China and India Growth Surge: Is it a curse or blessing for Africa? The Case of Manufactured Exports

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Abstract

In this paper, we address two major questions. First, the question of whether China and India are displacing the African manufacturing export from the third market. Second, whether there is an evidence of shifting comparative advantage from China and India to Africa. We employed a gravity model with a panel data using thirteen African exporter clothing and apparels for the period 1995-2005 to answer the first question. To answer the second question, we used a flying-gees model and estimated Spearman's rank correlation coefficients on indices of the revealed comparative advantage vectors of the African exporters and China and India for the same period. Both the gravity and flying-geese models predicted similar outcome. We found that there is strong evidence that China has been displacing African manufactures from the third market while – India has been complementing it in the early years of the study. However, the overall third market impact of China and India has been that of complementarity in the later years of the study period. This result is found to vary across countries. Furthermore, we found an evidence of shifting comparative advantage from China and India to Africa as the flying-geese theory predicts, South Africa being the leading goose followed by Kenya.The major implication of the study is that, in the world where China and India are reshaping the global economic order dynamically, the outcomes of the traditionally received wisdom of trade liberalization and industrialization policies through export promotion may be uncertain and requires strategic thinking.

Key words: *China; India; Africa, Manufacturing exports*
JEL Classification 040, 053

I. Introduction

Over the last twenty years, China has grown at the rate of nearly 10 per cent per annum, driven primarily by an expansion of the modern, industrial export oriented sector. With some 20 million Chinese workers moving from rural underemployment to the modern sector annually, the impact is akin to adding

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another middle sized-industrial economy to the world economy each year (Eichengreen *et al*, 2004). According Eichengreen *et al*, 2004, between 200 to 300 million workers still would be reallocated from rural underemployment for years to come, this is not simply a one-time shock, but an ongoing process that should continue for a decade and more. Similarly India's economy has also been growing at about 6 percent per annum in the same period. Between 1990 and 2002 trade as a share of GDP almost doubled in India and increased by more than two-thirds for China (Eichengreen *et al*, 2004).

The rise of China and India is both a threat and an opportunity for Africa. Trade between African and China surged from $3 billion in 1995 to $32 billion in 2005 though Africa makes up only 2.3 % of China's world trade. The latter constitutes about 10% of Africa's world trade, however. This trade is expected to double by 2010. For some African countries exports to China is becoming significant share of their world export (for instance in 2005 it constituted 70% for Sudan which was only 10% in 1995, for Burkina Faso about 33% which was none before; for Ethiopia about 13% which was none before). The pattern of trade is increasingly shifting from African traditional partner, the EU, whose share has declined from 44 to 32% between 1995 and 2005. The US share, however, has also increased from about 11% to 19% between the same periods (1995 to 2005). China is also contributing about $1 billion out of 15 billion the continent received as investment in 2004. For the some countries China's investment is huge: China promised to invest about $4 billion in Nigeria (in return for oil rights) and offer Angola $4 billion concessional credit – the latter debt being to be paid in oil (The Encomiast, 28/10/06)[2].

It also seems that, China and India's recent emergence as key net importers of commodities from Africa means that global commodity markets are likely to be the main channels through which the impact of China and India's ascendancy has been (and will be) felt on the African continent (Eichengreen *et al*, 2004). African countries which export labor-intensive manufactures may also face competition in the third market where China and India are active – this seems a potential threat to Africa. There are also opportunities for some countries to increase exports to China and India as incomes in China and India increase (Jenkins *et al*, 2005:ii). But we do not know exactly what the balance of these challenges is and opportunities are in Africa.

Most studies about the impact of the Asian drivers are on Latin America and Asia, studies on African being limited (see footnote 1, however).As Chen *et al* (2005) noted, the sheer size of the Asian drivers, their phenomenal rate of growth and their growing economic and political power entail that they will re-

[2] The Chinese and Indian trade and investment in Africa has an impact on governance in African and Africa's relation with the Western countries and multinational institutions. We are not dealing with those issues in this study. An ongoing project on the impact of China and India on Africa which is comprehensive is underway by African Economic Research Consortium (AERC, Nairobi). See www.Aerceafrica.org .

shape the world economy and change the rules of the game. Thus, it is likely that they may transform past relationships in a number of key respects, bringing both challenges and opportunities not just for the major trading partners in OECD countries, but also for developing countries such as those in Africa; and thus, the need to understand their interaction with Africa.

According to Chen *et al* (2005), the limited available empirical study along this line on Africa includes the studies by Jenkins and Edwards (2005) and Kennan and Stevens (2005). The former combines a disaggregated trade analysis with a framework to assess trade-poverty linkages whereas the later estimates the impact of China on African countries' trade balance and draws a tentative list of African "losers" and "winners" from China's rise in the international trade arena. The study by Kaplinsky *et al* (2006) is also inconclusive. They summarized the trade, production & FDI and Aid related impact of China and India on Africa against direct (both complementary and competitive) and indirect (both complementary and competitive) impacts and noted that it is difficult to conclude whether the impact is positive or negative across countries and sectors (Kaplinsky *et al*, 2006). The availability of studies is even weaker in the case of India (Alemayehu, 2006). This study is aimed contributing to this gap in the literature.

The rest of the paper is organized as follows. In the next section we will outline to theoretical models that we have used to answer the questions raised above. This followed by section three where we presented, the data we used and the empirical results that we found based on the theoretical models outlined in section two. Section four concludes the paper.

