OPENNESS AND ECONOMIC PERFORMANCE IN SUB-SAHARAN AFRICAN COUNTRIES: EVIDENCE FROM TIME-SERIES AND CROSS-SECTIONAL ANALYSES

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Abstract
There is a lack of strong empirical evidence on the relationship between openness and economic performance largely due to problems associated with the measurement of openness and analytical methods. This paper uses more appropriate policy based measures of openness since most countries of Sub-Saharan Africa have made substantial changes over the last decade. The study examines the hypothesis that increased openness, improves economic performance holds for Sub-Saharan Africa as a subgroup for the period of 2000-2009. Equally, the study examines the extent to which Sub-Saharan African Countries had participated in the global economy using various indicators of economic integration and macroeconomic variables. Empirical analysis is carried out using panel data with Generalized Least Squares Method (GLS) to measure the impact of Openness on the Economic Performance of selected countries in Sub-Saharan Africa. The result of the finding shows the evidence of a positive link between openness and performance, surprisingly robust, using the trade dependency ratio as a measure of openness, to different periods, and to the inclusion of other policy variables. The relationship is especially strong in fixed-effect estimates that use annual panel data with country dummies to capture unobserved country-specific differences while the size and significance of the openness coefficients do not change when controlled for macroeconomic performance.

Keywords: Openness, Economic Performance, Developing Countries, Fixed-Effect, Random-Effect

Introduction
The economic crises experienced in world markets since the mid-1970s had severe adverse effects on Africa. In sub-Saharan Africa, free-market regime has found far fewer converts. Despite tremendous pressure from donor governments and multilateral agencies, African policy makers have generally been more skeptical about the value of opening up their economies and reducing the role of government. Consequently, reforms have progressed rather gradually and have been full of interruptions and reversals(Ogujiuba, et al 2004). Altogether, there is growing
evidence that increased openness improves economic performance in developing countries (Martin, 1992; Harrison, 1991), and there is also considerable skepticism about the relevance of this relationship for Sub-Saharan Africa.

A good deal of country-specific evidence reveal that African producers respond positively to improved incentives, although but the skeptics argue that increased openness does not work in Sub-Saharan Africa for various reasons. While some have argued that reforming trade regime to enhance efficiency and exports contributes less to output growth than increasing aid or promoting faster technical progress in agriculture (Helleiner, 1991). Others argue that efficiency gains from reforms may be small because domestic producers cannot reallocate resources sufficiently due to weaknesses in the human resource base, in infrastructure and in institutions (Elbadawi, 1992). Nearly half the countries of the region are poorer today than they were a generation ago (World Bank, 1991). More than three quarters of them have undertaken policy reforms during the twentieth century and on the face of reforms, it does not appear to be associated with improved economic performance in the region. A number of reasons could be responsible for the stagnant and inconsistency of aggregate output and economic openness. First, if producers do not respond to the trade reforms because inconsistent macroeconomic-policies may have undermined their credibility, then greater openness would not generate the expected gains in productivity. Second, even when trade reforms are credible, producers may be unable to respond to reforms because of domestic regulations in product and factor markets or because of intrinsic weaknesses in institutions, infrastructure and the human resource base.

There is enormous systematic cross-country evidence of openness-performance link in developing economies since the time of Adam Smith when he argued that openness and trade liberalization provide the necessary ingredients for economic growth (Miller and Upadhya, 2000). Recent empirical research seems to suggest that the lack of openness mainly explains the dismal growth experience of Sub-Saharan Africa and other developing countries (Dollar, 1992; Sachs and Warner, 1997). In a survey therefore, there exists considerable weaknesses in the econometric literature and argued that the empirical evidence to date does not provide convincing evidence. They concluded that openness to trade in the sense of lower tariff and removal of non-tariff barriers to trade are significantly associated with economic growth. Economic policy in the last two decades had one dominating theme. As an integral element of the structural adjustment package (SAP), trade liberalization was espoused on the argument that it enhances the welfare of consumers and reduces poverty as it offers wider platform for choice from among wider variety of quality goods and cheaper imports. The link between openness
and economic growth and development has long been of interest to economists. Martin (1992) and Harrison (1991) are of the opinion that trade liberalization promotes economic growth while some opined that the interrelationship between trade liberalization and economic growth depends on other variables. In a solely African study by Oyejide (1996), there is evidence that trade liberalization promotes growth. It is shown that liberalization is associated with increased export orientation and higher trade shares in all the countries in the study. The more open economies in the case study grew faster than the closed ones while structural change, corresponding to a shift in reliance from primary production to manufacturing occurred faster in open economies than in relatively more closed ones. Africa has consistently lagged behind and the income gap relative to the advanced countries and some developing countries especially Asia has widened.

