Determinants Of Economic Growth In Sub-Saharan Africa: Decomposition Of Exports And Imports

A Thesis

presented to

The Graduate School of Business

University of Cape Town

In partial fulfilment

of the requirements for the

Master of Commerce in Development Finance Degree

by

Olawale Oyebanjo

December 2017

Supervised by: Dr. Sean Gossel

PLAGIARISM DECLARATION

Declaration

1. I know that plagiarism is wrong. Plagiarism is to use another's work and pretend that it is one's own.

2. I have used the APA convention for citation and referencing. Each contribution to, and quotation in this dissertation from the work(s) of other people has been attributed, and has been cited and referenced.

3. This dissertation is my own work.

4. I have not allowed, and will not allow, anyone to copy my work with the intention of passing it off as his or her own work.

5. I acknowledge that copying someone else's assignment or essay, or part of it, is wrong, and declare that this is my own work.

Signature Signed by candidate

Olawale Oyebanjo

ABSTRACT

This dissertation examines the impact of export and import components on economic growth in 18 Sub-Saharan African countries over the period of 1996-2015. This study uses a neoclassic economic growth model containing GDP, export components, import components, export concentration index, capital and labour force as variables of analysis.

The results of fixed effects estimations show that both exports and imports contribute significantly to economic growth. On a specific level, growth in raw material exports, and not manufactured exports, is significantly associated with GDP growth while growth in manufactured imports, and not raw material imports, is significantly associated with GDP growth. The export concentration index is found to have no significant relationship with GDP growth. In addition, the results find that capital formation has a more significant influence on economic growth than labour does.

TABLE OF CONTENTS

LIST OF FIGURES AND TABLES

LIST OF ABBREVIATIONS AND ACRONYMS

DRC	Democratic Republic of Congo
DOLS	Dynamic Ordinary Least Square
EU	European Union
ELG	Export-led Growth
FDI	Foreign Direct Investment
FEM	Fixed Effects Model
FMOLS	Fully Modified Ordinary Least Square
GCF	Gross Capital Formation
GDP	Gross Domestic Product
ILG	Import-led Growth
IMF	International Monetary Fund
NIC	Newly Industrializing Countries
REM	Random Effects Model
SSA	Sub-Saharan Africa
UK	United Kingdom
USA	United States of America
UNCTAD	United Nations Conference on Trade and Investment Statistics
WITS	World Integrated Trade Solution
WTO	World Trade Organisation

ACKNOWLEDGEMENT

Most importantly, I appreciate God Almighty for the gift of life and health as well as his giving of knowledge, wisdom and understanding. Lord, you have been with me throughout the thick and tides.

Next, much thanks to my unique supervisor, Dr Sean Gossel; a thorough and detailed advisor. Despite being several miles away, making regular physical appearance almost impossible, we communicated via emails like he is just next door. He consistently allowed this paper to be my own work but steered me in the right direction whenever he thought I needed it. During this period of his supervision, I learnt a lot, not only in the scientific arena, but also on a personal level. Writing this dissertation has had a big impact on me.

Another special thanks goes to the business school librarian, Mrs. Mary Lister, for assisting with those hard-to-get literatures that have added knowledge to this dissertation.

I also wish to express my appreciation to the research coordinator, Dr Abdul Latif Alhassen, for his support and encouragement.

To my wife and daughter, I cannot thank you enough for your love, support, perseverance and understanding.

Lastly, I would like to thank my friend and colleague, Molatelo Mosepe, for making my life on campus bearable.

