REVISITING THE ACCURACY OF RICARDIAN THEORY OF COMPARATIVE ADVANTAGE IN AFRICA IN THE 21ST CENTURY: AN EMPIRICAL VERIFICATION

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ABSTRACT
This paper empirically examined the accuracy of Ricardian theory of comparative advantage in Africa in the twenty-first (21st) century using system GMM. The study used 52 African countries for the analysis covering 2001 to 2018. The study found that the Ricardian theory is theoretically plausible but lacks strong empirical evidence in Africa. The study finding implies that international trade is beneficial but African countries have not significantly benefitted from the trade. Based on the finding, the study recommends that the African countries should re-strategise their economies towards improving their export commodities relatively higher than the value of their imports commodities that could even stand competitive at the global market. This could create a basis for comparative cost advantage thereby increasing foreign earnings that could contribute positively to economic growth and in turn create domestic jobs for the region. The African countries should also ease of the complex and cumbersome border procedural requirements and other forms of institutional trade costs found in African economies.

Keywords: Comparative Advantage, Economic Growth, International Trade and Ricardian Theory

JEL Classification: F11, F41, F43

1. Introduction

The Ricardian theory is a theory that supports international trade through comparative advantage. The early logic that international trade could be beneficial for countries was based on Adam Smith's theory of absolute advantage in production (market specialisation). However, Ricardo further explicated the basis of mutually beneficial trade across countries and it has been a key feature of the international economy. International trade is the exchange of goods and services across borders. It is seen as an integral part of the Gross Domestic Product of an economy, particularly in developed and emerging economies. Therefore, it implies that an expansion in the volume of exports would lead to an increase in the volume of international or foreign trade and in turn, spurs economic growth. Generally, the arguments in favour of international trade are that it allows the dissemination of knowledge and technological progress, and encourages competition in

the domestic and international market and accelerates economic growth (Ijirshar, 2019; Dinç, Gökmen, Nakip & Azari, 2017; Chang, Kaltani & Loayza, 2009; Young, 1991; Eicher, 1999).

To Ricardo (2004), the gains from international trade come through the specialisation of countries in the production of goods in which they have a comparative advantage and engage in trade and exchange to meet their other needs. The theory explores dominant support for the gains of international trade because of the principle of mutually beneficial trade to both countries even if one of the countries is disadvantaged in the production of both commodities of trade. Contrary to this argument, if market or institutional imperfections ensue, international trade can lead to under-utilisation of human and capital resources, concentration in extractive economic activities, or specialisation away from technologically advanced increasing-return sectors (Grossman & Helpman, 1991a; Matsuyama, 1992).

Over the years and particularly in the 21st century, African countries have made several efforts in not only promoting intra-African trade flows but perhaps, more importantly, providing a wider platform to encourage trade with other trading partners or regions. Among them are the African Continental Free Trade Area (AfCFTA) agreement and establishment of the African Trade Centre (ATC). The African Continental Free Trade Area (AfCFTA) agreement stands to connect 1.3 billion people across 55 countries, making it the largest free trade area in the world by the membership and lifts many people out of poverty (The World Bank, 2020). The AfCFTA regional market is a major opportunity to help African countries diversify their exports and accelerate growth. The African Trade Center (ATC) is a trade and investment promotion agency committed fully to promoting, foreign and local direct investment into the African economy, the optimal utilisation of local content, facilitation of regional trade integration, and the export and acceptance of African made goods in the international market. More so, the African Growth and Opportunity Act (AGOA) was approved by the United States Congress in May 2000 to assist the economies of sub-Saharan Africa and to improve economic relations between the United States and the region (Nowak, 2017; AGOA.info, 2020). Other measures include the USAID supports for Africa's regional integration agenda by promoting the adoption and implementation of regional and international trade protocols, and the USAID's trade and investment hubs that work to reduce the cost of doing business in Africa by leveling the playing field, reducing risk, and cutting through red tape to deepen regional economic integration and trade as a whole. These measures and many more were implemented to boost production and favourable trade among the African countries that could spur economic growth.

Unlike other economies of World and particularly East Asia that successfully pursued export-oriented industrialisation with emphasis on trade liberalisation through an export promotion that consistently yielded faster growth, Africa remains marginalised in the global trading system. Statistics have shown that the African share in world exports has fallen from 6% in 1980 to 2.3% in 2018, and its share of world imports has fallen from 4.6% in 1980 to 2.5% in 2018. The region has only recorded an improvement in terms of intra-regional trade from 5.1% in 1980 to 16% in 2018 but this remains low as compared with levels of intra-regional trade in Europe with 73% and Asia with 52% in 2018 (Afreximbank, 2019). More so, the composition of Africa's export basket has not changed significantly but remains primary commodities and natural resources that account

for a significant share of total African exports. According to Rasheed (1996), few African countries have succeeded in diversifying the structures of their production and exports. Available statistics show that over 49 African countries recorded trade deficits in most periods in the 21st century while only a few of the African countries recorded trade surpluses in most of the periods (The World Bank, 2020). These outcomes have questioned whether African countries are benefitting from trade as eluded in the Ricardian theory. Hence, the need to assess the outcomes of the agreements and other related developments in promoting trade in Africa. More worrisome is the overdependence of African countries on primary commodities as noted earlier, and the continuing deterioration in Africa's terms of trade and the strong expectations that primary products will face long-term declining price trends and substitution possibilities by synthetic products.