Thus, empirical research has generally found a positive relationship between greater openness and economic performance. The early cross-country work relied on changes in export growth or in export shares as a proxy for changes in openness (Tyler 1981, Feder 1983 and Ram 1985). Most of these studies use the aggregate production function framework to analyze whether differences in export performance explain cross-country differences in economic growth after controlling for growth in capital stock and labour. All of them confirm a positive openness-performance link for developing countries. However, several of these studies (Michaely 1977, Tyler 1981, Feder 1986) have argued that a positive openness-performance relationship is not relevant to low income countries because such a link may not operate below a threshold level of development. For example Michaely (1977) claims that ‘the positive association of the economy’s growth rate with the growth of the export share (which is the index of openness) appears to be particularly strong among the more developed countries, and not to exist at all among the least developed.

Martin (1992) reveals that countries in the Sub-Saharan African region which enhanced the openness of their trade regimes have, on average, tended to perform better than those that have not. This cross-country evidence, developed in his paper, find a positive openness-performance relationship in Sub-Saharan Africa which is surprisingly robust. The results not only hold across different measures of openness, and different time periods, but also when a macro-economic policy variable is included in the regressions. What is more surprising is that the estimated openness-performance link in Sub-Saharan Africa is not very different from that in Non-Sub-Saharan Africa over the period studied (Martin, 1992). Most of the coefficients on openness are statistically not significantly different for the two groups. Moreover, the study carried out separately by Maku (2007) and Ogede (2004)
reflect that the degree of openness of global market by the Sub Saharan Africa Countries and Nigeria respectively in the last twenty five years (1980-2004) has a negative impact on economic development. They attributed this to their inadequate human and institutional capacity, physical infrastructure and access to markets, capital and technology necessary for integrating into the world economy.

Thus, how much of these benefits of growth performance has actually materialized in the developing world is a matter of great controversy and this study intends to determine this empirically. Taking a close look at the Sub-Saharan African countries, Maku (2007) and Oyejide (1996) found that there is evidence that trade liberalization promotes growth. It is shown that liberalization is associated with increased export orientation and higher trade shares in all the countries in the study. To this end, this study use data on growth rate of GDP to test the potential effects of trade openness on economic performance in the Sub-Saharan African (SSA) countries respectively and also to test if the economic systems in the region allow such potential to transform the economy of the region. Also, whether there is actually a causal relationship between the variables and whether this correlation is robust enough for controlling other factors remain an unresolved question which this study tends to provide answer for. The study seeks to add to the empirical literature by departing from earlier cross-country analysis of openness-performance relationship by using more appropriate policy-based measures of openness. Since most countries of Sub-Saharan Africa have made substantial changes in commercial and exchange rate policies over the last decade, period-averages of any measure of openness is likely to be misleading.

The following pertinent questions were raised as guide for the investigation.

i. How has openness to trade affected performance of economic growth in the selected Sub-Saharan African countries?
ii. Why is openness to trade continually advocated for the Sub-Saharan African countries?
iii. What are the prospects and problems of openness to trade to Africa’s economic growth?
iv. How much of these benefits of economic growth have actually materialized in the developing world like of Sub-Saharan Africa?

Review of Literature

Theories on openness suggest that a higher level of openness or increases in openness promote better economic performance. Static allocative efficiency gains suggests that greater openness yields unambiguously better economic performance in terms of a higher level of output or income even if not in terms of a higher long-run rate
of growth. The traditional case for increased openness or enhanced neutrality of trade regime was based primarily on theories of static allocative-efficiency gains. The removal of trade barriers expands the feasible set of consumption possibilities by providing a “more efficient technology” to transform domestic resources into goods and services.

