for the furniture industry, and land for the agrobusiness industry.

The study evaluates the circumstances by investigating SSA's success in exporting clothing and basic labour-intensive exports that have served as the first gateway to world export markets for some countries. The shares of global clothing exports by country and region are shown in Table V, by comparing other regions with sub-Saharan African countries. The presence of SSA countriess in the global export market for clothing has never been large, and has dropped further recently. A number of low-income African countries take advantage from trade preferences under the African Growth and Opportunity Act (AGOA) enacted in 1999. These comprise Madagascar and Lesotho and, to a lesser degree, Kenya and Swaziland. However, with the end of the Multi-Fiber Agreement in 2005, AGOA preferences have apparently not been enough to sustain African countries' competitiveness, and their modest share of exports in early 2000 declined.

(I EK	CENT OF W	OKLD EAI O	K 15)	
	2000	2005	2010	2013
China and India				
India	3.02	3.14	3.18	3.66
China	18.25	26.65	36.73	38.55
Low-Income Asia				
Vietnam	0.92	1.68	2.94	3.74
Bangladesh	2.56	2.48	4.20	5.11
Cambodia	0.49	0.79	0.86	1.11
Myanmar	0.40	0.12	0.10	0.10
Middle-Income East Asia				
Thailand	1.90	1.47	1.22	0.89
Indonesia	2.40	1.78	1.93	1.67
Malaysia	1.14	0.89	1.10	1.00
High-Income East Asia				
Korea	2.54	0.93	0.46	0.46
Taiwan	1.53	0.56	0.28	0.19
Latin America				
Mexico	4.37	2.63	1.23	0.98
Dominican Republic	1.29	0.68	.0.16	0.18
El Salvador	0.85	0.61	0.48	0.45
Honduras	1.15	1.00	0.82	0.87
Middle-Income Africa				
South Africa	0.11	0.06	0.03	0.04
Mauritius	0.48	0.27	0.19	0.17
North Africa				
Tunisia	1.13	1.12	0.87	0.61
Egypt	0.16	0.07	0.36	0.30
Morocco	1.22	1.02	0.85	0.68
Sub-Saharan Africa				
Tanzania	0.00	0.00	0.00	0.00
Madagascar	0.16	0.12	0.10	0.08
Swaziland	0.06	0.06	0.01	0.01
Kenya	0.00	0.07	0.05	0.06
Senegal	0.00	0.00	0.00	0.00
Ghana	0.00	0.00	0.00	0.00
Nigeria	0.00	0.00	0.00	0.00
Ethiopia	0.00	0.00	0.00	0.00
Lesotho	0.08	0.16	0.12	0.09

TABLE V CLOTHING EXPORTS, BY REGION AND COUNTRY (PERCENT OF WORLD EXPORTS)

Source: Author's calculations using WTO Statistics database.

Numerous other African countries, comprising relatively successful countries like Tanzania, Ethiopia and Ghana entered the apparel export market in any significant volume since 2013. Moreover, middle-income South Africa and Mauritius have seen their moderate shares of the market drop more recently. Based on the clothing market, there is no sign from current data to signify that African countries are turning out to be successful exporters of labour-intensive manufactures, despite China's falling competitiveness. Instead, the shares of other low-income Asian countries are snowballing in the face of high Chinese costs. Thus, SSA countries are still finding it difficult to take advantage of China's falling competitiveness. Why are SSA countries not able to capture this opportunity?

The first answer to this question is *based on the fact* that unit labour costs in SSA countries continue to soar in relation to China and other Asian countries in *numerous* cases. Productivity, wages and unit labour costs in manufacturing for the Asian and SSA countries relative to U.S. are presented in Table VI; this is the part for which data are available.⁹ Comparatively, while other SSA countries have high relative labour costs, the scenario was different for Tanzania and Ethiopia, where relative unit labour costs turned out to be very competitive.

$_$ ASIA, RELATIVE TO THE UNITED STATES, 2010 (THE UNITED STATES = 1)				
	Relative Productivity	Relative Wage	Relative Unit	
			Labour Cost	
Asia				
Vietnam	0.03	0.04	1.23	
India	0.12	0.06	0.50	
Bangladesh	0.02	0.02	0.70	
China	0.18	0.11	0.61	
Indonesia	0.08	0.04	0.55	
Sub-Saharan Africa				
Tanzania	0.06	0.04	0.57	
Senegal	0.10	0.15	1.41	
South Africa	0.18	0.28	1.56	
Kenya	0.05	0.06	1.23	
Malawi	0.03	0.05	1.79	
Mauritius	0.09	0.14	1.64	
Ethiopia	0.03	0.02	0.53	

TABLE VI PRODUCTIVITY, WAGES AND UNIT LABOUR COSTS IN AFRICA AND ASIA, RELATIVE TO THE UNITED STATES, 2010 (THE UNITED STATES = 1)

Source: Author's calculations using UNIDO Industrial Statistics database.