1. BACKGROUND OF THE STUDY

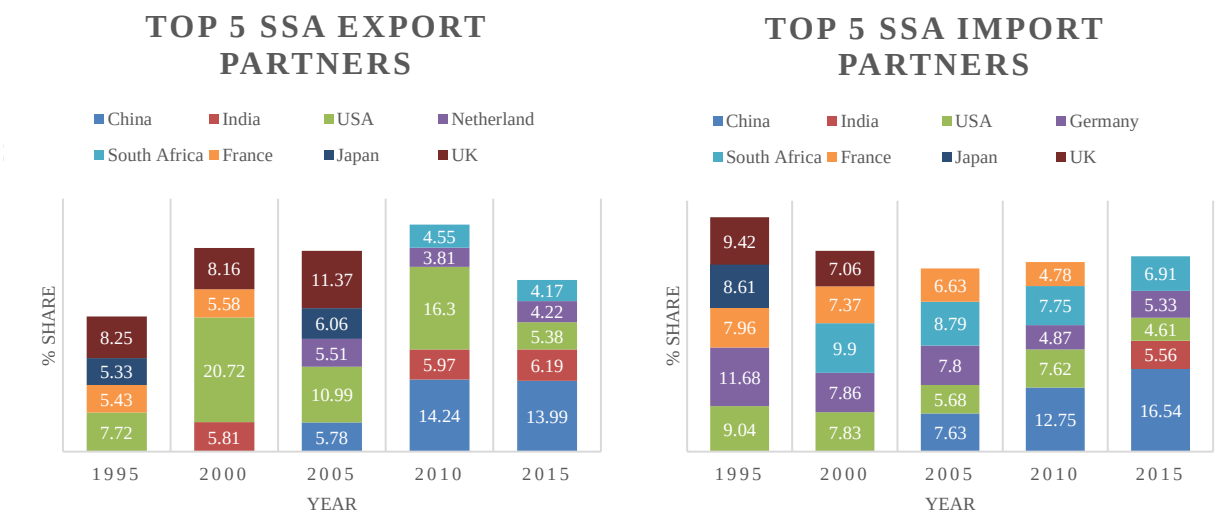
According to World Bank (2015), Sub-Saharan Africa (SSA) accounts for approximately 2% of the world GDP and 12% of the world population. The region has recorded an average annual gross domestic product (GDP) growth rate of 3.6% since 1961 with the peak annual growth rate of 11.6% recorded in 2004. The region is enriched with several primary commodities ranging from energy to both base and precious metals to several agricultural goods, making export of commodities a large source of its revenue. The six largest economies in the region by GDP size are Nigeria, South Africa, Angola, Sudan, Kenya and Ethiopia, which collectively account for approximately 70% of the region's GDP.

Sub-Saharan African countries have a long history of reliance on trade with Europe and North America but has increasingly engaged with other partners to exploit new markets, marking a historic reorientation of trade (Elmorsy, 2016). In recent years, this shift of both exports and imports has focussed on China and India. China has become the single largest national trading partner to SSA as a whole accounting for 13.99% of exports and 16.54% of imports in 2015. Other major export partners to the region in 2015 were India (6.19%), United States (5.38%) and Netherland (4.22%) while other major import partners were India (5.56%), Germany (5.33%) and United State (4.61%). China's trade with SSA has been driven by the country's growth for investments in capital goods, requiring intensive need for primary commodities as inputs, notably oil and metals (Drummond and Liu, 2013).

According to the IMF's Direction of Trade Statistics, bilateral trade in goods between China and SSA rose from US$16.7 billion in 2005 to an estimated US$109 billion in 2014, driven in part by China's increasing demand for natural resources largely oil, but other exports also grew significantly. During this period, Sub-Saharan African exports to China have trebled from about 2.4 percent to 6.5 percent of the region's GDP. A similar reorientation is also taking place in investment flows, with China accounting for 16% of total foreign direct investment (FDI) flows to the region (Elmorsy, 2016). However, the country's recent rebalancing away from raw material-intensive sectors may create spill-over challenges for the

SSA region which may include contraction of economic activity as well as lowered consumption (Anderson *et al*., 2015). Figure 1 shows the top 5 trading partners' percentage share of SSA exports and imports.

Figure 1: SSA Main Trading Partners



Source: WITS (2015)

In addition to expansion into Asian markets, SSA has also expanded its intra-regional exports so as to mitigate an over-reliance on external trade partners (Chea, 2012).

However, 60% of the SSA's total exports results from fuels, ores, and metals while 16% results from manufactured goods unlike other regions such as Asia, European Union (EU) and United State (WITS, 2015). This pattern of exports thus renders SSA highly susceptible to commodities price volatilities. In recent years, oil exporters such as Nigeria, Angola, and five of the six countries within the Central African Economic and Monetary Community continue to face particularly difficult economic conditions. The decline in commodity prices has also negatively impacted non-energy commodity exporters, such as Ghana, South Africa, and Zambia (Newiak, 2016) while the Ebola crisis significantly impeded growth in Sierra Leone and Guinea as mining production contracted (Davis, 2015). The effect of severe drought in

several southern and eastern African countries, including Ethiopia, Malawi, and Zimbabwe has increased food insecurity and negatively impacted exports of agricultural produces (Jacques, 2016).