Bergsman (1974) measures the conventional production cost, a technical inefficiency cost and a monopoly cost for four countries in Asia and Latin America (Pakistan, Philippines, Brazil, Mexico) and finds it to range between 4% and 7% of GDP, of which the conventional production cost was less than 1% of GDP. Vernon (1966) and Hirsch (1967) develop theories of trade that attempted to explain the tendency for the production of new goods to be concentrated in the developed countries early in the life of the product, but to move to other economies later on. The basic argument is that the factors requirements for a good, will vary over the lifetime of that good, so that we may observe a cycle in the production of a new good. The innovation of a new good is a risky business, and these risks may best be borne by relatively rich firms, particularly if the good in question is one which is of interest to consumers with relatively high incomes. The risks may be reduced by flexibility on the production side, which Hirsch argues will require skilled labour and by a good flow of information on consumers’ responses, which Vernon suggests may be obtained by proximity to the market. All these suggest that in the early, riskier, stage of a product’s life cycle, we should expect production to concentrate in the richer countries.

As the product and the manufacturing process become more standardized, and as any patents expire, producers in other countries will seek to enter the market if the pattern of factor prices in their economies is such as to give them a cost advantage over the initial producers. If the production process still requires inputs of highly skilled labour, and the good is still sufficiently costly to restrict its purchase to high income consumers, we would expect to see such competition arising in other developed countries. It may well be the case that the firm which produced the good initially will itself set up production facilities in other developed countries in order to take advantage of their more favourable factor prices rather than let competitors establish themselves. In either case, we would expect to observe that exports of the good from the original innovating country will decline. If the technology for the good becomes completely standardized in a form that can use relatively unskilled labour, and is widely known and freely available, we might expect the location of production to transfer to relatively labour rich economies. Again, the production might come from newly established domestic companies in these countries, or it might be a consequence of existing companies transferring
operations. Whatever the case the country originally producing the good, and even others that started production in the second stage of the product cycle will experience a decline in their exports, and may even become importers. Thus, an efficiency gain from a better allocation of resources raises the level of national output. In addition, reduction of trade barriers reduces other costs of a less open trade regime: deadweight losses arising from domestic monopolies, costs arising from scale inefficiency, technical inefficiency or X-efficiency (Corden, 1974) and costs of rent-seeking and directly unproductive activities (Krueger, 1974).

The “new” growth theories suggest a link between openness and the long-run rate of growth of output rather than a rise in the level of output. This can occur through the favorable impact of openness on technological change. For example openness to trade increases growth rate because it provides access to a variety of imported inputs which embody new technology (Grossman & Helpman 1992, Romer 1986). Another channel of favourable impact is that greater openness expands the size of market facing domestic exporters (Krugman, 1974) thereby raising returns to innovation and thus enhancing the country’s specialization in research-intensive production.

However, this theoretical literature is not unambiguous about the direction of the effect of increased openness on the growth rate. It does not predict that greater openness will unambiguously raise the growth rate. This is because the “new” growth theories also show that growth can be lowered by increased foreign competition or it can be increased by import protection if protection promotes investment in the research-intensive sectors of the relevant country. The new theory does not, however, predict any positive link between openness and increase in growth can be lowered by increased foreign competition or it can be increased by import protection. Thus, under the endogenous growth literature, the direction of the openness-growth relationship is not theoretically given. It is an open question for empirical investigation. Reviewing the existing theories, Cooper (2002) came to the conclusion that “there is in theory, no systematic link between trade and sustained growth. Just as there is no single, simple connection between growth and trade, there is no single or simple connection between trade and growth. The impact of new trade on growth may well be powerful in some countries, but it can well be negligible or even negative in other”.