⁹These estimates use the ICP values of the purchasing power parity exchange rate for all reported countries.

Table VI shows that numerous Asian countries have low relative unit labour costs in relation to the United States, indicating that SSA countries have very high unit labour costs in relation to these Asian competitors. The second answer to the above question is connected with the fact that labour costs are not the only source of competitiveness. The business environment counts as well; for that reason, SSA countries have a tendency to perform poorly in the areas of institutional quality, infrastructure and corruption (Eifert *et al.* 2008, Golub *et al.* 2011). Golub and Hayat (2015) gave a very good example by making reference to Tanzania and Ethiopia, *the two countries with favourable* unit labour costs. They state that power outages are frequent, ports are slow to process containers, and roads are of poor quality.

V. CONCLUSIONS AND POLICY IMPLICATIONS

Although SSA economies have experienced remarkable growth, this has been substantially based on capital-intensive sectors like telecommunications and minerals, with the consequently limited growth of the *formal sector*. This is different *from* Asian dependence on labour-intensive manufacturing exports, which have added dramatically to alleviating poverty as well as enhancing job opportunities. In particular, China has turned out to be a leading exporter of *manufacturing* products to SSA, and its bilateral trade with SSA is highly unbalanced in the sense that China is overwhelmingly exporting manufacturing products to SSA, while importing minerals from the region. Recently, China's wages have been soaring and outpacing productivity growth, lessening China's competitive advantage in manufacturing as well as opening the door to inroads by lower-income countries.

The study finds that SSA's global competitiveness has improved, but continues to be largely unfavourable in relation to China, as measured by relative unit labour costs. Real wages in SSA formal manufacturing are very high in relation to per capita income. High real wages in formal manufacturing lessen competitiveness in labour-intensive manufacturing. Weak institutions as well as poor infrastructure adversely affect the business environment for overseas investment. Notably, low-income Asian countries have displayed a greater capability to enter into the international manufacturing than SSA, particularly in the crucial apparel sector. Dinh *et al.* (2012) *assert* that, based on China's leading presence in SSA, the possibilities for the region to compete in low-skill manufacturing are not encouraging, despite some glimmers of progress in a few

nations like Ethiopia. On the contrary, Golub *et al.* (2008) assert that African countries may have greater possibility to boost labour-intensive exports in other sectors, especially agriculture. Traditional primary goods exports, however, *share* most of the features of manufacturing, both in terms of their possibilities to spur job creation and growth, and the institutional constraints that they encounter in attaining this possibility.

Most of the critical aspects of manufacturing exports (fostering development, reducing poverty) apply to traditional primary goods and non-traditional primary goods as well. These comprise access to the state-of-the-art foreign technology via FDI outsourcing, consequently increasing producer incomes and the possibilities for technological improvement. However, this also requires achieving global competitiveness, implying critical role of low-cost labour and a favourable environment for investment. Golub and McManus (2009) and Mbaye and Gueye (2014) assert that for agriculture, especially phytosanitary and sanitary norms in developed country markets are a major obstacle to successful exporting, similar to the demanding specifications of international buyers of manufacturing products. The success of SSA in exporting labour-intensive goods depends on developing the business environment as well as enhancing competitiveness via augmented labour wage moderation and labour productivity. Above all, while some are positioned better than others, all of the countries examined will need to improve in several areas if they are going to attract high levels of investment into export-based manufacturing sectors. African countries should act to take advantage of recent trends such as African regional growth and rising wages in China.

