

China's Trade Restrictions and Africa's Exports

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Abstract: Sustainability of growth in Africa depends in part on the extent to which it can exploit opportunities available from trade. Trade barriers exist to key African exports which make it difficult for the continent to take advantage of the opportunity that abounds in trade. This study evaluates the impact of trade restrictions in China on African exports. We found that trade restrictions in China hinder import from Africa while the non-tariff restrictions are more significant than any other restrictions.

Key words: Trade restrictions, exports, opportunity, gravity model, panel data, Africa

INTRODUCTION

The attainability of sustainable growth and reduction in poverty level in developing countries has been linked to their interaction and integration with the rest of the world. Trade has been recognised to be part of the channels with which countries can interact or relate economically. Global trade has been acknowledged by many theorists; especially the orthodox ones to have been beneficial and countries could gain from their participation. These theorists based their propositions on the premise that there will be trade flows among/between participating countries.

However in reality, this is often not the case as there are various market access barriers to some key exports, especially those that developing countries and particularly Africa has comparative advantage. As a result of these trade policies, Africa found it difficult to take full advantage of the opportunities embedded in global trade. In the theory of comparative cost advantage, countries are advised to specialize in the production of commodities in which they have comparative cost advantage over other countries. This will make countries to gain from international trade. African exports prior to this time (during 1950 and 1960's) have performed relatively well in terms of the volume and number of products while the issue of market access barriers to their exports in the markets of their trading partners did not arise. Though, Africa has its strength in the production of primary products that attract fewer restrictions in the developed nations' markets (especially in the markets of their colonial masters), continent has however gain from trade in which the returns serve as the bulk of their foreign exchange during these periods. However, recently the developed countries found it appropriate to engage in backward integration (that is to encourage the production

of primary products for the use of the industrial sector of their economies) that will reduce the import bills they pay to their trading partners (Kareem, 2010). It is as a result of this that the developed countries started encouraging the production of primary products especially agricultural products which attracted some supports and subsidies that distort international prices of these commodities. These subsidies and supports made imports from African countries to be less competitive coupled with the fact that these developed countries imposed restrictions on agricultural exports access to their markets.

So far, there has been a divergence of opinions as to what really undermines Africa's exports in global trade. While African governments believe that it is the trade policies that hindered Africa's exports to developed countries and some developing countries thereby, reducing the income level and employment rate, some scholars opined and even argued that even if Africa's exports are allowed free access to the developed countries' markets, the continent lacks the ability to produce to meet the demand due to Africa's supply constraints.

Some studies have been carried out on the issue of market access conditions, many of which ascertained the extent that Africa has gained from the trade preferences granted to the continent (Mayer and Zignago, 2005; Hammouda *et al.*, 2005; Francois and Wooton, 2006; Francois *et al.*, 2005; Manchin, 2004; Amjadi *et al.*, 1996; Yeats, 1998).

The studies that modelled the actual distortions to trade due to market access restrictions focused on trade mostly between developed and developing, i.e., North-South trade and in particular for sub-Saharan Africa (Kee *et al.*, 2006; Mayer and Zignago, 2005). It is against this background that this study tends to determine to extent to which trade policies in developed and

developing countries have affected Africa's exports. Does Africa's participation in trade agreements with these trading partners have any contribution to her exports.

MATERIALS AND METHODS

Several theories have been used to give theoretical underpinning to the issue of trade barriers or restrictions in the empirical literature. We have adapted the new trade theory as the theoretical construct in this study due to the fact that it could be used to explain trade liberalization and protectionism.

The new trade theory evolved from the researchers of Krugman (1980) and Helpman and Krugman (1985). The theory is based on economies of scale and imperfect competition. It tends to relax the two major assumptions of the no-trade model or the Heckscher-Ohlin (H-O) model as follows:

- While the H-O theory assumed Constant Returns to Scale (CRS), international trade can also be based on Increasing Returns to Scale (IRS)
- Relaxing the assumption of perfect competition can also lead to new trade theory. About half of the trade in manufactured goods among industrialized nations is based on product differentiation and economies of scale which are not easily reconciled with the H-O factor endowment model. Thus to explain intra-industry trade, we need new trade theories

Underlying the application of the monopolistic competition model to trade is the idea that trade increases market size. In the industries where there are economies of scale both the variety of goods that a country can produce and the scale of its production are constrained by the size of the market. By trading with each other and therefore forming an integrated world market that is bigger than any individual national market, nations are able to loosen the constraints. Each country can specialize in producing a narrower range of products than it would in the absence of trade; yet by buying goods that it does not make from other countries each nation can simultaneously increase the variety of goods available to its consumers.