Thus, arising from the desire to re-address all national and continental development strategies including the African Union's Agenda 2063 and the move of digital transformation for economic development and effective integration of African countries into the global economy, it is imperative to verify and clear the doubts as to whether African countries have actually benefitted from international trade as elucidated by Ricardo in his comparative advantage theory empirically. This has become vital since the empirical verification of this relationship among African countries has not been given any empirical attention. Therefore, this study examined the accuracy of the Ricardian theory of comparative advantage in Africa in the 21st century using 52 African countries from 2001 to 2018 within the dynamic framework of system Generalised Methods of Moment (GMM).

2.   Review of Literature
2.1   Theoretical Literature
2.1.1   Ricardian Comparative Advantage Theory
Before the advent of Ricardo's comparative advantage theory, there exists an extreme form of economic nationalism and protectionism known as Autarky situation. The fear of foreign competition makes countries try to produce all that they need and impose heavy restrictions to keep out foreign goods. But countries rarely produce and consume in autarky due to differences in factors endowments. Adam Smith and David Ricardo were among the first to question the idea of the Autarky situation. An autarky refers to the state of self-reliance, and it is typically applied to an economic system or nation characterised by self-sufficiency and limited trade. The Adam Smith's theory of absolute advantage emphasised the importance of specialisation in production and division of labour in 1776, while Ricardo in 1817 extended it to incorporate the theory of comparative advantage and showed the basis why nations need to trade and why trade is mutually beneficial to countries (Rehim, 2002).

Adam Smith showed how both countries could benefit from trade (Smith, 2000), but it was David Ricardo who is credited with what is commonly called "comparative advantage," the idea that both parties can benefit from trade even if one of them is better at producing everything than the other (Morgan, 2001; Maneschi, 1998). The comparative advantage theory states that even if one nation has an absolute disadvantage to the other nation in the production of both commodities, there is still a basis for mutually beneficial trade. According to the theory, the nation should specialise in the production and export of the commodity in which its absolute disadvantage is smaller (that is,

the commodity of its comparative advantage) and import the commodity in which its absolute disadvantage is greater (that is, the commodity of its comparative disadvantage). In other words, Ricardo believed that international trade could actually make every country better-off even if an economy can produce pretty much, everything that it knows, at its lowest cost, it is still better to focus on the products that can make it most efficiently to sacrifice the least of other goods, and the rest of the World does the same. By specialising, they can then export their products to each other and that makes them better-off (Ricardo, 2004).

It is important to note also that countries differ in respect to climatic conditions, availability of cultivable land, forests, mineral products, labour, capital, technology, and entrepreneurial skills resulting in diversities in resource endowment. International trade is, therefore, seen as a vehicle through which nations can specialise in those goods they can produce and export most cheaply and efficiently and in return import those products in which they have comparative cost disadvantage in the production (Bonuedi, 2013). Ricardo suggested that there are mutual national benefits from trade even if one country is more competitive in every area than its trading counterpart and that a nation should concentrate its resources only in goods or industries where it has a comparative advantage (Roberts, 2003). That is, in those industries in which it has the greatest competitive edge. Thus, to Ricardo, international trade based on comparative advantage can take place with mutual benefits even if one country is more efficient in both activities (Jones, 2014).

The more general discussion of the role of comparative advantage would compare the relative prices of the commodities when each country is in autarky. It is basic to note that the Ricardian theory of trade is useful especially in considering dynamic features involving comparative advantage and trade patterns (Jones, 2014). Ricardo attempted to prove theoretically and mathematically that international trade is always beneficial (Bouare, 2009). Paul Samuelson called the numbers used in Ricardo's example dealing with trade between England and Portugal as the "four magic numbers" (Samuelson, 1972). Even though Portuguese could produce both cloth and wine with less amount of labour, Ricardo suggested that both countries would benefit from trade with each other. The theory made use of opportunity costs and labour theory of value. According to labour theory of value, the value or price of a commodity depends exclusively on the amount of labour going into its production. But Ricardo's theory was criticised because of the assumption of the labour theory of value and that there is no reason to believe that two countries have the same scale of production for two different commodities, and it does not take into account the unintended curtailment of demand in both countries, which in turn can make trade non-beneficial for both countries (Bouare, 2009).