REFERENCES

- Alden, C. and A. C. Alves. 2009. "China and Africa's Natural Resources: The Challenges and Implications for Development and Governance." *Occasional Paper 41*, South African Institute of International Affairs.
- Asongu, S. A. and G. A. Aminkeng. 2013. "The Economic Consequences of China– Africa Relations: Debunking Myths in the Debate." *Journal of Chinese Economic* and Business Studies, 11(4): 261-277.
- Ceglowski, J. and S. Golub. 2007. "Just How Low Are China's Labour Costs?" *The World Economy*, 30 (4): 597-617.
 - _____2012. "Does China Still Have a Labour Cost Advantage?" *Global Economy Journal*, 12(3)
- De Grauwe, P., R. Houssa and G. Piccillo. 2012. "African Trade Dynamics: Is China a Different Trading Partner?" *Journal of Chinese Economic and Business Studies*, 10(1): 15-45.
- Derek, A., Jorge Ivan C. K., P. Drummond, E. Petro and Dirk M. 2015. "Spillovers from China onto Sub-Saharan Africa: Insights from the Flexible System of Global Models (FSGM)." IMF Working Paper No. W15/221. International Monetary Fund, Washington, D.C.
- Dinh, H. T., V. Palmade, V. Chandra and F. Cossar. 2012. *Light Manufacturing in Africa: Targeted Policies to Enhance Private Investment and Jobs.* Washington, D.C.: World Bank.
- Davies M., P. Draper and H. Edinger 2014. "Changing China, Changing Africa: Future Contours of an Emerging Relationship." Asian Economic Policy Review, 9 (2): 180–197.
- Dollar, David. 2016. China's Engagement with Africa: From Natural Resources to Human Resources. John L. Thornton China Center at Brookings.
- Eifert, B., A. Gelb and V. Ramachandran. 2008. "The Cost of Doing Business in Africa: Evidence from the Investment Climate Data." World Development, 36(9): 1531-1546.
- Eisenman, J. 2012. "China–Africa Trade Patterns: Causes and Consequences." *Journal of Contemporary China*, 21(77): 793-810.
- Golub, S. 2012. "Entrepot Trade and Smuggling in West Africa: Benin, Togo, and Nigeria." *The World Economy*, 35(9): 1139-1161.
- Golub, S. and F. Hayat. 2015. "Employment, Unemployment and Underemployment in Africa." In C. Monga and J. Lin (eds.) *Oxford Handbook of Africa and Economics*. forthcoming.

- Golub, S. and J. McManus. 2009. "Horticulture Exports and African Development." Paper prepared for UNCTAD.
- Golub, S., A. Bernhardt and M. Liu. 2011. "Development and Trade Strategies for Least Developed Countries." Paper prepared for UNCTAD.
- Golub, S., S. A. O'Connell and W. Du. 2008. "Export Competitiveness and Development in LDCs: Policies, Issues, and Priorities for Least Developed Countries." Paper prepared for UNCTAD.
- Information Office of the State Council, 2014, "China's Foreign Aid (2014)." Information Office of the State Council of the People's Republic of China White Paper (Beijing, China) (July 2014), available at <u>http://news.xinhuanet.com/</u> english/china/2014-07/10c_133474011.htm
- Jacobs, B. 2012. "A Dragon and a Dove? A Comparative Overview of Chinese and European Trade Relations with Sub-Saharan Africa." *Journal of Current Chinese Affairs*, 40(4): 17-60.
- John Hopkins University SAIS China-Africa Research Initiative. 2016. "Data: Chinese Investment in Africa." Available at: www.sais-cari.org/data-chinese-and-american-fdi-to-africa.
- Lin, J. Y. 2012. New Structural Economics: A Framework for Rethinking Development and Policy. Washington, D.C.: World Bank Publications.
- Mail & Guardian Africa. 2016. "China's imports from Africa shrank nearly 40 per cent in 2015 – it could get really painful for these countries." Available at www.mgafrica.com/article/2016-01-13-chinas-imports-from-africa-plummet-in-2015-officials
- Maswana, J. C. 2011. "Emerging Patterns in Sino-African Trade and Potentials for Enterprise Development." A paper presented to the *China-OECD/DAC Study Group Conference on Enterprise Development* at Addis Ababa, February.
- Mbaye, A. A. and A. Gueye. 2014. "SPS Standards and International Competitiveness in Africa: The Case of Senegal." In M. Jansen, M. S. Jallab and M. Smeets (eds.), *Connecting to Global Markets*. Geneva: World Trade Organization.
- Van Marrewijk, C. and S. Hu. 2013. "An Empirical Analysis of the China-Africa Trade Puzzle: The Role of China's Trade Policies." *unpublished working paper*.
- World Bank. 2015 "Lessons for Africa from China's Growth." Available at: www.worldbank.org/en/news/speech/2015/01/13/lessons-for-africa-from-chinasgrowth.

APPENDIX

Group	Constituents	SITC Codes
Primary	Food, Beverages, Minerals, Crude Oil, Animal and Vegetable Oils	0,1,2,32,333,34,35,4
Natural Resources Intensive	Leather Manufactures, Lime, Cement, Clay, Mineral Manufactures, Precious Stores, Pig Iron, Non Ferrous Metals	61,63,661,662,663,667,671,68
Human Capital Intensive	Dyeing materials, essential oils, Rubber Manufactures, Steel Ingots, Telecommunications equipment Photographic apparatus, watches	53,55,62,672,673,674,675,676,677,678, 679,69,761,762,73,885 894,895,896,897,898,899
Unskilled Labour Intensive	Textile yarn, Glass, Prefabricated buildings plumbing, heating, furniture, Travel goods, apparel, footwear	65,664,665,666,81,82,83,84,85,894,895
Technology Intensive	Organic and inorganic chemicals, fertilizers, plastics	51,52,54,56,57,58,59,71,72,73,74,75,76 77,792,87,881,882,883 884, 892, 893

DEFINITION OF PRODUCT GROUPS