As a result, trade offers an opportunity for mutual gain even when countries do not differ in their resources or technology. Suppose for example that there are two countries, each with an annual market for one million automobiles. By trading with each other, these countries can create combined market of 2 million automobiles. In this combined market more varieties of automobiles can be produced at lower average costs than in either market

alone (economic of scale). The monopolistic competition model can be used to show how trade improves the trade-off between scale and variety that individual nations face. In developing a general model of trade under imperfect competition we need to have a representation of consumer choice that treats product differentiation. The most popular model in the literature is that of Dixit and Stiglitz (1977).

The analysis in this study is based on a model that is adapted from the empirical work of Mayer and Zignago (2005) that depicts the extent to which market access in global influenced regional trade through a border-effect methodology. The modification that the study has done to the work of Mayer and Zignago (2005) is by including non-tariff barriers and trade agreements. A gravity model is specified which got its theoretical underpinning in almost every trade model with full specialization, as shown by Evenett and Keller (2002). However, the theoretical framework is derived from the new trade theory above that made provision for economic of scale and imperfect market. Bergstrand (1990) provides a description of the link between gravity equation and bilateral trade patterns in a monopolistic competition framework of the new trade theory.

Tinbergen (1962), Poyhonen (1963) and Linnemann (1966) were the set of researchers that first applied gravity model to the analysis of global trade flows. The name of the model was derived from its passing similarity to Newtonian physics which indicates that large economic entities such as countries or cities are said to exert pulling power on people (migration model) or their goods (trade models) or capital (FDI model).

The simplest form of international trade gravity model assumes that the volume of trade between any two trading partners is an increasing function of their national incomes and populations and a decreasing function of the distance between them. In the model, it is common to use the dummy variables to capture geographical effects (such as signalling whether the two countries share a border or if a country has access to the sea), cultural and historical similarities (such as if two countries share a language or were linked by past colonial ties), regional integration (such as belonging to a free trade agreement or sharing a common currency) as well as other macroeconomic policy variables (such as bilateral exchange rate volatility). Anderson (1979), Bergstrand (1985) and Helpman and Krugman (1985) have derived gravity equations from trade models based on product differentiation and increasing returns to scale.

Linnemann and Verbruggen (1991) have explicitly studied the impact of tariffs on bilateral trade patterns using a gravity model framework. However, it was

Esteveordal and Robertson (2002) that explicitly studied the incorporation of preferential tariff rates in a gravity model. The monopolistic competition model of new trade theory provides the theoretical foundations to the gravity model (Helpman, 1987; Bergstrand, 1989).

Here, the product differentiation by country of origin approach is replaced by product differentiation among producing firms while the empirical success of the gravity model is considered to be supportive of the monopolistic competition explanation of intra-industry trade. Assume that the consumers in country, i have a 2-level utility function where the upper level is a Cobb-Douglas with expenditure parameter u_i which gives rise to a fixed expenditure share out of the income, y_i .

The lower level utility function on the other hand is a Constant Elasticity of Substitution (CES) aggregate of differentiated varieties produced in the considered industry with s representing an inverse index of product differentiation:

$$U_i = \left(\sum_{j=1}^N \sum_{h=1}^{N_j} (a_{ij} c_{ij})^{\frac{\sigma-1}{\sigma}} \right)^{\frac{\sigma}{\sigma-1}} \quad (1)$$

The CES structure usually indicates the love for variety, based on the fact that the consumers are willing to consume all the available varieties. The study shall deal with a situation where the consumers have different preferences over varieties depending on bias. The consumers' preference parameter in country i for varieties produced in j is denoted a_{ij} . Thus, the solution to Eq. 1 gave an estimable equation with respect to Africa's trade relations with her trade partners from the monopolistic competitive equation of Krugman (1980). The step by step solution could be seen from Kareem (2010):

$$\begin{aligned} \ln \left(\frac{m_{ij}}{m_{ii}} \right) &= -(\sigma-1)[\beta + \eta] + \ln \left(\frac{v_j}{v_i} \right) - \sigma \ln \left(\frac{P_j}{P_i} \right) - \\ &(\sigma-1) \ln(1+t_{ij}) - (\sigma-1) \ln(1+ntb_{ij}) - (\sigma-1)\delta \quad (2) \\ \ln \left(\frac{d_{ij}}{d_{ii}} \right) &- (\sigma-1)[\theta_1 - \eta_i] RTA_{ij} + \epsilon_{ij} \end{aligned}$$

Where:

$$\epsilon_{ij} = (\sigma-1)(e_{ij} - e_{ii})$$

$(-\sigma-1)[\beta+\eta]$ is the constant of Eq. 2 and it gives the border effect of the international trade for countries that belong to the same group, the South for instance. This includes both the level of protection of the importing country (η) and the domestic bias of consumer (β). The coefficient RTA measures the effects that the regional trade agreements have on African exports. Theoretically,

we expect an inverse relationship between relative price and Africa's exports due to the problem of imported inflation that might arise in the economies of Africa's trading partners. Relative output is expected to have a direct relationship with Africa's exports that is as output increases there will be more to export.