II. The Theoretical Framework

The available literature on the methodology of evaluating the impact of the integration of China, and, by extension India in to the world economy can generally be classified in to two. The first relates to the use of a general equilibrium model such as the Global Trade Analysis Project (GTAP) (see for example, Valerie, *et al*, 2005, Ianchovichina and Martin, 2006). The second approach is the use of a gravity model (see Eichengreen *et al* ,2004). We will be using the latter approach as part of the method used in this study.

III. The Theoretical Framework

The available literature on the methodology of evaluating the impact of the Asian drivers in to the world economy can generally be classified in to two. The first approach relates to the use of a general equilibrium models derived from the Global Trade Analysis Project (GTAP) (see for example, Valerie, *et al*, 2005,

Ianchovichina and Martin, 2006). The second approach relates to the use of a gravity model (see Eichengreen *et al* ,2004).

As we noted above, there are two major questions that this study attempts to address. First, we will ask whether African exports are displaced by Chinese and Indian export growth in the third market. If the answer to this question is yes, then the growth of Chinese and India could be a threat or a challenge to Africa. However, it may not be a major threat, if African countries are stepping-in in the technological ladder of manufacture exports that are left by China and India. This leads to the second major question of this study: Are African countries indeed stepping-in the technological ladder of manufacturing activities left by China and India as the latter move up in the technological ladder of manufacture exports?. In this study the first question is addressed using 'the gravity model' approach while the second question is handled using 'the flying-gee' model. We attempt to offer a fairly comprehensive answer for these questions in African context based on the result of the two models.

2.1 Are African Exporters being displaced by China and India?

The gravity model has been widely used to study the determinants of bilateral trade flows among trading countries beginning with pioneer applied econometric work by Tinbergen (1962) and Pöyhönen (1963). The literature on gravity model has been growing very vast since then (see for example, Anderson, 1979; Oguledo and MacPhee, 1994; Deardorff, 1995; Cyrus, 2002; Egger, 2002; Frankel and Wei, 1995; Màtyàs, 1997, 1998; Greenway and Milner, 2002; Anderson and Wincoop, 2003; Cheng and Wall, 2005; Baldwin and Taglioni, 2006**;** Bussière and Schnatz, 2006; Greenway *et al,* 2006, Linders and Groot, 2006; Subramanian and Wei, 2007). The model is formed on the central idea that income and distance between countries are respectively positive and negative determinants of bilateral trade.

One strand of this literature claims that, though the gravity model performed well empirically, it has no theoretical foundations (see, for example, Frankel and Wei (1995), Rose (2004); Eichengreen *et al* (2004), Greenway *et al* (2006). However, others researchers have attempted to give it sound theoretical basis (see for example, Anderson (1979); Oguledo and MacPhee 1994; Deardorff (1995); Baldwin and Taglioni (2006)). In this latter literature the gravity model is derived from a linear expenditure system of the trading partners. More recently, Eichengreen *et al* (2004), Greenway *et al* (2006) Bussière and Schnatz, 2006 used the gravity model to study the impact of China on the exports of other Asian countries. From the current literature we note the following four points.

First, it is interesting to note that almost all studies which attempt to give the gravity model a theoretical basis follow the analogy of Newton's universal law of

gravity which states that the force of attraction between two bodies (say the earth and the sun) is directly proportional to the product of their masses and inversely proportional to the square of the distance between them. In Newtonian (classical) physics, this force of attraction is directed towards the centre of the mass of the respective bodies, i.e., the forces act in opposite direction. Therefore, the bodies are always in equilibrium (the earth with less mass relative to the sun rotating around the sun with larger mass relative to the earth) at a given distance. However, Anderson (1979); Oguledo and MacPhee (1994); Deardorff (1995); Baldwin and Taglioni (2006) establish theoretical foundation for gravity equation by cases with balanced trade which is analogically similar to the equation in classical physics of the earth and the sun. Then, they derived the gravity equation from expenditure function. In the Newtonian framework, the equilibrium is established because of the gravitational force. But balanced trade (which is analogous to equilibrium) comes first in establishing the theoretical foundation of gravity model. However, in the real world trade is not balanced. In formulating gravity model, therefore, probably the best way could be to model it as a disequilibrium system and then explain adjustments mechanism towards equilibrium and hence the analogy becomes compatible to that of the Newtonian physics. However, owing to the limited scope of this study, this interesting research direction is not pursued here.

The second point to note in this literature is that most gravity models of bilateral trade are subjected to estimation biases. This is because in Newton's law of gravity, the two forces are not averaged; rather, their interaction in opposite direction establishes equilibrium. But in gravity model of bilateral trade, imports and exports are averaged without theoretical justification, hence the bias. To tackle this, Subramanian and Wei (2007) suggested a specification with imports which are more closely aligned to the fundamentals of the theory.

Third, point to note in this model relates to the fact that, most of the researchers follow Anderson (1979) formulation, which suits to a cross-section data. However, the traditional cross-section approach suffers from severe problem of misspecification. Màtyàs (1997) notes that the most natural representation of bilateral trade flows is three-way specification, with exporter (local) country effect, importer (target) country effect, and time (business cycle) effect all taken on board. Eliminating one of these three dimensions (especially, time) implies that the natural representation of time-averaged gravity model is a two-way panel with (fixed or random) exporter and importer effects. Since these are the most important dimensions of variations, the use of OLS is very likely to result in inconsistent estimate (Egger, 2002).

Finally, again on the estimation issues, most of the empirical research (see for example, Eichengreen *et al,* 2004; Greenway *et al,* 2006; Bussière and Schnatz, 2006) about the impact of the Asian drivers is done on the exports of other Asian counties using gravity model. These studies assume positive value of

trade flow between pairs of countries. However, in practice missing values of trade flows between pairs of countries is a common phenomenon. Ignoring or dropping missing values will mean loss of information on the causes of this missing trade flows. Under this situation, the gravity model will underestimate potential imports and exports between trading partners. The gravity model which will be used in this study will attempt to address these major problems.