However, Haberler (1936) using the opportunity cost concept tackled this drawback. According to Haberler (1936), the opportunity cost of a commodity is the amount of a second commodity that must be given up to release just enough resources to produce one additional unit of the first commodity. Thus, the nation with the lower opportunity cost in the production of a commodity has a comparative advantage in that commodity. But when constant opportunity costs arise, the resources are perfect substitutes or used in fixed proportions in the production of both commodities and all units of the same factor are homogeneous or exactly of the same quality while the opportunity costs are constant in each commodity, they differ among nations, providing the basis

for trade. Hence, the opportunity cost is measured by the slope of the PPF, also known as the marginal rate of transformation. But the difference in relative commodity prices between the two nations is a reflection of their comparative advantage that provides the basis for mutually beneficial trade.

To Bouare (2009), Ricardo assumes the equality between the relative price and relative labor cost of two commodities even though they are different, and the possible destruction of the domestic industry in the case of free trade, even though this might make domestic consumers worse off and also lock a country out of industrialisation. Other criticisms associated with the theory is that transport costs may outweigh any comparative advantage, increased specialisation may lead to diseconomies of scale, and governments may restrict trade and that comparative advantage measures static advantage but not any dynamic advantage (Robinson, 1979). With the market and institutional imperfections in developing economies like Africa, the empirical verification of the theory is imperative.

The long dominance of the Ricardian theory of comparative advantage over Smith's theory of absolute advantage was largely due to the belief that the alternative was necessarily a mess as the theory of international trade followed the perceived line of least mathematical resistance (Dimand, 2000). While Krugman (1970) did not mention Smith's ideas in any of his two essays, Haberler's surveys did mention Smith only for absolute advantage and vent for-surplus, not for increasing returns since the tidiness and convenience of Ricardo's theory of comparative advantage obliterated Smith's insights. Even Ricardo's tidy example, however, sometimes reaches prominent non-economists writing about international trade only as a garbled echo (Dimand, 2000).

Therefore, to say that unregulated international trade is automatically beneficial because of some "principle of comparative advantage" is to offer a verbal formula in place of the causal processes, laws, and institutions that actually shape actions and events (Lutz, 2008; Culbertson, 1984). To Lutz (2008), it is especially dangerous at a time when China, Indonesia, and India were poised to add some two billion workers to the global labor force, all occurring in a world made smaller by the ongoing revolutionary changes in transportation, communication and information technology (Lutz, 2008). Therefore, Culbertson added to the understanding of international trade within realistic or scientific economics and devised policies that will make international trade in the troubled world of the late twentieth century, a force for human betterment rather than decline (Lutz, 2008). In underlying the myths of trade theory, Lutz (2008) states that some myths constitute exceedingly stubborn roadblocks toward a realistic understanding of modern international commerce and the necessary measures to protect the economic future of States. Samuelson's reply to Ricardo's theory of comparative advantage is that the theory is mathematically correct and nontrivial but not that it is empirically valid (Costinot & Donaldson, 2012). However, to validate this theory, researchers must overcome this empirical challenge.

2.2   Empirical Literature
Several studies have examined the relationship between international trade and economic growth in different regions and countries thereby highlighting the benefits or otherwise of international trade among countries. Some scholars have assessed the effect of international on economic

growth in developing countries (Zahonogo, 2017; Iyoha & Okim, 2017; Ijirshar, 2019; Sakyi, Villaverde, Maza & Bonuedi, 2017; Iyoha & Okim, 2017; Manwa & Wijeweera, 2016; Zahonogo, 2016; Manwa & Wijeweera, 2016; Stancheva-Gigov & Poposka, 2014), while others have examined the effect of international trade on economic in both developed and developing economies (Kim, Lin & Suen, 2016; Sun, & Heshmati, 2010). According to International Monetary Fund (2001), opening up economies to the global market has been essential in enabling many developing countries to develop competitive advantages in the manufacture of certain products and that more outward-oriented countries tend consistently to grow faster than ones that are inward-looking. With the mathematical validity of the Ricardian theory of comparative advantage and the general belief that developing countries would gain about equally from trade liberalisation, it is pertinent to examine the existing empirical studies with the view of assessing the benefits or otherwise of international trade on economic growth with particular focus on African countries.

Zahonogo (2016) investigated how trade affects economic growth in developing countries using sub-Saharan Africa (SSA) countries. The study employed a dynamic growth model with data from 42 SSA countries covering 1980 to 2012. The Pooled Mean Group estimation technique was considered and the result indicates that a trading threshold exists below which greater trade openness has beneficial effects on economic growth and above which the trade effect on growth declines. However, since the study did not take cognizance of larger cross-sections (42) relative to time dimension (33), it violates the assumptions for the application of panel Autoregressive Lag Models such as Pooled Mean Group estimation technique. Sakyi, Villaverde, Maza, and Bonuedi (2017) also examined the effects of trade and trade facilitation on economic growth in Africa for a panel of 35 African countries covering 2010 to 2014. The study used a dynamic system GMM estimation technique and found that trade facilitation serves as an important channel through which trade affects economic growth. The latter has employed a framework that accounts for a very short period. Even though the system GMM requires a relatively short time dimension, the study has not sufficiently explained the state of benefits of international trade in the 21st century.