Trade openness may generate significant gains that enhance economic transformation. Under greater openness to trade, allocation of productive resources tends towards activities with comparatively greater efficiency. Trade liberalization may improve domestic productivity and economic growth by increasing knowledge spillovers from more advanced trading partners (Agenor, 2002). In the long run,
trade openness may generate dynamic gains by way of facilitating the acquisition of new inputs, less expensive or higher-quality intermediate goods, and improved technologies, which enhance the overall productivity of the economy. Thus, access to a variety of foreign inputs at a lower cost (or the role of the international diffusion and adoption of new technologies or new goods) shifts the economy-wide production possibility frontier outward, thereby raising productivity (Romer, 1994). The mechanism through which increased productivity and growth rates occur as economies become open to international trade is not limited to the adoption of more specialized intermediate inputs and machinery available from trading partners; there are many types of useful knowledge that are not embodied in material inputs (such as production engineering and information about changing product patterns).

Recent models of endogenous growth have used these ideas to study the effects that trade can have on the long-run rate of growth (Romer, 1994). Trade openness may foster greater possibilities of exploitation of economies of scale and location effects, as efficient producers expand their market share, which further reduces costs (Baldwin, 2000; Drabek and Laird, 2001). New endogenous growth models generate results, which show that openness “can also yield permanently reduced rates of growth, as when trade pushes an economy to speculate in sectors with no dynamic scale or other benefits” (Rodrik, 1999). Indeed, exports of many developing countries continue to consist of agricultural products and relatively low technology manufactured goods (such as textiles). Even though openness to trade (and capital flows) may help these countries to assimilate technologies and production techniques over time (thereby enabling them to shift eventually toward the production of goods and services that are characterized by dynamic gains) there may again be a transition period during which globalization may have only a limited effect on growth and poverty.

In consonance with potential dynamic gains of trade openness, most early empirical studies have examined a set of trade openness measures and their correlation with each other and with economic growth and found a clear positive link. For example, Harrison (1996) looks at a number of openness indicators that turned out to have a positive ‘association’ with economic growth and produced evidence in support of bi-directional causality between openness (trade share) and economic growth. Later research, however, has questioned the robustness of the relationship. Rodriguez and Rodrik (1999) confirm the Harrison-Hanson critique and argue that much of the work that correlate trade openness and economic growth have been plagued with subjective and collinear measures of openness that, though positively related with economic growth, arrive at their conclusions through problematic econometric methodologies. Harrison (1996) and Pritchett
(1996) show that the various measures of trade openness tend to be only weakly correlated and are often of the wrong sign. In general, empirical studies suffer from a number of shortcomings, and as a result they have not resolved the questions surrounding the correlation between openness and growth. Baldwin (2000) offers explanations for the differences among researchers of the openness-growth nexus. The study states further that if any study uses measures that were even slightly correlated, then the empirical literature together could be taken as proof of a positive relation between openness and growth. However, the most reliable indicators of openness that had earlier been highlighted by several authors include:

(i) Edward Leamer’s (1988) openness index, built on the basis of the average residuals from regressions of trade flows;
(ii) The average import tariffs from UNCTAD via Barro and Lee (1994);
(iii) The World Bank’s subjective classification of trade strategies in *World Development Report*;
(iv) The Sachs-Warner openness index;
(v) The average black market premium;
(vi) The average coverage of non-tariff barriers, also from UNCTAD via Barro and Lee (1994);
(vii) The subjective Heritage Foundation index of Distortions in International Trade; and
(viii) The ratio of total revenues on trade taxes (exports + imports) to total trade.

Thus, most of studies of the openness and growth relationship have resorted to more creative empirical methodologies which include:

(a) Testing robustness by using a wide range of measures of openness, including subjective indicators (Edwards 1992, 1998);
(b) Constructing alternative indicators of openness (Dollar 1992; Sachs and Warner 1995); and
(c) Comparing convergence experience among groups of liberalizing and non-liberalizing countries (Ben-David, 1993).