Following Baldwin and Taglioni (2006), Greenway *et al* (2006), Subramanian and Wie (2007), we will use imports, rather than average bilateral trade, of country i (third market in this study) as the dependent variable. We adopt a version of gravity model suggested by Màtyàs (1987, 1998), Egger (2002), Egger and Pfaffermayr (2003) that used the more general and proper panel econometric specification of the gravity equation which is a two-way error component model with exporter and business cycle interaction effects taken on board. To examine the displacement effect of China and India, we include China and/or India's exports to the same destination (third market) of the African countries' exports as an additional explanatory variable.

The model we used is given by equation 1 below. It will have three fundamental determinants of bilateral trade volume: (a) export supply capacity, captured by income and income per capita of the exporting country; (b) import demand captured by income and income per capita of the importing country; and (c) resistance or attraction captured by distance and well known gravity model variables such as sharing border. These fundamental determinants are augmented by the local (exporter) country effect, and the time (business cycle effect) as given by equation 1 below.

$$\begin{aligned} lnM_{ijt} = {} & \beta_0 + \beta_1 lnChEXP_{it} + \beta_2 \ln IndEXP_{it} + \beta_3 lnGDP_{it} + \beta_4 lnCAPM_{it} + \beta_5 lnGDPX_{jt} \\ & + \beta_6 lnCAPX_{jt} + \beta_7 lnDIST_{ijt} + \beta_8 lnAreap_{ijt} + \beta_9 Broder_{ijt} + \beta_{10} Comlang_{ijt} \\ & + \beta_{11} Comcol_{ijt} + \beta_{12} Colony_{ijt} + \beta_{13} ImpCorrrup_{it} + \alpha_i + \lambda_i + \epsilon_{it} \end{aligned} \quad [1]$$

Where:

M_{ijt}	mports of country i from the African country j at time t
$ChEXP_{it}$	Exports of China to third market i at time t
$INDEX_{i\,t}$	Exports of India to third market i at time t
$GDPM_{it}$	=Real GDP of the importing country i at time t
$CAPM_{it}$	Real per capita GDP of the importing country i at time t
$GDPX_{jt}$	Real GDP of the exporting country j at time t
$CAPX_{jt}$	Real per capita GDP of exporting country j at time t
$DIST_{ijt}$	Distance between i and j at time t
$Areap_{ijt}$	Product of country areas of country pairs i and j a time t
$Border_{ij}$	Binary dummy which is unity if i and j share a land border, zero otherwise at time t
$Comlang_{itj}$	Binary dummy which is unity if i & j share common language zero otherwise at time t
$Comclo_{ijt}$	Binary dummy which is unity if i and j were ever colonies of post 1945 with same colonizer, zero otherwise at time t

$Colony_{ijt}$	Binary dummy which is unity if i ever colonized j or vice- versa, zero otherwise
$ImpCorrup_{it}$	Importer's corruption index at time t
α_i	the exporter country effect
λ_t	the time (business cycle effect)
ε_{ijt}	white noise disturbance term

The result form estimation of this model is given in section three below.

2.2 Is Africa Stepping-in in the Export Space Left by China and India?

Even if Africa may be displaced by the surge of China and India export growth in the third market, it still may benefit from this growth, if the Africans are stepping-in in the manufacturing export space left by the Asian drivers as the latter move to higher technological ladder of manufacture exports. A theoretical framework that helps to see this is what is called the 'Flying-gees theorem'. The "flying-geese pattern of development"(FG theorem hence forth) that was originally developed by Kaname Akamatsu in the 1930's (Akamatsu, 1935, 1937, ci: Kojima 2000) is popularized in 1961 in articles written in English (see for example, Kojima 2000; Ozawa 2001, Cutler *et al* 2003 among others). Kojima (2000) offers a comprehensive review of the FG model. This theorem is recently being in use to explain the rapid economic growth in East Asia. In this theorem late comers successfully adopt a strategy of entering into sectors in which they have a rising comparative advantage and import technology from a more mature economy whose advantage in that industry is declining. The later in turn invest in newer industrial projects using more advanced technology and know-how in which they have an innovative edge (Rana, 1990:244). Rana (1990) and also Dowling and Cheang (2000) argued that the flying-geese theory is similar to that of the "product cycle" theory, developed by Vernon (1966). Dowling and Cheang (2000) further pointed out that key difference between the two theories is the perspective taken. "Product cycle" theory takes the perspective of the developed countries while FG theorem takes the developing country.

As noted by Kojima (2000) the 'FG theorem' intends to explain the catching-up process of industrialization in late comer economies which have the following pattern: (i) a basic pattern, i.e., a simple industry grows tracing out the three successive curves of import, production, and export; and (ii) a variant pattern in which industries are diversified and upgraded from consumer goods to capital goods and/or from single to more sophisticated products (Kojima 200:376). Akamatsu discovered these two patterns, which looked like a flying geese formation, through statistical analysis of industrial development in the prewar Japanese industries such as textiles (see Ozawa 2001). According to Ozawa (2001) in essence, what Akamatsu had in mind was an evolutionary model of sequential catch-up through teacher-learner relations among nations

in the stages of industrial upgrading. It was a model of derived economic development via-cumulative learning in a late comer nation (Ozawa, 2001:472). Ozawa (2001) pointed out that Akamatsu did not leave any formalized theoretical model to explain his ideas. However, based on his ideas, Kojima (2000) introduced a theoretical model in which the accumulation of physical and human capitals cause the economy to diversify first to a more capital-intensive key industries and then to rationalize them so as to adopt more efficient production methods. Such diversification/rationalization paths are repeated in moving the economy towards higher stages of production and export. In such set up, Kojima (2000) further quotes Akamatsu (1962:17) "the less-advanced 'wild-geese' are chasing those ahead of them, some gradually and others rapidly, following the course of industrial development in a wild-geese-flying pattern. The advanced "wild geese," which are in the lead flying onward, increasingly achieving technological innovations and trying to maintain a certain distance of heterogeneous (or dissimilar) difference from less-advanced 'wild geese' (see also Ozawa 2001, Cutler *et al* 2003)