One of the policy options usually pursued by economic policy makers with a view to achieving GDP expansion is international trade (imports and exports). Thirlwall (2000) observes that the benefits of buying and selling commodities among nations (international trade) have been well known in the developed countries since the days of Adam Smith (1776) and David Ricardo (1817). For Adam Smith, international trade-induced economic growth results because of 'absolute advantage' whereby a country increases its national income or output levels through the production of commodities at less input costs than other rival countries. On the other hand, David Ricardo attempted to expand and improve the 'absolute advantage' principle by arguing that growth in national output occurs because of 'comparative advantage' whereby a country produces commodities at less real cost (opportunity cost) than other nations (Thirlwall, 2000). According to these classical economists, international trade-induced economic growth results from specialisation which generates surplus goods and services and the need to exchange these commodities for money or other commodities (Carbaugh, 2003). Hence, exports and imports have been strongly endorsed by standard economic theory as a catalyst for economic growth.

Generally, both classical and neoclassical economists broadly agreed on the fact that free international trade leads to GDP growth mainly through increased specialization, efficient utilisation of factor inputs, generation of foreign exchange, acquisition of better foreign technology, creation of a market for surplus output, generation of inter-industry production competition, creation of employment, and increased national income (Lee, 1995).

For developing countries it was the spectacular economic development of the 'Asian Tigers' (South Korea, Taiwan, Singapore and Hong Kong) in the 1970s that provided arguably the strongest empirical evidence in support of the positive impact international trade has on GDP growth. Through export-oriented policies, these four 'Asian Tigers' meteorically rose from being LDCs to becoming middle-income or Newly Industrialising Countries (NICs) in the

1970s. It is this success that has largely inspired other developing countries, particularly countries in Sub-Saharan Africa, to vigorously engage in foreign trade as a tool for fostering economic growth in their countries (Lall, 2000). Hachicha (2003) also states that the main reason that LDCs have attempted to replicate the Export-Led Growth (ELG) and Import-led Growth (ILG) of the Asian Tigers was because foreign trade not only encourages the efficient allocation of resources due to foreign competition, but also that the resources generated can be used to finance industrialization, which would lead to economic growth and poverty reduction. However, ever since the implementation of outward oriented trade policies, developing countries have had very varying results, with some experiencing rapid GDP growth while others have seen their national output dwindling over the years and thus having only mixed effects on their poverty reduction strategies (Edwards, 1998; Rodriguez and Rodrik, 2001).

1.1 PROBLEM DEFINITION

Export expansion has been attributed as an enhancer of economic growth through direct and indirect relationship (Tang, 2006). More specifically, exports can be viewed as an engine of economic growth in three ways. Export expansion can be a catalyst for output growth directly as a component of aggregate output. An increase in foreign demand for domestic exportable products can cause an overall growth in output via an increase in employment and income in the exportable sector (Verdoorn, 1949). Also, export growth directly provides foreign exchange, hence relieving import shortages of intermediate goods that in turn raises capital formation which can stimulate output growth (Esfahani, 1991). Furthermore, export growth can influence economic growth indirectly by way of efficient resource allocation, greater capacity utilization, exploitation of economies of scale, and stimulation of technological improvement resulting from foreign market competition (Helpman and Krugman, 1985).

However, the relationship between imports and economic growth tends to be more complicated than between exports and economic growth because of the effects of import substitution (Kim, Lim and Park, 2007). Import growth has a potential complementary role in

stimulating overall economic performance through transfer of technology (Grossman and Helpman, 1991; Awokuse, 2008). Imports of capital goods and intermediate goods that cannot be produced domestically enable domestic firms to diversify and specialize, further enhancing their productivity (Sjoeholm, 1999). Imports are important to productivity growth because increased imports of competing products spur innovation as domestic producers respond to the technological competitive pressure from foreign competition (Lawrence and Weinstein, 1999).

While trade integration is often regarded as a principal determinant of economic growth, the empirical evidence for a causal linkage between trade and growth remains ambiguous (Busse and Königer, 2012). In addition, despite ample studies on the export and import-led growth hypotheses (ELGH and ILGH respectively), only a relatively limited number of studies have been conducted on SSA, and those that have considered SSA have tended to focus on ELGH rather than considering the ILGH as well. Furthermore, Bbaale and Mutenyo (2011) argue that it is not exports *per se* that matter, but rather the different export components that significantly influence growth. Thus, this study uses a decomposition of exports and imports in order to determine their constituent effects on economic growth in SSA over the period of 1996-2015.