**Materials and Methods**

The study area of this work is Sub-Saharan African countries. It covers the vast majority of the land areas and the population of the entire continent of Africa. It includes all the countries in the continent with the exception of the North African countries. The Sub-Saharan African (SSA) countries comprise of all the forty seven countries located down the coast of the Sahara desert. The Sub-Saharan
African (SSA) countries represent 88% of the total number of all the 53 countries in Africa; it is taken as a good representation of the continent. The region (SSA) exhibits the vast of economic, social and political features of the continent of Africa. The SSA accounts for more than 75% of the land area of Africa. Hence, the findings from this study area can be a good framework in the study involving the entire continent. The Sub-Saharan African (SSA) countries cover Central Africa, East Africa, West Africa and South Africa. Eight (8) countries were carefully selected, two from each of Central Africa, Southern Africa, East Africa and West Africa. Thus, these eight countries selected control substantial percentage of the economy of the entire SSA. However, these countries were selected across the considered four sub-regions on the basis of data availability from reliable source, similar regional economy ties and trend of economic growth. The time series variables required of each cross-section country for the estimation of equation (3.5) is total exports, imports, gross domestic product at market price, foreign direct investment, exchange rate of naira vis-à-vis U.S dollar, external debt and net foreign reserves. All time-series variables considered for pool sample are in United States dollar unit for comparative and single measurement purpose.

Methods of trade openness in general differ in several studies significantly. This study used the trade to GDP ratio as mostly used by earlier research as proxy for openness. It adopts the Mundel-Fleming model of open macroeconomics in Obaseki (1999), the openness equation, which captures some aspects of globalization by providing impetus for socio-economic integration, can be expressed as:

\[ \text{GRATEg} = f(\text{OPEN}, \text{RESERVE}, \text{FDI}, \text{GRPCI}, \text{EXTR}, \text{DEBT}, \text{CPI}, \text{BOP}) \] …………..(3.1)

where

- \( \text{GRATEg} = \) Growth rate of real GDP
- \( \text{OPEN} = \) Openness \( \frac{X + M}{GDP} \)
- \( \text{RESERVE} = \) Total foreign reserves
- \( \text{FDI} = \) Foreign direct investment
- \( \text{EXTR} = \) External reserves
- \( \text{FEXR} = \) Foreign exchange rate
- \( \text{DEBT} = \) Total Debts
- \( \text{GRPCI} = \) Growth Rate of per capita-income
- \( \text{CPI} = \) Consumer Price Index
- \( \text{BOP} = \) Balance payment

Following the lead of Obaseki (1999) quoted by Maku (2007), econometric model for this study can be expressed in a panel model form as:
\[ GDP_{g_{it}} = \eta_{0i} + \eta_{1} OPN_{it} + \eta_{2} X + u_{t} \]  
(3.2)

Where \( GDP_{g}\) = Gross Domestic product growth rate as a proxy for economic growth

\( OPN = \) Openness to trade measured by trade dependency ratio

\( X = \) Set of exogenous factors that affects economic growth via trade relations

\( i = \) Cross-sectional identifier

\( t = \) Time

\( u_{t} = \) Idiosyncratic term or residual term

The idiosyncratic term represents non-measurable net effect of omitted time invariant variable such as political instability, government turnover, climatic conditions, corruption and the likes specific to each country. Unlike, the empirical model employed by Obaseki (1999), the set of exogenous variables (X) considered are Foreign Direct Investment, consumer price index, exchange rate, external debt, and net external reserves. Some of these exogenous factors are indexed as a ratio of Gross Domestic Output (GDP) excluding exchange rate and consumer price index. However, the considered exogenous factors are incorporated to modify the adopted Obaseki (1999) model with exclusion of Gross Per Capita Income to avoid multi-collinearity with the indexed variables and Gross domestic product growth rate. Also, the balance of payments is excluded because it is an aggregated variable of imports, exports, and reserves defined as:

\[ BOP = CA + CF - R \]

\[ CA = EX + IM \]  
(3.3)

Where \( CA\) = Current Account

\( CF = \) Capital and Financial Account

\( R = \) Reserves

\( EX = \) Exports

\( IM = \) Imports

Therefore, incorporating BOP simultaneously with reserves and openness to trade to formulate the modified empirical panel model for this study as expressed:

\[
\begin{array}{c}
\left( \frac{GDP_{t} - GDP_{0}}{GDP} \right)_{it} = \eta_{0i} + \eta_{1} \left( \frac{EX + IM}{GDP} \right)_{it} + \eta_{2} \left( \frac{FDI}{GDP} \right)_{it} + \eta_{3} CPI_{it} + \eta_{4} EXR_{it} + \eta_{5} DEBT_{it} + \eta_{6} RES_{it} + u_{it} \ldots (3.4)
\end{array}
\]

\[ GDP_{g_{0i}} = \eta_{0i} + \eta_{1} OPN_{it} + \eta_{2} FDI_{it} + \eta_{3} CPI_{it} + \eta_{4} EXR_{it} + \eta_{5} DEBT_{it} + \eta_{6} RES_{it} + u_{it} \ldots (3.5) \]
Equation (3.4) is further simplified in representation as:

Where FDI\(G = \) Foreign direct investment as a percentage of GDP  
\(\text{CPI} = \) Consumer price Index  
\(\text{EXR} = \) Exchange rate of naira vis-à-vis U.S dollar  
\(\text{DEBTG} = \) External debt as a percentage of GDP  
\(\text{RESG} = \) Reserves as a percentage of GDP

The econometric estimation method adopted for this study is the panel data estimate, and the estimation used is the Generalized Least Squares (GLS). The justification for using panel data method is rooted in the nature and type of variables considered in the study. The interest of the study is to investigate time series and cross sectional structure of economic units so that individual differences in behaviour can be captured by pooling all the data (information) for estimation and inference purposes. Thus, as a result of presence of autocorrelation and hetero-skedasticity in the panel data model, the least squares, nonlinear least squares and instrumental variables remain unbiased, consistent and asymptotically normally distributed but no longer efficient estimator and hence the usual inference procedures are no longer appropriate. In an attempt to retain the efficiency property of least squares in panel data, the model has to be transformed. When it is transformed, the OLS is no longer the estimator but the generalized least squares (GLS). This is meant to ensure that the autocorrelation and hetero-skedasticity are dealt with and make the GLS the appropriate estimator. However, after the GLS transformation the fixed effects that correct for cross-section seemingly unrelated regression (SUR) weights and random effects of Swamy and Arora estimators are employed for the empirical model estimation. While the Hausman test is used to determine the most efficient estimator between fixed effect and random effect estimation techniques.

**Results**

The results of the estimated panel regression model that capture the effect of openness on economic performance in Sub-Saharan Africa (SSA) using the fixed and random effects estimation techniques are presented in table 1 and the interpretation in respect to estimation methods and diagnostic test follows subsequently.
Table 1: Estimated Panel Regression Model

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<td>CPI</td>
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<td>EXR</td>
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<td>RESG</td>
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<td>0.0000</td>
<td>-0.00037*</td>
<td>-2.22652</td>
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Fixed Effects (Cross)      Random Effects (Cross)

| _AG   | 6.733166 | _AG   | 2.302569 |
| _CA   | 1.260899 | _CA   | 0.426435 |
| _GA   | -5.470534 | _GA   | -3.15525 |
| _GH   | 0.734424 | _GH   | 0.103769 |
| _KY   | -2.992024 | _KY   | -0.79976 |
| _NG   | 1.264827 | _NG   | 0.72509 |
| _TZ   | 2.54539 | _TZ   | 1.33141 |
| _SA   | -0.078149 | _SA   | -0.98341 |