One of the issues to be addressed in this study is, therefore, to use this FG theory as a theoretical framework to assess if there can be a Pax China and India-led macro-clustering in FG-style catch-up in Africa as Pax Americana-led macro-clustering has resulted in FG-style catch-up in East Asia. This requires however, some measure of comparative advantage between China and India on the one hand and the African exporters in our sample countries on the other. Notwithstanding the problems of measuring comparative advantage Balassa (1965), cited in Mahmood (2001), approximated the comparative advantage concept in an indirect way by using post-trade data that manifests both post-trade relative prices and prevailing factor and product market distortions (Mahmood, 2001). According to Balassa (1965, cited in Mahmood, 2001) and Balassa (1979), comparative advantage is revealed in relatively high shares of export markets (Mahmood, 2001). However, to evaluate what is low, Balassa (1965, cited in Mahmood, 2001) and Balassa (1979) called for these shares to be compared to some average. Defined as such, the revealed comparative advantage index (RCAI) compares a country's world export share of the commodity in question with the total world export share of the total exports of country in question (Mahmood, 2001). If a country's share of world export of a particular commodity is greater than the country's share of world exports of all commodities, the RCAI will be greater than one (see for example, Lutz 1987; Rana 1990; Dowling and Cheang 2000; Mahmood 2001).

In this study, the degree and nature of export specialization association between Africa and the Asian drivers is thus evaluated by estimating the Spearman's Rank Correlation (SRC) coefficients of RCA between the Asian drivers and Africa in the world market of manufacturing products. The SRC coefficient is widely used to analyze the degree of association between two variables and is given by equation number 2 (see for example, Dowling and Cheang 2000; Mahmood 2001):

$$SRC = 1 - \frac{6}{N(N^2 - 1)} \sum_{i=1}^{N} D_{RCAIi} \qquad [2]$$

Where: SRC = the Spearman's Rank Correlation Coefficient

N = the number of observations or product group categories

D_{RCAIi} = the difference between any pair of RCAI ranking of two countries

In the rest of the section, using the FG theoretical framework we will attempt to address the following questions: (i) whether there is evidence of industrial development through shifting comparative advantage in African clothing and accessories manufacturing; and (ii) whether there is a shift in comparative advantage from China and India to Africa in clothing and accessories manufacturing; and (iii) whether this is beneficial to Africa. In section three below We will estimate the SRC between RCAI vectors of the 13 African countries in the sample and the Asian drivers for the period 1995-2004 for the commodity under discussion. Then, the sign and magnitude of the SRC will give us an implication of shifting comparative advantage between the African exporters of clothing and accessories relative to that of China and India.

III. The Data and Empirical Results

3.1 The Data

Based on UN Economic Commission for Africa (UN ECA) reporting system and also historical and economic reasoning (see Alemayehu 2002) the African countries could be categorized in to the following regions: East and Southern Africa (ESA), North Africa (NA) and West Africa (WA) and Central Africa (CA). A sample is taken from each of these regions. Countries for which data was not available in Sitc Rev.3 in the study period are excluded. A total of 13 countries that export clothing and accessories are selected using probability sampling. The 13 (ie.*; Algeria, Burkina Faso, Cot d'Ivoire, Gabon, Ghana, Kenya, , Lesotho, Madagascar, Niger, Rwanda, South Africa, Tunisia, Zambia)* countries in this study constitute 25% of the African countries (in terms number). In terms of trade, according to the data from UN Comtrade, they constitute 73% of the African export of clothing and accessories classified under SITC Rev.3 during the study period. The UN Commtrade Statistics provides the major importers of clothing and accessories from each of the selected African exporters. These are taken as third market. France and USA happened to be major common importers of Clothing and accessories from seven and two African countries in the sample respectively. Thus, including France and USA, there are 6 countries that are defined as the third *market (ie.; France, Nigeria, Uganda, UK, USA, and Zimbabwe)*

Since African countries are generally taken as labor-abundant; it is hypothesized that they face competition from China and India in labor-intensive manufactures on the third market. Thus, such commodities are selected for this study. Owns and Woods (1997) and Cutler *et al* (2003) categorized clothing and accessories as labor-intensive exports. The rule of thumb that we followed in using a given classification is to use older classifications such as SITC Rev.1 and SITC Rev.2 to obtain long time series data and use recent classifications like HS2002 and HS1996 for more detailed information. The drawback of use of SITC Rev.1 is that a lot of modern technology was not available at the time of its introduction (around 1960). The newer classifications (like HS2002) have more clearly defined commodities , but have been in use only recently, which means that only a few years of data can be found for that classification. SITC Rev.3 is taken for our purpose. This is because this classification has been in use by many countries since 1990. This allows us to use time series data and commodities with relatively latest technological embodiment.