Assessing the relationship in some regions in Africa, Iyoha and Okim (2017) also analysed the impact of trade on economic growth on ECOWAS member countries using panel data from 1990 to 2013. Using four estimators; pooled OLS, fixed effects model, Random-effects model, and dynamic panel regression model although dynamic panel data estimator was preferred to handle the problem of endogeneity, they found that exports significantly determine per capita real income growth and that trade has a significant positive impact on economic growth in ECOWAS member countries. Building on the weakness of applying the conditions for selection between Pooled Mean Group estimator and Mean Group estimator through the application of Hausman test and a bid to achieve the proper application of non-stationary heterogeneous panel model estimators, Ijirshar (2019) assessed the impact of trade openness on economic growth among ECOWAS countries using panel data from 1975 to 2017. The study uses non-stationary heterogeneous dynamic panel models through the application of Pooled Mean Group (PMG) and Mean Group (MG) estimators since the time dimension was more than cross-sections. Using the Hausman test, the PMG estimator was preferred. The study also found that trade openness has positive effects on growth

in ECOWAS countries in the long-run but mixed effects in the short-run. Manwa and Wijeweera (2016) also examined the link between free-trade and growth for five Southern African countries; Botswana, Lesotho, Namibia, South Africa, and Swaziland. Using Auto-Regressive Distributed Lag (ARDL) framework, the study found that South Africa has clearly benefited from its trade liberalisation policies both in the short-run and the long-run as compared to other countries. These studies, however, lack the power of generalisation in testing the Ricardian theory in the African region due to the likely chances of the fallacy of composition.

In investigating the relationship in developing and developed economies generally, Stancheva-Gigov and Poposka (2014) utilised a panel data of 84 countries from 1972 to 2011. The study used panel regression analysis and found that trade openness has a moderate effect on economic growth. Kim, Lin, and Suen (2016) also examined the relationship of trade with economic growth and growth volatility covering 1960 to 2011. The study used Cross-Sectionally Augmented Autoregressive Distributed Lag (CS-ARDL) panel data approach with a sample of 73 developing and developed countries to account for the potential dynamic heterogeneity and cross-section dependency on the effects of trade. The study shows that greater international trade, on average, promotes economic growth and amplifies growth volatility in the long run. The study also found that there is large heterogeneity in the effects of trade, depending upon a country's development level, financial system, macroeconomic policies, human capital, corruption, and labour regulation. However, this study could not capture most of the African countries where it is assumed that the effect may differ due to market and institutional imperfections. Were (2015) assessed the differential effects of trade on economic growth and investment using panel data from 1991 to 2011. The study found that trade has a positive impact on economic growth in developed and developing countries with insignificant effects for Least Developed Countries (LDCs) which largely include African countries. Similarly, in analysis on developed economies, Naveed and Shabbir (2006) investigated the impact of foreign direct investment and trade on growth using a panel data from 1971 to 2000 for 23 developed countries. The study employed a fixed effect regression technique and found that trade has a significant positive effect on growth.

Few time-series analysis on the connection between foreign trade and economic growth in Africa are as follows: the long-run impact trade openness and of foreign direct investment on economic growth in Ghana was carried out by Sakyi, Commodore, and Opoku (2015). The study covered the period from 1970 to 2011 within the framework of the endogenous growth models. Adopting the autoregressive distributed lag bounds testing approach to cointegration, the study suggests that the interaction of foreign direct investment and exports has been crucial in fostering growth. Boakye and Gyamfi (2017) also examined the impact of foreign trade on the economic growth of Ghana and found that exports are positively related to GDP, while import has a negative influence on GDP. Adeleye, Adeteye, and Adewuyi (2015) also examined the impact of international trade on economic growth in Nigeria covering 1988 to 2012. The study employed regression analysis as the method of analysis using co-integration and error correction modeling techniques. The study found a long-run relationship between economic performance and international trade. Only total export showed a positive and significant impact on economic growth.

Musila and Yiheyis (2015) also investigated the effects of trade openness on the level of investment and the rate of economic growth in Kenya using annual time series data from 1961 to 2013. The aggregate trade openness and trade-policy induced openness were evaluated. Controlling for several factors, aggregate trade openness was found to have positively affected the level of investment and the rate of economic growth, although the effect on the latter was statistically insignificant. On the other hand, the study found that trade-policy induced openness to have negatively and significantly affected investment and the rate of economic growth. Granger Causality tests suggested that a change in trade openness influences the long-term rate of economic growth through the interaction with physical capital growth in the case of Kenya. Similarly, Mogoe and Mongale (2014) also analysed the impact of foreign trade on economic growth in South Africa using a quarterly time series data from 1990Q1 to 2013Q2. Johansen and Vector Error Correction tests were applied. The study found that all the variables produced a long-run relationship and that there is a positive influence of international trade on economic growth in South-Africa.