Hence the primary research question for this study is as follows:
What is the differential impact of the components of trade on economic growth in Sub-Saharan Africa?
In addition, this study will address the following secondary questions:

a. What is the impact of export diversification as measured by the export concentration index on the economic growth of Sub-Saharan Africa?
b. Does capital formation or labour affect economic growth more?

1.2 CONTRIBUTION OF THE STUDY

A considerable body of research has sought to examine exports as determinant of economic growth in developing countries (Jung & Marshall, 1985; Dorado, 1993; Riezman et al, 1996; Awokuse, 2007) with just a few considering imports as a factor. Many of the studies have yielded mixed findings as to whether exports and/or imports have causal relationship with economic growth in developing countries. The peculiarity of SSA makes the study of exports and imports in relation to its economic growth an important discussion to policy makers and other stakeholders considering the high reliance of the countries within the region on primary commodities as their main sources of governmental revenue. This study is intended to contribute to the literatures on the relationship of export growth and import growth to economic growth with evidence from Sub-Saharan African region.

2. LITERATURE REVIEW

Most of the recent literature analyses the bivariate relationships between exports and economic growth while relatively few studies deal with the associations between exports, imports and economic growth. In addition, few papers use panel data analysis as most focus on specific countries and of these cross-country studies, few focus on Sub-Saharan Africa. Hence, this literature review first reviews the cross-country studies and then focusses on studies devoted to Sub-Saharan Africa.

2.1 *Cross-Country Studies*

Over the last three decades, a significant amount of empirical studies have examined the export led growth hypothesis (ELGH) and the import led growth hypothesis (ILGH). However, the conclusions are relatively mixed with some studies finding support for the ELGH and/or ILGH, while others find no significant evidence depending on the methodologies, time periods and countries included (Medina-Smith, 2001). With regards to developed countries, Feder (1983) uses OLS to analyse the trade-based sources of growth for a group of 19 semi-industrialized countries over the period of 1964-1974. The results show that growth can be generated not only by increase in the aggregate levels of labour capital, but also by the reallocation of existing resources from the less efficient non-export sector to the higher productivity export sector.

Kugler (1991) tested the long-run relationship between GDP, consumption, investment and exports for 6 industrialized countries (United States, United Kingdom, Japan, Switzerland, West Germany and France) over the period of 1970-1987 using a vector autoregression model. The results show that there is only support for the export-led growth hypothesis in the long run for France and West Germany. Marin (1992) investigates the relationship between exports, productivity, the term of trade and world output using cointegration and causality testing in United States, United Kingdom, Germany and Japan over the period of 1960-1987. The results find support for the export led growth hypothesis in all four countries.

Michelis and Zestos (2004) examine the relationship between exports, imports and GDP in six European Union countries (Belgium, France, Germany, Greece, Italy and the Netherlands) for varying time spans from the 1950s to 1990s using vector error correction models (VECM) and Granger causality tests. The empirical findings show strong evidence of bi-directional causality from GDP to exports and imports for all countries except for the Netherlands, for which only weaker evidence exists.

With regards to cross-country studies of developed and developing countries, Anwer and Sampath (1997) examine the causal associations between exports and economic growth for 96 countries comprising developed and developing countries for the period of 1960-1992. They find that the majority of countries do not show any relationship between exports and economic growth, with unidirectional causality running from GDP to exports for 12 countries, exports to GDP for only six countries (Belgium, Costa Rica, El Salvador, Germany, Pakistan and Senegal), and bidirectional causality for Cameroon and Israel.

Riezman, *et al.* (1996) investigate the ELG hypothesis for 126 countries over the period of 1950-1990, they find that standard methods of detecting export-led growth using Granger causality tests may give misleading findings if imports are not included as both "type I" and "type II" errors could result with spurious rejection of export-led growth as well as spurious detection of it. Thus using bivariate causality analysis, they find evidence of the ELG hypothesis for only 16 of the 126 countries but for a trivariate system, the number of cases increased to 30 after controlling for imports while 25 have economic growth driving exports instead, suggesting imports may play the role of a confounding variable in causal ordering. The study also concludes that the effects of export growth on income growth not only vary across countries, they are not uniform over time for the same country, suggesting that it may prove fruitful to examine the temporal nature of export-led growth more closely, in addition to its geographical occurrence.