The trade data is obtained from the UN Commtrade database and IMF's Direction of Trade Statistics (DOTS) while income and related data are from World Bank's World Development Indicators (WDI). The usual gravity model variables (distance, common border, and common language) are taken from Feenstra's Web site and Encarta Encyclopedia 2007. The study covers the period 1995 to 2005, given the availability of complete data for countries in the sample in this period. Real GDP and GDP per capita are in constant 2000 U.S. dollars. Imports and exports are deflated by U.S CPI (2000=100) to have them in real terms.

The standard gravity model formulation do not allow to easily deal with missing values. However, missing observations contain important information for understanding the patterns of bilateral trade, and should not be discarded *a priori* (Linders and Groot, 2006). In our data set, some dependent variable values are missing and this may lead biased results. Several approaches have been suggested in the literature to address this problem. The approach adopted here is that of King (1995), King *et al* (2000) and King *et al* (2001) which considers multiple imputation as a superior approach to the problem of missing data in applied statistical analysis. According to King *et al* (2001), a multiple imputation involves imputing *m* values for each missing item and creating *m* completed data sets. Across these completed data sets, the observed values are the same but missing values are filled with different imputations to reflect uncertainty levels. That is, for the missing cells, the model predicts well, variations across the imputations are small. Analysts can then conveniently apply the statistical method they would have used if there were no missing values to each of the *m* data sets, and *m* can be as small as 5 or 10 (King *et al,* 2001:53). Following this procedure and using *Ameliaview* multiple imputation

software developed by King, values for the missing data are imputed. Then, for each *j* imputed data set, only the one with minimum standard deviation is used for our analysis.

3.2 Empirical Results

(a) The Gravity Model

To examine whether the Asian drivers are displacing the African exporters in the third market, the gravity model given in section two above as equation 1 is estimated by Generalized Two Stage Least Squeer (G2SLS) estimation method. We have used the pooled data consisting of 6 importing countries regarded as the third market, 13 exporting countries, for the sample period 1995 -2005. The result is shown in table 3.1. The model fits the data well with overall R^2 of 0.50. All the variables in the model are also jointly statistically significant as given by the Wald statistics.

As expected, distance is found to have the expected negative and statistically significant coefficient. All other things remaining the same, a 1% difference in distance will reduce third market of clothing and accessories from Africa by 1.2%. A 1% difference in importer's and exporter's combined land area would increase trade in clothing and accessories by 2.%. Common border, common language, importer's colonization history of African exporters have positive impacts on third market imports of clothing and accessories from Africa.

Table 3.1: G2LSLS IV Regression result: Dependent Variable log of third market imports

Explanatory Variables	*coefficient*	*t-ratio (99%)*	*P-value (99%)*
Log of china's Export	*-2.25*	*-3.69*	*0.00*
Log of India's Export	*2.08*	*4.64*	*0.00*
Log of Importers real GDP	*0.33*	*0.70*	*0.49*
Log of Exporters real GDP	*-1.91*	*-1.00*	*0.32*
Log of Exporters real GDP per capita	*-1.50*	*-1.57*	*0.12*
Log of Importers real GDP per capita	*0.23*	*0.22*	*0.83*
Log of distance between importer and exporter countries	*-1.18*	*-4.52*	*0.00*
Log of importer and exporters land area product	*2.04*	*3.58*	*0.00*
Importer corruption index	*0.81*	*1.35*	*0.18*
Common border between importer and exporter countries	*1.73*	*2.24*	*0.03*
Common language between importer and exporter countries	*1.69*	*2.92*	*0.00*
Importer and exporters being colonized by common colonizer	*0.13*	*0.30*	*0.76*
Importer post 1945 colonization of exporters	*1.96*	*2.76*	*0.01*

α –*Exporter specific dummy for Algeria*	*-10.68*	*-2.32*	*0.02*
α –*Exporter specific dummy for Burkina Faso*	*-14.87*	*-2.79*	*0.01*
α –*Exporter specific dummy for Cot d' Ivoire*	*-8.70*	*-2.59*	*0.01*
α–*Exporter specific dummy for Gabon*	*-8.70*	*-3.32*	*0.00*
α–*Exporter specific dummy for Ghana*	*-11.74*	*-2.63*	*0.01*
α –*Exporter specific dummy for Kenya*	*-7.54*	*-2.16*	*0.03*
α –*Exporter specific dummy for Lesotho*	*-9.75*	*-1.49*	*0.14*
α–*Exporter specific dummy for Madagascar*	*-11.03*	*-1.49*	*0.03*
α –*Exporter specific dummy for Niger*	*-19.92*	*-3.17*	*0.00*
α –*Exporter specific dummy for Rwanda*	*-11.78*	*-1.98*	*0.05*
α–*Exporter specific dummy for South Africa*	*-2.37*	*-0.40*	*0.69*
α–*Exporter specific dummy for Tunisia*	*-0.04*	*-0.01*	*0.99*
α–*Exporter specific dummy for Zambia*	*-16.88*	*-3.43*	*0.00*
λ_{1995}–*time specific dummy for year 1995*	*-3.74*	*-2.07*	*0.04*
λ_{1996}–*time specific dummy for year 1996*	*-3.18*	*-3.60*	*0.00*
λ_{1997}–*time specific dummy for year 1997*	*-1.90*	*-2.33*	*0.02*
λ_{1998}–*time specific dummy for year 1998*	*-2.62*	*-3.04*	*0.00*
λ_{1999}–*time specific dummy for year 1999*	*-2.45*	*-3.05*	*0.00*
λ_{2000}–*time specific dummy for year 2000*	*-0.94*	*-1.31*	*0.19*
λ_{2002}–*time specific dummy for year 2002*	*1.32*	*1.88*	*0.06*
λ_{2003}–*time specific dummy for year 2003*	*0.87*	*1.17*	*0.24*
λ_{2004}–*time specific dummy for year 2004*	*2.51*	*2.71*	*0.01*
λ_{2005}–*time specific dummy for year 2005*	*3.04*	*2.66*	*0.01*
Constant	*16.13*	*0.32*	*0.75*
R^2 Within *0.3711*	*0.37*		
Between *0.9404*	*0.94*		
Overall *0.5002*			
Waldchi2(36) *964.72*			
Number of observations 858			
Prob>chi2 *0.0000*			
Sigma _U 0			
Sigma_e 4.103549			
Rho 0 (fraction of variance due to U_i)			