To better understand the relationship among other developing countries, a study was undertaken by Trejos and Barboza (2015) on the relationship between trade openness and output growth for a sample of 23 Asian countries using both a static OLS and dynamic ECM estimation models. At the country-specific level, the findings of this study provided robust empirical evidence indicating that higher revealed trade openness is not the main engine explaining the Asian economic-growth miracle. The study found particularly that physical capital accumulation is at the core of the observed long-run output per worker growth while, at the regional level, the study observed a marked difference between the pre and post 1997 to 1998 financial crisis, wherein the post period, trade openness has a positive and significant effect on output growth. But in general, the results from the dynamic estimations prove that the conventional OLS static estimates underestimate the effect of investment on output growth while the dynamic model allows for a separation of gains from trade between short term and long term. The results also provided support of the idea that countries with a growing degree of trade openness may experience faster per-capita output growth through gains in productivity associated to capital accumulation, rather than the assumed technological spillover effects from the trading sector and that, at the regional level in the post-financial crisis period both short term and long term gains from trade are relevant to growth.

According to Sun and Heshmati (2010), Chinese international trade has experienced rapid expansion together with its dramatic economic growth which has made the country to target the world as its market. The study examined the role of international trade to economic growth in China using econometric and non-parametric approaches for a 6-year balanced panel data of 31 provinces of China covering 2002 to 2007. The study found that increasing participation in global trade helps China reap the static and dynamic benefits, stimulating rapid national economic growth. To Lamaj (2015), there is a strong relevance to international trade and competition markets in developing countries. The study used descriptive statistics and found that international trade plays a key role in a country's economy and the global economy using a descriptive approach. The study analysed three important issues related to the international trade and the competition market: the importance of free trade in an economy; the way a capitalist economy influences free trade and how small numbers of suppliers lead to imperfect competition.

The above studies displayed dominant support for international trade even among developing countries. However, given the new waves of globalisation, and the nature of the goods and services traded by African countries in the face of global competition has warranted the investigation of the accuracy of the Ricardian theory of comparative advantage in Africa.

3. Methodology
3.1 Data Description
The panel data utilised in this study include data on economic growth, trade balance, inflation, household consumption expenditure, domestic investment, government spending, external debt, foreign direct investment, exchange rate, and competitiveness. The data covers the period 2001 to 2018, that is, in the 21st century. The study used panel data on 52 African countries viz: Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, the Democratic Republic of the Congo, Djibouti, Egypt, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Ivory Coast, Kenya, Lesotho, Liberia, Libya, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, Sudan, Swaziland, Tanzania, Togo, Tunisia, Uganda, Zambia, and Zimbabwe. These data were obtained from The World Bank, TheGlobalEconomy.com, and the World Economic Forum.

3.2 Model Specification
This study adopts the Ricardian theory of comparative advantage for modelling. The study also incorporates four determinants of aggregate national income in Keynesian theory. According to the Ricardian theory of comparative advantage, trade is mutually beneficial to even if one country has a comparative disadvantage in both the commodities of trade (Rehim, 2002). This can be captured in a functional form as:

$$ECG = f(TDB) \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad (1)$$

Where ECG= Economic growth, and TDB=Trade Balance, percent of GDP
Given that growth or income is also determined by consumption expenditures from basic economic units (that is, households, firms and government) (Ikwuagwu, Ariwa & Onyele, 2017), the study incorporates expenditures by those economic units as identified by Keynes, viz: household consumption expenditure by households, domestic investment expenditure by domestic firms, foreign direct investment expenditure by foreign firms, and government expenditure. More so, according to Muhanji and Ojah (2011), external debt influences growth to a certain threshold; beyond which, it exerts an adverse effect on growth. Similarly, inflation also explains the level of economic growth (Bawa & Abdullahi, 2012). In determining the effects of trade and trade facilitation on economic growth in Africa, Sakyi, Villaverde, Maza, and Bonuedi (2017) also incorporated inflation. To the World Economic Forum (2017), there exists a very clear correlation between growth and global competitiveness implying that a country is productive and has improved income only if the economy is competitive. Thus, incorporating the major explanatory variables as identified above, the functional form of the model can be re-stated as:

$$ECG = f(TDB, INF, HHC, DIV, GSP, EXS, FDI, EXR, COM) - \quad - \quad - \quad (2)$$

Where INF=Inflation: percent change in the consumer price index, HHC= Household consumption, percent of GDP, DIV= Capital investment, percent of GDP, GSP= Government spending, percent of GDP, EXS= External debt, percent of Gross National Income, FDI= Foreign Direct Investment, percent of GDP, EXR= Exchange rate: local currency units per the US. Dollar, and COM= Competitiveness-World Economic Forum Index

The equation (2) for this study is stated in a typically linear panel model (econometric form) as:

$$ECG_{it} = \beta_0 + \beta_1 TDB_{it} + \beta_2 INF_{it} + \beta_3 HHC_{it} + \beta_4 DIV_{it} + \beta_5 GSP_{it} + \beta_6 EXS_{it} + \beta_7 FDI_{it} + \beta_8 EXR_{it} + \beta_9 COM_{it} + \varepsilon_{it} \qquad (3)$$