Hsiao and Hsiao (2006) examine the Granger causality relations between GDP, exports and FDI among eight rapidly developing East and Southeast Asian countries (China, Korea, Taiwan, Hong Kong, Singapore, Malaysia, Philippines, and Thailand) over the period 1986 - 2004 using fixed effects and random effects approaches. The panel data causality results

reveal that FDI has unidirectional effects on GDP directly and indirectly through exports, and there also exists bidirectional causality between exports and GDP for the group.

Sheridan (2014) uses ordinary least squares and fixed effect estimation as well as regression tree technique to explore the potential relationship between disaggregated exports and economic growth in a panel of 117 developed and developing countries over the period 1960 to 2009. The study finds that manufacturing exports are more highly correlated with economic growth than primary exports, conditional on a country having attained a threshold of human capital. Hence, concluding that investing heavily in the manufacturing sector in a country without the necessary skilled workforce is likely to be an inefficient use of resources.

With regards to developing countries, Jung and Marshall (1985) examine the lead and lag timing patterns between growth rate of real exports and growth rate of real output for 37 developing economies covering the period of 1950-1981. The results of Granger causality test show that the ELGH applies to Indonesia, Egypt, Costa Rica and Ecuador only, suggesting a weak evidence to support ELGH. Dorado (1993) applies a similar methodology to Jung and Marshal (1985) to analyse 80 developing countries covering the period from 1961 to 1986. The results of Granger causality tests also weakly support the notion of export as an 'engine' of growth as only seven countries (Bangladesh, Costa Rica, Indonesia, Israel, Papua New Guinea, Malta and Uganda) were able to demonstrate a positive causal effect from exports growth to GDP growth at 10 per cent level of significance.

Awokuse (2007) investigates the contribution of both exports and imports to economic growth in Bulgaria, Czech Republic, and Poland over the period of 1993 to 2004 using a neoclassical growth model and multivariate cointegrated VAR methods. He finds support for both the ELGH and ILGH for Bulgaria, a unidirectional relationship from exports and imports to GDP for the Czech Republic, and only the import-led growth (ILG) for Poland. Similar to Riezman *et al* (1996), Pop-Silaghi (2009) examines the export-led growth hypothesis (ELG) using both bivariate and trivariate (including imports) systems for the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovenia and Slovakia for period 1990-2004 and, Bulgaria and Romania for the period 1990-2006 through cointegration and causality tests. When considering bivariate systems, causality from exports to GDP is obtained for

Bulgaria, the Czech Republic, Estonia, Latvia and Lithuania. In trivariate systems, ELG remains valid in the Czech Republic only and becomes valid in Lithuania.

Din (2004) carried out an empirical analysis of the export-led growth hypothesis for Bangladesh, India, Nepal, Pakistan, and Sri Lanka over the period 1960 – 2002 using Granger causality tests with a Multivariate Vector Auto-Regression framework. While controlling for imports, the results indicate bi-directional causality between exports and output growth in Bangladesh, India, and Sri Lanka in the short-run while long-run equilibrium relationships are noted among exports, imports, and output for Bangladesh and Pakistan. However, for India, Nepal, and Sri Lanka, no evidence of a long-run relationship among the relevant variables is found.

Barış Tekin (2012) investigates potential Granger causality among the real GDP, real exports and inward FDI in 18 least developed countries for the period between 1970 and 2009. The results indicate one-period-ahead, unidirectional causality from exports to GDP in Haiti, Rwanda and Sierra Leone, and from GDP to exports in Angola, Chad and Zambia.

Mushtaq *et al* (2014) explore association among government spending, exports, imports and economic growth proxied using GDP for eight countries (China, Indonesia, Japan, Malaysia, Pakistan, Philippines, Sri Lanka and Thailand) over a period of 1995 to 2011 using panel cointegration test and fixed effects model. The results show that government spending, exports and domestic private investment affect economic growth positively and significantly while imports affect economic growth negatively and significantly.