As can be read from Table 3.1, over the period 1995-2005, China's export of clothing and accessories has significantly displaced African export of the same from the third market with a statistically significant elasticity coefficient of (negative)-2.25. On the other hand our result shows a positive elasticity of 2.1 for India. Thus Indian manufacturing exports are found to complement African exports of this commodity in the third market. This may entail a rather cloth link between Indian and African manufacture exporting firms compared to that of China. However, this requires a further study using micro level data.

Given the above evidence that China's exports of clothing and accessories is driving out African exports from the third market, it will be interesting l to ask which African exporters are facing severe competition from China. This question is addressed by analyzing country specific effects. By looking at country specific dummies, we note that Niger, Zambia and Burkina Faso are the three most vulnerable exporters of clothing and accessories followed by Ghana, Algeria, Gabon, Cot D'Ivoire and Kenya that also experienced a displacement effect from China (see Table 3.1). Looking at these exporters, we note that except for Zambia, Ghana and Kenya, most of the affected countries are the former colonies of French. This may suggest a possible effect of colonial history in determining export performance and hence third market effect.

The result that China is competing and India is complementing the African manufacturing export in the third market of clothing and accessories has led us to examine the issue across time over our sample period. For this we have used the business cycle or time dummies. It can be read form Table 3.1 that the early years were characterized by higher displacement than the later years. The years 1995-1999 were characterized by substantial displacement effect. However, the displacement effect has been declining up to 1999. In fact years 2004 and 2005 did show complementary effects. This underscores the importance of focusing on the dynamics of the impacts as the effect may vary across time as could be read form the positive and significant time dummy coefficients of 2.50 and 3.04 for the years 2004 and 2005, respectively.

This result may also be related to the effect of African Growth and Opportunity Act (AGOA) legislation which became law in 2000 and set to provide duty-free and quota-free access to US market without limit for apparel made in eligible SSA countries. With respect to AGOA, our data set from UN Comtrade, for instance, shows that USA never imported from Lesotho before the year 2000. But in year 2000, USA import from Lesotho was US$ 146 million. This has increased to 482 million in year 2004. In the case of Madagascar, USA's import value of clothing and accessories was 49.06 million in 1999. This jumped to 116 million in 2000 and 294 million in 2005. Four years (1995-1998) total USA import from Madagascar was 60.32 million USD which is only 52.12% and 20.5% of its import from Madagascar in 2000 and 2005 respectively. Another possible explanation for Asian drivers' complementary impact on African manufactured exports in the later years of the study period is the rapid growth of the drivers as well as their active participation in the beneficiary African exporting countries through their investment. The Chinese and Indian growth will also obviously increase their demand for primary commodities and minerals from Africa. This may create a channel for African and the Asian drivers' exports to complement on the third market.

(b) The Flying-gee Model

A related point with the first question of whether African countries are being displaced by China and India is to address the question of (i) whether there is a dynamics of comparative advantage in African manufacturing of clothing and accessories and (ii) whether there is an evidence of shifting comparative advantage from the Asian drivers to Africa. The answers to these questions are important to provide an adequate answer to the question of the impact of china and India on Africa which is the central theme of this study. To do that RCAI for clothing and accessories are constructed for the 13 major African manufacturing exporters which constitute, as we noted above, 73% of African export of manufacturing under the classification of SITC Rev.3. We have used the FG theorem to frame our questions using the available data that covers the period 1995-2004.

A data exploration of the trend of RCAI for each country reveals the following major points. First, in the period 1995-1999, RCAIs have been declining for most of the African exporters in our sample (with minor exceptions for Rwanda, Gabon and Ghana). On the other hand, the RCAI vectors of China and India have been moderately stable. Second, in the period 2000-2004, for African exporters, RCAIs behaved differently. Algeria, Burkina Faso, Cot d'Ivoire, Lesotho, Madagascar, Niger, Rwanda and Zambia are exporters with declining RCAIs. For Gabon, it was initially rising and then declining after 2002 while for that of Ghana it initially was volatile but declined at the end. For Tunisia, it has been stable. The RCI for Kenya and South Africa revealed consistent and significant rise after 2002. On the other hand, the RCAIs of china and India have been declining moderately from their value in the year 2000. Though the RCAI for the China and India are falling, the level of values of exports of China and India has been rising.

From the preceding analysis, we note that the RCAI trends are consistent with the results from econometric estimation of the gravity model where the earlier period was characterized by overall displacement effect while the later period was characterized by overall complementarity effect. During those years when time specific effects in the gravity model were negative and significant, the RCAIs of China and India have been rising, while during those years when time specific effects in gravity model were positive and significant, the RCAI vectors of China and India have been declining. Thus, the results from the econometric estimation of gravity model and analysis of RCAI vectors are complementing each other.