Where $\varepsilon_{it} = \mu_i + \eta_{it}$, β_0= Intercept, $\beta_1 - \beta_9$=Parameter to be estimated, μ_i=Individual Specific Effect or Fixed Effect and η_{it}= An idiosyncratic error, $i = 1, ..., n; \quad t = 1, ..., T$

Following a typical dynamic (including a lag of the dependent variable as a regressor in a model makes it a dynamic model) panel data model, a panel Generalised Method of Moment (panel GMM) is specified as:

$$Y_{it} = \delta Y_{i,t-1} + X'_{it}\beta + u_i + \eta_{it} \text{--(4)}$$

And the generalised framework as:

$$Y_{it} = \delta w_{it} + X'_{it}\beta + \varepsilon_{it} \text{---(5)}$$

Where $i = 1, ..., n; \quad t = 1, ..., T$, $\varepsilon_{it} = u_i + \eta_{it}$, w_{it} is a vector of predetermined covariates (which may include the lag of Y) and endogenous covariates, all of which were correlated with the u_i (error term that captures all other omitted factors), and δ measures the causal effect of lagged dependent variable on current levels of the dependent variable. Equation (3) is re-stated as:

$$ECG_{it} = \delta ECG_{i,t-1} + \beta_1 TDB_{it} + \beta_2 INF_{it} + \beta_3 HHC_{it} + \beta_4 DIV_{it} + \beta_5 GSP_{it} + \beta_6 EXS_{it} + \beta_7 FDI_{it} + \beta_8 EXR_{it} + \beta_9 COM_{it} + \varepsilon_{it} \qquad (4)$$

Where $\beta_1 - \beta_9$=Parameter Coefficients to be estimated and ε_{it}= Idiosyncratic error. $i = 1, ..., 52$ and $t = 2001, ..., 2018$.

3.3 Variables Description and Measurements

The theoretical apriori expectation of trade balance, inflation, household consumption expenditure, domestic investment, government spending, external debt, foreign direct investment, exchange rate, and competitiveness is expected to have a positive influence on economic growth. According to Ikwuagwu, Ariwa and Onyele (2017), expenditure (household consumption expenditure, domestic investment expenditure, government expenditure, and foreign direct investment

expenditure) connotes the final purchase of goods and services by economic units such as individuals, firms, and government. These have a positive multiplier effect on economic growth or national income of a country. More so, an economy that becomes more competitive assumes a better position at the global market that could yield more income. To the World Economic Forum (2017), nations that are more competitive are more productive and are therefore more able to provide for the social needs of their people and greater income. More so, weaker domestic currency (higher exchange rate) stimulates exports and makes imports more expensive while stronger domestic currency (lower exchange rate) hampers exports and makes imports cheaper (Šimáková, 2014). The study also expects that improved favourable trade flows spur economic growth. According to Zahonogo (2016), increased international trade can generate economic growth. Given the developing nature of African countries, inflation and external debt are necessary for growth. However, there exists a threshold for sustainable economic growth (Muhanji & Ojah, 2011; Bawa & Abdullahi, 2012). The brief description of the variables and respective measurements and data sources as presented in Table 1.

Table 1: Variable Description and Measurement

Label	Variable	Definition	Measurement	Source
ECG	Economic Growth	Economic growth is the annual percentage growth rate of GDP at market prices based on constant local currency.	Percent	The World Bank and TheGlobalEconomy.com
TDB	Trade Balance	Trade balance is the external on goods and services equals exports of goods and services minus imports of goods and services	Percent	The World Bank and TheGlobalEconomy.com
INF	Inflation	Inflation is the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly	Percent	The World Bank and TheGlobalEconomy.com
HHC	Household consumption, percent of GDP	Household consumption expenditure is the market value of all goods and services, including durable products purchased by households.	Percent	The World Bank and TheGlobalEconomy.com

DIV	Capital investment, percent of GDP	Gross capital formation (formerly gross domestic investment) consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories.	Percent	The World Bank and TheGlobalEconomy.com
GSP	Government spending, percent of GDP	General government consumption expenditure includes all government current expenditures for purchases of goods and services (including compensation of employees)	Percent	The World Bank and TheGlobalEconomy.com
EXS	External debt, percent of Gross National Income	External debt is the total external debt stocks to gross national income.	Percent	The World Bank and TheGlobalEconomy.com
FDI	Foreign Direct Investment, percent of GDP	Foreign direct investment are the net inflows of investment to acquire a lasting management interest in an enterprise operating in an economy other than that of the investor.	Percent	The World Bank and TheGlobalEconomy.com
EXR	Exchange rate	Official exchange rate refers to the exchange rate determined by national authorities or to the rate determined in the legally sanctioned exchange market.	local currency units per dollar (ratio)	The International Monetary Fund and TheGlobalEconomy.com
COM	Competitiveness	The Global Competitiveness index is composed of 12 pillars of competitiveness, viz: Institutions, Infrastructure, Macroeconomic Stability,	Points	The World Economic Forum and TheGlobalEconomy.com

Health and Primary
Education; Higher
Education and Training,
Goods Market Efficiency,
Labour Market
Efficiency, Financial
Market Sophistication,
Technological Readiness,
Market Size; Innovation
and sophistication factors.