Tariffs and non-tariffs are expected to have inverse relationship with Africa's exports. This means that as more market conditions are imposed on Africa's exports there will be restriction in the access of Africa's exports and if eventually the exports get into the trading partners market, it cannot compete favourably with similar products.

Same colonial affiliation is expected to enhance trade theoretically that is countries of the same colonial affiliation tend to trade more with themselves. Language is a barrier to trade if the trading partners did not speak similar language. Distance is another inhibiting factor to trade that is the higher the distance, the lower the trade. Involvement in trade agreements is expected to boost trade among trading partners.

This study makes use of generalized method of moment panel data analytical methods with the test of the panel data properties and panel granger causality. These methods allow us to estimate the regression equations for the whole of Africa and the sub-groups. The reason for the use of panel data technique in the gravity model is based on the several benefits of the technique as identified by Hsiao (1985, 1986), Klevmarken (1989) and Solon (1989). It could be used to control for individual heterogeneity, it provides more informative data, more variability, less collinearity among the chosen variables, more degree of freedom and more efficiency.

Also, panel data technique is a better option when one intends to study the dynamics of adjustment and duration of economic states like poverty and employment and if these panels are long enough they can shed light on the speed of adjustments to economic policy changes. Panels are necessary for the estimation of inter-temporal relations, life-cycle and intergenerational model and they can easily relate individual's experiences and behaviour at another point in time.

They are better able to identify and measure effects that are simply not detectable in cross-section or time-series data such as in Ordinary Least Square (OLS) method. The basic class of specification of these models is given as:

$$Y_{it} = f(X_{it}, \beta) + \delta_i + \gamma_t + \epsilon_{it} \quad (3)$$

This leading case involves a linear conditional mean specification so that we have:

$$Y_{it} = \alpha + X_{it}\beta_{it} + \delta_i + \gamma_t + \epsilon_{it} \quad (4)$$

Where:

- Y_{it} = Stands for the dependent variable
- X_{it} = K-vector of regressors
- ϵ_{it} = Error terms for $i = 1, 2, \dots, M$ cross-sectional units observed for dated periods $t = 1, 2, \dots, T$
- α = Represents the constant of the model
- δ_i, γ_t = Represent the fixed and random effects, respectively

Identification obviously requires that the β coefficients have restrictions placed upon them. They may be divided into sets of common (cross-section and periods), cross-section specific and period specific regressor parameters.

This panel estimation technique will enable us to estimate panel equations using linear or non-linear squares or instrumental variables (system of equations) with correction for the fixed or random effects in both the cross-section and period dimensions and in addition, the Generalized Method of Moment (GMM) will be used to estimate the specification with various system weighting matrices. It should be noted that apart from the above basis for panel data analysis, panel equations allow us to specify equations in general form and also permits specification of non-linear coefficients mean equations with additive effects.

Panel equations do not automatically allow for β coefficients that vary across-sections or period but one may create interaction variables that permit such variation.

RESULTS AND DISCUSSION

The panel data used in this study covers the period 1990-2007 for 31 African countries. The outcome of this research starts with the descriptive analysis of the variables used. The Africa-EU trade model indicates that the average ratio of imports is 0.00040 while that of ratio of outputs between these trading partners in the period under consideration is 0.0021. Average ratio of prices is 0.9288 that of tariffs is a 5.8733% and non-tariff barrier is 0.5333. The average language between these partners shows that 90% of the countries in Africa speak same language with the European countries while the mean distance is 5579.5 and at least 60% of these countries have regional trade agreements with the EU. Also 93% of them have colonial affiliation with the European countries. The difference between the predicted values and actual values of the variables is very limited except for distance that has a wide difference. Using the GMM to estimate the models we present two different estimates of the GMM, vis-à-vis, no effect and random effect. We have decided to estimate the random effect due to the fact that the

Table 1: Panel GMM result (Africa-EU)