Given the above result, it is useful to examine whether increases in RCAI were beneficial. This will be so if the world demand for clothing and accessories was growing fast. In order to test this we defined two vectors: (i) the RCAI's of those countries which gained comparative advantage and (ii) the growth rate of world demand for clothing and accessories. We used the growth rate of world imports during 1995-2004 as a proxy for the growth of world demand for clothing and accessories. Positive correlation between the changes in the RCAI vectors

during a given period and the growth rate of world demand for particular country would mean that the country had successfully gained comparative advantage in commodities in growing world demand. A negative sign would mean that the country gained comparative advantage in declining industry (Rana, 1990). Since countries which gained comparative advantage were Kenya and South Africa, we focus our analysis on them. We found that the correlation coefficient between RCAI and the world demand growth of manufacture exports rate vectors are 0.32 and -0.056 for Kenya and South Africa respectively. Thus, Kenya was gaining comparative advantage in the study period while South Africa was gaining comparative advantage in declining industry. Having this evidence, it is instructive to ask whether South Africa has moved from manufacturing of clothing and accessories to a higher ladder of industrial development as the FG theory would predict. In other words we have examined if there is a shift in comparative advantage from the Asian drivers to Africa in manufacturing of clothing and accessories.

To test whether comparative advantage has moved from China and India to Africa, the Spearman's rank correlation coefficient (SRC) between RCAI vectors of each of the 13 African exporter countries on the one hand and China and India on the other are calculated for the period 1995-2004. Considering China and India as references countries in exporting clothing and accessories, the SRC on RCAI vectors of the 13 African countries is compared with those of China and India. A negative and statistically significant coefficient suggests that the recipient country/group of countries replace the source recipient country/group of countries, thus indicating uni-directional shifts in comparative advantage. In this context, negative sign would mean Africa is increasing its industrial development. This provides support for the plausibility of the FG theorem in the China and Africa relation. Similarly, a positive and significant coefficient indicates that the comparative advantage of the pair of countries/group of countries is moving in the same direction and there are complementary export expansions between the pair, thus diverging form the FG theorem (Dowling and Cheang, 2000). In table 3.2 we have tested the null hypothesis of *Ho: The RCAI vectors for pair of countries are independent against the alternative hypothesis of* H_1*: Ho is not true.* The result of this analysis is given in Table 3.2 below.

Table 3.2: Spearman's Rank Correlation Coefficient between the RCAI's of African exporters and the Asian Drivers (China and India)

No.	*African Exporter*	*Asian Driver*			
		China		*India*	
		Rho	*P-value*	*Rho*	*P-value*
1	*Algeria*	*0.25*	*0.49*	*0.23*	*0.52*
2	*Burkina Faso*	*0.50*	*0.14*	*0.49*	*0.15*

3	*Cot D'IVoire*	*0.57*	*0.08*	*-0.22*	*0.55*
4	*Gabon*	*-0.36*	*0.31*	*-0.06*	*0.87*
5	*Ghana*	*0.27*	*0.44*	*-0.07*	*0.85*
6	*Kenya*	*0.65***	*0.04*	*0.24*	*0.50*
7	*Lesotho*	*-0.08*	*0.82*	*0.50*	*0.14*
8	*Madagascar*	*0.19*	*0.60*	*0.71***	*0.02*
9	*Niger*	*0.85****	*0.00*	*0.62**	*0.06*
10	*Rwanda*	*-0.05*	*0.90*	*-0.24*	*0.50*
11	*South Africa*	*-0.67***	*0.04*	*-0.14*	*0.69*
12	*Tunisia*	*-0.16*	*0.65*	*-0.11*	*0.76*
13	*Zambia*	*0.14*	*0.70*	*-0.13*	*0.71*

NB: ** Significant at 5%, *** Significant at 1 %

In Table 3.2, the second and the third columns show the SRCs and their P-values, respectively, between each African exporter and China while the fourth and the fifth column show the same for India. The SRCs give very important information about shifts in comparative advantage. From the table, we note that Kenya, Madagascar and Niger are the African exporters with positive and significant SRC. The SRC between Kenya and China is 0.65 and significant at 5% while SRC between Madagascar and India is 0.71 and significant at 5%. Between Niger and China and Niger and India, SRCs are 0.85 and 0.62 respectively and both significant at 5%. Thus, we fail to accept the null hypothesis and conclude that these countries' manufacturing exports did not receive comparative advantage from China and India to undergo substantial structural change in manufacturing.

Niger, Madagascar and Kenya, in order of importance according to the degree of their comparative advantage, are moving in the same direction as China and India. However, the SRC between South Africa and China is -0.67 and significant at 5%. Thus we fail to reject the null hypothesis and conclude that South Africa has received comparative advantage from China, has undergone a substantial structural change in that industry and has moved to the next stage of industrial development. This supports the view that South Africa is behaving in line with FG theorem. This makes South Africa a "leading goose" in the African region.

Notwithstanding the importance of this finding it is imperative to verify it. One way is to see how the manufacturing process in Kenya is linked to China and India and particularly how the manufacturing process in South Africa is linked to China and India on the one hand and to the rest of Africa on the other. In line with this, Mangieri (2006) noted, for instance that Kenya has links to India, China and Arabian Peninsula and this has a bearing on the current structure of the global textile and apparel industry. He argues that this is ignored by research that focuses exclusively on the economic aspects of these

ties. In Kenya, a view of the current ownership and management of textile and apparel manufacturing indicates a majority of Indian or Kenyans of Indian origin do engage in investment in the sector. Thus, Mangieri noted, given the deeply implicated histories of South Asians in Kenya, as elsewhere in East Africa, attention must be paid to their role in establishing and expanding textile production under the current AGOA regime (Mangieri, 2006). In the case of South Africa, the available evidence on the linkages is even well documented. As Rogerson (2000) puts it, the decade (1990-2000) was noted as a period when the clothing sector in South Africa underwent a metamorphosis as protected domestic manufacturers had given way to market which was increasingly exposed to international competitions. In the view of the National Clothing Federation of South Africa, in the year 2000, the clothing sector in South Africa was undergoing dramatic change and was in the process of entering the global market (Rogerson, 2000:694). Thus, these two cases provide us with supporting evidence to our empirical finding in this study. The implications for the rest of the African countries is that the lead from this finding need to be further examined by and in-depth country study that takes both the direct and indirect impact of the Asian drivers on the country in question.