Source: Author's Compilation

3.4 Estimation Technique

The method of data analysis is system Generalised Method of Moments (system GMM). Given that the number of countries (cross-sections) is greater than the number of periods (time dimension), the system GMM estimator is efficient. The period of 2001–2018 is considered adequate to examine variables' dynamic effects on the relationship under study using system Generalised Method of Moments (system GMM) estimator within a dynamic panel framework. The consideration of this approach is informed by two basic sources of persistence over time; first, autocorrelation resulting from the inclusion of a lagged variable among the explanatory variables and second, the unobserved main effects and interaction effect characterising the heterogeneity among the units (Olubusoye, Salisu & Olofin, 2016; Baltagi, 2008). Hence, applying either OLS (Ordinary Least Squares) or Fixed Effects (FE) estimator may render the estimates biased and inconsistent.

The dynamic panel model known as Blundell and Bond (1998) system GMM estimator was therefore employed. This is an improvement of the standard (Arellano and Bond) GMM estimators. The system GMM estimator by Blundell and Bond (1998) showed that an additional mild stationary restriction on the initial conditions process allows the use of an extended (system) GMM estimator that uses lagged differences of ECG_{it} as instruments for equations at levels, in addition to lagged levels of ECG_{it} as instruments for equations in first differences (Balatgi, 2008; Olubusoye, Salisu & Olofin, 2016).

The Blundell and Bond system GMM estimator adopted, the levels or untransformed equation is still instrumented with differences and describe how the original equation in levels is added to the system (that is, in addition to lagged levels of variables as instruments for equations in first differences. In this system GMM, variables in levels are instrumented with suitable lags of their first differences with the assumption that these differences are uncorrelated with the unobserved country effects. Given that the lags of the dependent variable (and any other variables used as instruments that are not strictly exogenous) are endogenous, thus bad instruments, the study conducted autocorrelation AR(1) and AR(2) tests. This is because based on the theoretical construct, the study expects the presence of the first-order autocorrelation particularly for the dynamic panel data model in first differences while the presence of a higher-order autocorrelation

may render some lags invalid as instruments. Sargan statistic and Hasen J Statistic were used to test for the validity of instruments in the system GMM regression estimated. Hence, the difference - in- Sargan/Hansen statistics which test whether subsets of instruments are valid were computed. The Blundell-Bond GMM estimator has one-and two-step variants. Both the one-and two-step GMM estimators were conducted since the two-step is asymptotically more efficient but the reported two-step standard errors tend to be severely downward biased (Arellano & Bond, 1991; Olubusoye, Salisu, & Olofin, 2016; Blundell & Bond, 1998).

4   Results and Discussion

The results of one step and two-step system GMM are presented in Table 2.

Table 1: GMM Results

ECG	One-Step system GMM				Two-Step system GMM			
	Coefficient	Standard Error	t-statistic	P>|t|	Coefficient	Standard Error	t-statistic	P>|t|
L1.ECG	0.2142	0. 0594	3.61	0.000***	0.2967	0.0639	4.64	0.000***
TDB	0. 1266	0. 0916	1.38	0.167	0.5324	0.4537	1.17	0.241
INF	-0.0042	0. 0306	-0.14	0.890	-0.0043	0.0427	-0.10	0.920
HHC	0.1378	0. 0906	1.52	0.801	0.5596	0.4637	1.21	0.227
DIV	0.1678	0.0908	1.85	0.065*	0.5671	0.4519	1.26	0.209
GSP	0.0773	0.0985	0.78	0.432	0.5148	0.4835	1.06	0.287
EXS	-0.0236	0.0091	-2.59	0.010**	-0.0202	0.0089	-2.26	0.024**
FDI	0.0553	0.0193	2.87	0.004***	0.0518	0.0200	2.59	0.010**
EXR	0.0001	0.0001	0.91	0.363	0.002	0.0002	1.04	0.300
COM	0.3130	0.4107	0.76	0.446	1.0076	0.9868	1.02	0.307
Observations	928				928			
No. of Instruments	35				35			

No of Groups	37	37
Wald Chi2	4070.61	8106.54
Prob.	0.000	0.000
AR(2), Chi2 (Prob)	-1.28(0.201)	-1.07(0.283)
Hansen Test, Chi2(Prob)	12.48(131)	12.48(0.131)

Source: Computed from STATA 15 Output. The symbols *, ** and *** denote statistical significance at 10%, 5 % and 1% respectively.