Weighted Diagnostic Tests

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<td>R-squared</td>
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<td>Durbin Watson Stat</td>
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<td>0.874653</td>
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Note: * significant at 5% & ** significant at 10%
Source: Author’s Computation using E-Views 7.1
Fixed Effects
The results for the estimated pool regression model for the analysis of the effect of openness to trade on economic growth in Sub-Saharan Africa (SSA) based on the survey of 8 countries from Central Africa, East Africa, West Africa and Southern Africa sub-regions are presented in table 1. The reported results reveal that openness to trade and exchange rate have positive effect on economic growth in SSA and these conform with the theoretical expectations excluding the influence of exchange rate. In magnitude term, a percentage increase in degree of openness and unit increase in exchange rate of each sampled country vis-à-vis U.S dollar, gross domestic product grows by 0.047% and 0.0024 respectively. Also, consumer price index, foreign direct investment, total debt and foreign net reserves as a percentage of GDP are found to exert negative effect on economic growth in SSA. This implies that for a basic point increase in consumer price index as measure of inflationary pressure, economic growth in SSA deteriorates by 0.014%. However, for a percentage increase in foreign direct investment, total debt and foreign net reserves as a percentage of GDP, economic output will decrease by 0.509%, 0.084% and 0.0007% respectively. Although, it is only the effects of foreign direct investment and external reserves that are not in tandem with a priori expectations in this specified model. The fixed effects differential intercept is 6.7332 for Angola, 1.2609 for Cameroon, -5.4705 for Gabon, 0.7344 for Ghana, -2.9920 for Kenya, 1.2648 for Nigeria, 2.5454 for Tanzania and -4.0762 for South Africa. This is to indicate the differences in each country economic structure. In examining the individual statistical significance of each estimated pooled parameters that is constant for all cross-sections, the t-statistic results reveal that the degree of openness to trade, foreign direct investment, consumer price index, total external debt and reserves are statistically significant at 5%. The weighted diagnostic tests results reveal that the fixed effect adjusted R-squared is 91.8% and this indicates that 91.85 of the total variation in SSA economic growth is accounted for by openness to trade and other exogenous incorporated factors via trade relations between 2000 and 2009. The F-statistic explains the simultaneous significance of all considered factors and the result reveals that openness to trade, consumer price index, exchange rate vis-à-vis U.S dollar, foreign direct investment, total debt and foreign net reserves as a percentage of GDP have simultaneous significant effects on output growth level in SSA between 2000 and 2009 at 5% critical level. The Durbin Watson statistics also tests for the presence of first-order serial correlation and reported d-stat value (2.1621) which is close to 2 indicates that there is no presence of auto-correlation in the fixed effect estimated panel regression model.
Random Effects
Like the fixed effect estimation, the random effect estimation technique is also employed to examine the effect of openness to trade as a measure of globalization via trade on economic growth proxy by gross domestic product growth rate in Sub-Saharan Africa (SSA) based on the survey of 8 countries from Central Africa, East Africa, West Africa and Southern Africa sub-regions are presented in table 1. The random effect estimation results reveal that openness to trade, consumer price index, and exchange rate have positive effect on economic growth in SSA and these conform with the theoretical expectations excluding the influence of consumer price index and exchange rate vis-à-vis the U.S dollar. In magnitude term, foreign direct investment, total debt and foreign net reserves as a percentage of GDP are found to exert negative effect on economic growth in SSA. This implies that for a percentage increase in foreign direct investment, total debt and foreign net reserves as a percentage of GDP, economic output will decrease by 3.32%, 2.055 and 2.23% respectively. Although, it is only the effects of foreign direct investment and external reserves that are not in tandem with a priori expectations. The random effects differential intercept is 2.3026 for Angola, 0.4264 for Cameroon, -3.1553 for Gabon, 0.1038 for Ghana, -0.7998 for Kenya, 0.7725 for Nigeria, 1.3331 for Tanzania and -0.9834 for South Africa. This is to indicate the random differences in each country’s economic structure. In examining the individual statistical significance of each estimated pooled parameters that is constant for all cross-sections, the t-statistic results reveal that the degree of openness to trade, foreign direct investment, total external debt and reserves are statistically significant at 5%. Consumer price index and exchange rate vis-à-vis U.S dollar are found to be statistically insignificant at 5% and 10% critical level. The weighted random effects diagnostic tests results revealed that the adjusted R-squared is 10.6% and this indicates that 10.6% of the total variation in SSA economic growth is accounted for by openness to trade and other exogenous incorporated factors via trade relations between 2000 and 2009. This implies that going by the random effect estimation, the incorporated openness to trade and other exogenous factors have low explanatory power to explain changes in economic growth rate in SSA. While, the F-statistic explains the simultaneous significance of all considered factors and the result reveal that openness to trade, consumer price index, exchange rate vis-à-vis the U.S dollar, foreign direct investment, total debt and foreign net reserves as a percentage of GDP have simultaneous significant effects on output growth levels in SSA between 2000 and 2009 at 5% critical level. The Durbin Watson statistics also tests for the presence of first-order serial correlation and reported d-stat value (0.87465) which is far from 2 indicates that there is presence of autocorrelation in the random effect estimated panel regression model.
Hausman Test
The Hausman test is employed to determine the best estimator between fixed effect and random effect estimation techniques for the analysis of the impact of openness to trade on economic growth in SSA. The test is based on the null hypothesis, “there are no substantial differences between fixed and random effects estimators” and the hypothesis is evaluated using the Chi-Square statistic which result is presented in table 2.