IV. Conclusion

In this study we have attempted to quantify the possible impact of China and Indian on African using the case of manufacture exports of clothing and accessories. We attempted to examine whether China and India are competing with or complementing to Africa's exports in the third market using a sample of thirteen African major exporters of three digits SITC Rev.3 manufactured clothing and accessories the period 1995-2005. The major innovation of this study is that, unlike other researches which rely on a single approach to evaluate the impact of China and India on different regions of the world, we employed two models to frame our study. First, we have used a gravity model to evaluate the impact of china and India on the manufacturing export of Africa on the third market. Second, we used the FG theorem using Spearman's rank correlation coefficient (a non-parametric test for the hypothesis) to detect an evidence for shifting comparative advantage from China and India to Africa. The principal findings of the study are the following.

First, we found that China and India affect Africa differently. Their effect is also found to vary across time. In the early years of the study period, particularly before the year 2000, the overall impact of China was crowding out African labour intensive manufacturing export. India on the other hand, has been complementing the African exports of labour intensive manufacture to the third market. However, the overall impact of China and India seems to be that of complementarity during the later years of the study period. This is subject to

two different interpretations. First, it could be that during the early years, Africa has been importing consumer goods which do not have production enhancing effect in the manufacturing process from China while competing in the third market with China, but has been importing capital goods or skills which augment African manufacturing process production from India. The complementarity effect during the later years in the study period may imply that Africa has been importing production augmenting capital goods or skills and technology from both China and India. Second, the AGOA act of May 2000 could be another possibility that shifted the impact after the year 2000. This is particularly true as AGOA provides a special rule for textile and apparel which applies to duty- free and quota-free access to SSA's textile products made from USA fabrics, yarns and threads following what has been called triple transformation rule (Nouve and Staatz, 2003). Obviously, duty-free access of SSA's export to USA would mean the duty-free import by USA off-sets high initial production cost in Africa which enabled Africa to compete with China and India on USA market. Moreover, Chinese and Indian firms were active in investing in Africa to exploit this opportunity during this time. This is reflected by the fact that year specific dummies are positive and significant for the later years in the econometric estimation of the gravity equation.

The second major finding is that the impact varies across countries. The source of these variations could also be different. But one source of variation seems to be the colonial history. This could be read from the fact that (i) dummy for importers colonization history of exporters is significant and positive and (ii) except for Tunisia, for countries which were the former colonies of French, the country specific dummies are significant and negative. This could provide evidence of how little the destinations of African exports have changed from the colonial period. Oonce these markets become open to China India's exports, it is possible for the African manufacturing exports to be crowded out from these markets.

The third finding is that using the FG theoretical framework of industrial development, we found an evidence for shifting comparative advantage from China and India to Africa. However, this should be interpreted with caution. Since the Spearman's rank correlation coefficient is based on revealed comparative advantage, it is possible for a country to gain (loose) comparative advantage in the process of de-industrialization (industrialization) in absolute terms. Nevertheless, other empirical studies (see for example, Rogerson, 2000) has also shown that South Africa has gained comparative advantage and has undergone substantial structural change in manufacturing. It is also possible to argue that the source of the comparative advantage could be countries or regions other than China and India. However, the findings in this study are meant to show there has been a significant shift of comparative advantage from the Asian drivers to Africa.

What is the implication of these findings for Africa? To begin with an important observation in the context of this study is related to the methodological issues. We found that, the gravity model (which involves econometric estimation of parameters) and the FG theory (which involves a non-parametric test) provided us with similar evidences. This implies that in research areas, such as the topic under discussion and where conclusive empirical evidences are non-existent, employing different methodologies may result in a reliable conclusion.

Given different African countries are affected by China and India differently, and due to the dynamic nature of the impacts, it will be difficult to offer specific suggestions of how to design an optimum strategic policy that could enable African manufacturing exporters to maximize the benefits while minimizing the risks. However, generic policy stances that could emanate from this work include the following.

First, in the world where China and India are rearranging the global economic order dynamically, the outcomes of traditionally received wisdom of trade liberalization and industrialization policies such as simple export promotion strategy may be dubious. This is particularly true in a situation where African exporters of labor-intensive manufacturing commodities adopt endowment based trade policies, and yet, our econometric estimation of gravity model offered evidence that China's labor-intensive manufactured exports are crowding out African similar commodities from the third market. This underscores the need to re-think about African trade and industrial policies in general and its interaction with China and India in particular.

Second, for Africa to be benefit from a shift in comparative advantage from China and India, it is useful to understand the long run trend of the growth rate of world demand for the commodity in which Africa is gaining comparative advantage. Otherwise, it is possible that Africa gains comparative advantage, but in commodities in which the growth rates of the world demand is declining implying that Africa is not benefiting from this shift in comparative advantage.

Finally, we caution readers that this study examined only one aspect of Africa's interaction with China and India. This is only a single channel through which the impact of the Asian drivers could be transmitted to Africa. However, other channels such as FDI, governance and aid are open to research. Furthermore, their impact on domestic market and their overall net impacts are other areas for future research. This requires specific country based studies that are fundamental to chart a mutually beneficial interaction between African countries and emerging economies such as China and India.

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