The results of one-step and two-step system GMM have a similar theoretical relationship and level of significance. The difference is only in the magnitude of the coefficients which is extremely minimal and insignificant except for domestic investment. Since the two-step system GMM is asymptotically more efficient especially for system GMM, preference is made on the estimates of the two-step GMM. The result shows that previous economic growth (lagged dependent variable) has a positive coefficient of 0.0639. The coefficient is statistically significant at 5% level of significance. This implies that previous economic growth has a strong positive influence on the current growth of the African countries. The study also reveals that international trade has an estimated coefficient of 0.4537. The estimated coefficient of international trade is theoretically plausible but not statistically significant at 5% level of significance. The result implies that international trade is impactful among African countries, however, the nature of commodities often traded by the African countries has less value and less competitive at the global market thereby failing to exert a significant impact on the economic growth of African countries. Therefore, the study findings conform to the theoretical proposition of Ricardo that international trade is mutually beneficial even among African countries. Although, it is important to note that the gains are depending on other factors that necessitate effective global competition. This is also evident by the insignificant impact of global competition on economic growth in the region.

The estimated coefficient of the inflation rate shows -0.0043. The coefficient is negative and statistically significant at 5% level of significance. This implies that a percent increase in the inflation rate leads to 0.0043% decreases in economic growth and vice versa, *ceteris paribus,* among African countries. This indicates that inflation hurts African countries. The study also shows that household consumption expenditure, domestic investment, government spending and competitiveness are theoretically plausible. However, they are not statistically significant at influencing economic growth in Africa at 5% level of significance. The implication for household consumption is that most of the consumption expenditure incurred is not productive and hence, does not significantly exert a strong influence on economic growth among the African countries.

The insignificance effect of government spending on economic growth among African countries may be attributed to the high level of corruption and/or other factors such as the proportion of current expenditure that often outweighs capital expenditure, political, economic, and social turbulence or tempestuousness of other factors. In terms of competitiveness, the influence may be attributed to the intense competition from developed economies, thereby, making international

trade very unfavourable to African countries due to the nature of the goods traded at the global market (primary commodities without value addition) as noted earlier. Although, foreign direct investment is revealed to have exerted a strong influence on the growth of the African countries, the weak investment level in the domestic economies of the African countries has an insignificant influence on the growth of the countries using the two-step estimates. The implication is that African countries have location advantage of foreign direct investment inflows in the 21st century.

The study also revealed that inflation and external debt have negative influence on the growth of African countries. The influence of external debt is statistically significant at 5% level of significance. This implies that external debt burden leaves strong a negative influence on the growth of African countries. The estimated coefficient of exchange rate has a positive but insignificant influence on the growth of African countries. This implies that change (increase) in the exchange rate does not significantly cause change (increase) in the economic growth of African countries. This explains that even in the face of domestic currency devaluation or depreciation among the African countries, changes in exchange rate exert a weak influence on the growth of the countries in the region since exports are not effective in harvesting the benefits of higher exchange rate on growth.

Arellano-Bond test for AR (2) in first differences reveals insignificant values of 0.283. Since the null hypothesis is not rejected, it implies the absence of the second-order serial correlation in disturbances but the first-order serial correlation is expected due to the lagged dependent term and does not constitute a problem. The Sargen statistic and the Hansen's J. statistic for the one-step and the two-step system GMM indicate that the instruments in the system GMM regression estimated are valid. Since the null hypothesis of the Sargan–Hansen test is not rejected, the study can confirm the validity of the estimates and the satisfaction of the moment conditions underlying GMM. Given that the diagnostics are confirmed to be satisfactory, the statistical inferences drawn from the regression results presented above are assumed to be valid.

5.   Conclusion and Policy Recommendations

The study concludes that the Ricardian theory even though theoretically sound and empirically valid, there is lack of a strong influence of trade on growth in Africa. This is due to the trade composition of these African countries as the majority of the countries' trade is composed of more imports than exports. Even the export products are more of the primary commodities that have less value. Hence, the value of the countries' imports is relatively less than that of exports. This sends a weak influence of trade on the growth of African countries. Thus, the basis of trade should always be examined on comparative cost even though, the Ricardian theory is theoretically and empirically apt. The study, therefore, concludes that trade impacts positively on the growth of African countries but not very strongly given the nature and composition of their tradeable commodities. Based on the following findings, the study recommends that the African countries should re-strategise their economies towards improving the value of their export commodities relatively higher than the value of their imports commodities that could even stand competitive at the global market. This would create improved benefits from international trade that could exert strongly on the economic growth of the countries. This would also provide a basis for comparative cost advantage thereby increasing foreign earnings that could accelerate economic growth in one

way and create domestic jobs for the region in another way. The study also recommends ease of the complex and cumbersome border procedural requirements and other forms of institutional trade costs found in African economies that often inflate the costs of moving goods across borders. This constrains and erodes the competitiveness of local firms in the global markets.

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