Table 2: Correlated Random Effects-Hausman Test Results

<table>
<thead>
<tr>
<th>Correlated Random Effects - Hausman Test</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pool: GLOB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test cross-section random effects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test Summary</td>
<td>Chi-Sq Statistic</td>
<td>Chi-Sq. d.f.</td>
<td>Prob.</td>
</tr>
<tr>
<td>Cross-section random</td>
<td>47.129628</td>
<td>6</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

Cross-section random effects test comparisons:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Fixed</th>
<th>Random</th>
<th>Var(Diff.)</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPN?</td>
<td>0.062118</td>
<td>0.071808</td>
<td>0.001159</td>
<td>0.7760</td>
</tr>
<tr>
<td>FDI_GDP?</td>
<td>-0.490824</td>
<td>-0.291336</td>
<td>0.000939</td>
<td>0.0000</td>
</tr>
<tr>
<td>CPI?</td>
<td>-0.017695</td>
<td>0.002939</td>
<td>0.0000036</td>
<td>0.0096</td>
</tr>
<tr>
<td>EXR?</td>
<td>0.002800</td>
<td>0.002310</td>
<td>0.000018</td>
<td>0.9070</td>
</tr>
<tr>
<td>DEBT_GDP?</td>
<td>-0.090422</td>
<td>-0.042630</td>
<td>0.000247</td>
<td>0.0023</td>
</tr>
<tr>
<td>RES_GDP?</td>
<td>-0.000707</td>
<td>-0.000371</td>
<td>0.000000</td>
<td>0.0363</td>
</tr>
</tbody>
</table>

Source: Author’s Computation using E-Views 7.1

From table 2 above, the calculated Chi-square statistic value (47.1296) is found to be statistically significant at 5% critical level and 6 degrees of freedom, because the reported Chi-Square probability value (0.0000) is less than 0.05. Therefore, we do reject the null hypothesis “there is no substantial difference between fixed and random effects estimators” at 5% significance level. This implies that the fixed effect estimation technique is the best estimator for the analysis of the effect of openness to trade on economic growth in SSA from 2000 and 2009.
Conclusion
The study tests whether the hypothesis that ‘increased openness improves economic performance’ is true for selected Sub-Saharan African countries as a subgroup among developing countries for the period of 2000-2009. The econometric estimation methods used for this study are time-series and cross sectional analyses. The panel data estimate shows that openness exerts a significant positive impact on economic performance of selected countries in Sub-Saharan Africa. The relationship is especially strong in fixed-effect estimates that use annual panel data with country dummies to capture unobserved country-specific differences. The result of the finding shows the evidence of a positive link between openness and performance as surprisingly robust using the trade dependency ratio as a measure of openness, to different periods, and to the inclusion of other policy variables. Thus, the size and significance of the openness coefficients do not change when one controls for macrorconomic performance. Though, the research does not delve empirically into the exact mechanisms and processes through which openness affects economic performance in the selected Sub-Saharan African countries, it does provide persuasive evidence that differences in openness do account for cross country differences in economic performance of countries in that region. The results indicate that countries in the selected Sub-Saharan African region which enhanced the openness of their trade regimes have, on average, tended to perform better than those that have not.

Thus, the basis for the region’s integration into the global market is mainly to create market for domestic products and promote easy access to products that could not be produced in the region. In an attempt to achieve these goals, the degree of openness of SSA to the global market may cause them more havoc than benefits. Several authors have suggested that to be more integrated with the rest of the world, Sub-Saharan African countries must maintain strong and stable macroeconomic framework and encourage agricultural development. In spite of all these, it is important to bear in mind that trade is not a necessary condition for achieving high growth rate just as it is not a sufficient condition for a fast economic growth and welfare improvement. It is worth noting that, the sub-Saharan African countries would continue to gain from openness to trade if they position themselves appropriately since the integration into the global economy is however not a panacea for all of Africa’s economic ailments.
REFERENCES


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