Variables	No effects	Random effects
Routput	0.1321 (8.70) ^c	0.1537 (2.09) ^b
Rprices	-0.0006 (-0.58)	-0.0015 (-1.87) ^a
Tariffs	-0.0016 (-1.08)	-0.0010 (-2.06) ^b
NTB	-0.0006 (-1.32)	-0.0007 (-7.15) ^c
Distance	-0.00068 (-6.09) ^c	-0.0001 (-6.91) ^c
Language	-0.0004 (-9.90) ^c	-0.0003 (-8.73) ^c
RTA	-0.0069 (-1.53)	-0.0037 (-17.32) ^c
Colonial	0.0025 (0.97)	-0.0047 (-5.54) ^c
Constant	0.0048 (1.64)	0.0203 (2.35) ^b
Adj. R ²	0.5700	0.5300
Std. Error	0.0053	0.0013
D. Watson	1.5800	1.7800
J. statistic	63.0900	53.4100

The figures in parentheses are the t-statistic. The superscript c, b, a indicate 1, 5 and 10% level of significant, respectively

models for this study are gravity models that have dummy variables of which fixed effect estimator will be inappropriate. According to Baltagi (2001) and Greene (2003), fixed effect also known as Least Squares Dummy Variables (LSDV) suffers from a large loss of degree of freedom in which when it involves estimating (N-1) extra parameters and too many dummy variables, this will aggravate the problem of multicollinearity among the regressors. Also, the fixed effect estimator cannot estimate the effect of any time-invariant variable like sex, race, language, religious, colonial links, schooling, etc., because they will be wiped out by the Q transformation, the deviations from means transformation. Thus they concluded that any regression attempting to use this estimator will fail. It is on this basis that in this study, we have used the random effect estimator.

In the Africa-EU trade relation using the no effects, relative output between EU and Africa is an important variable to consider when modelling their trade relation. The result shows relative output has a significant positive slope in the model and it indicates that the absorptive capacity of the EU to exports from Africa is about 13%. The relative price conform with the apriori expectation, indicating that an increase in the relative prices will reduce the access of African exports to the EU though, statistically insignificant (Table 1).

Tariffs and the Non-tariff Barriers (NTB) have the required slopes that is the conform with the apriori expectation. These results indicate that the EU allowed African exports greater access than any other country chosen in this study. This is because the slopes of tariffs and NTB show that the EU encourages the importation of African product to their domestic economies by lowering down the tariffs and the non-tariff barriers to such products. The reason behind these encouraging trade relations is that the EU as signed some agreements particular non-reciprocal trade preference in which will allow African products access to the EU without

mandating African countries to reciprocate. Distance here is significant to the model and shows that it could discourage trade if the trading partners are far away from each other. Language also shows that if the trading partners do not speak same language, this might cause a barrier that will affect trade. Though, the magnitude of the reduction in trade is small (0.05%) but it is statistically significant. Colonial affiliation between Africa and the EU will propel trade among them. This means that the EU often trade more with those countries in Africa that they have same colonial affiliation or that they colonized. This could be seen in the relationship between francophone African countries and France. We discovered from the coefficient of the constant that there has been a considerable level of integration among African countries in this model, though it is insignificant but the magnitude is about 0.5%. However, the regional trade agreements between the continent and EU have not yielded any genuine trade to the continent.

This essentially might be due to Africa's supply constraints. In the random effects, the estimate confirms the results of the no effect estimator but here the random effect was able to establish significance to those hitherto insignificant. For instance, tariffs and NTB were not significant in the non-effect model but are now significant. Also, RTA and level of integration (constant) were not significant until now. Lastly, a major difference is that the colonial affiliation that is before now positively sloped is now having statistically significant negative relationship with trade.

CONCLUSION

This study has evaluated the effects of trade barriers in the EU and China on Africa's exports. We have shown empirically using descriptive analysis and econometrics method, the effects of these trade barriers on Africa's export products access to both the North and South markets. Thus, at this juncture, it is important to note that the objective of this study has been adequately achieved and accomplished that is we have shown the effect of trade barriers on Africa's exports in the North (EU) and South countries (China).

Therefore, the study concludes that African exports have not been gaining access to both the North and South countries not only because of inadequate implementation of the trade agreements which had led to the trade barriers imposed on their products but due to the fact that Africa has low and inadequate production capacity that will enable her to meet up with the market access allowed to her products despite the potentiality of her output gaining access to these trading partners

markets. We also conclude that products of relevance to African countries are confronted with higher trade barriers mostly in the South countries such as China than in the developed countries due to the fact that these South countries have not granted appropriate trade preference to African countries for the continent commodities to gain access these markets. The implication of this is that there are more market access conditions in South-South trade than North-South trade which confirm the results of Mayer and Zignago (2005) and Hammouda *et al.* (2005).

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