Yüksel and Zengin (2016) analyse six developing countries (Argentina, Brazil, China, Malaysia, Mexico and Turkey) over the period 1961 to 2014 using Engle Granger co-integration analysis (Engle and Granger, 1987) and vector error correction model similar to Kim, Lim, and Park (2007) as well as Toda Yamamato causality analysis (Toda & Yamamoto, 1995) to examine the relationship between imports, exports and economic growth. The results find support for the export-led growth hypothesis for Argentina only and no causal relationship between imports and economic growth in any of the other countries. The study also finds a causal relationship from imports to exports in China and Turkey and from exports to imports in Malaysia.

Hence, the cross-country studies find that the relationship between exports, imports and economic growth is not consistent across countries and appears to depend on domestic economic structures and policy choices. However, the review next turns to the studies devoted to Sub-Saharan Africa in order to determine whether these associations extend to this region as well.

2.2 *Studies on Sub-Saharan Africa*

Njikam (2003) investigates the relationship between exports (agricultural and manufactured) and economic growth in a sample of 21 Sub-Saharan African countries during the import substitution (IS) and export promotion (EP) using Hsiao's Granger causality method (Hsiao, 1979). The results reveal that during the IS period, unidirectional causality exists between manufactured exports and economic growth for Nigeria and Sudan, between agricultural exports and economic growth for Niger while bidirectional causality exists between manufactured exports and economic growth in DRC, Madagascar, and Sierra-Leone, and between agricultural exports and economic growth in Ghana. Bidirectional causality was found between total exports and economic growth in Benin, Cameroon and Cote-d'Ivoire. During the EP period, agricultural exports are found to have a unidirectional relationship with economic growth in nine countries (Cameroon, Côte-d'Ivoire, Ghana, Burkina-Faso, DRC, Madagascar, Malawi, Zambia and Gabon), manufactured exports unidirectionally cause economic growth in Cameroon, Malawi and Mali.

Yee Ee (2015) examines the validity of export-led growth hypothesis in four Sub-Saharan African countries (Botswana, Equatorial Guinea and Mauritius) over the period 1985-2014 using fully modified ordinary least square (FMOLS) and dynamic OLS (DOLS). The results find that the effect of export led growth is positive and significant, indicating that exports explain not only the cyclical changes in output (short term) but also in the long run trend. Keho (2015) analyses the relationships between exports, FDI and economic growth in 12 selected Sub-Saharan countries over the period 1970 to 2013. Multivariate cointegration analysis suggests that the three variables are cointegrated in ten countries. However, the

results show a weak support for export led growth hypothesis as a causal relationship between exports and economic growth was found only in Ghana.

In common with developed country studies, empirical literature that investigates the ILGH in Sub-Saharan Africa are less plentiful than those that explore the ELGH. Bbaale and Mutenyo (2011) examined ELGH along with ILGH by analysing the relationship between economic growth and exports using agricultural and manufactured components, and imports using capital goods imports in 35 Sub-Saharan African countries over the period of 1988 to 2007. The study using generalized methods of moments estimation finds that growth in agricultural exports is positively and significantly associated with per capita income growth for the sampled countries while the contribution of manufactured exports to per capita income growth is insignificant; supporting the study's main hypothesis that it is not exports *per se* that matter, but that different export components differently influence economic growth. The study also finds support for ILGH and it infers that one per cent unit growth in capital goods imports results in 0.03 per cent GDP per capita growth at 1% significance level.

Songwe and Winkler (2012) estimate the effects of exports and export diversification on economic growth using a panel of 30 selected Sub-Saharan African countries over the period 1995-2008. The fixed effect estimation method finds a positive relationship on growth from both exports and export diversification; and that export diversification of products and markets increase value-added and labour productivity. They thus conclude that resource-based economies need to concentrate on improving productivity in areas where they have a comparative advantage and on moving up the value chain in those commodities.

Thus in summary, there is a considerable divergence in the empirical findings for ELG and ILG hypotheses among Sub-Saharan Africa, as well as different export and import component effects. This study will hence examine these linkages by further examining the relationships between disaggregated exports-imports and economic growth in Sub-Saharan Africa.

3. DATA AND METHODOLOGY

This study uses a neoclassical growth model as the theoretical and analytical framework. The Solow's neoclassical growth theory (Solow, 1956) evaluates economic growth using the Cobb-Douglas aggregate production function (Cobb & Douglas, 1928) which argues that growth in national output (economic growth) stems from multiple factors such as labour force, capital, factor productivity including the level of technology and other exogenous factors such as government policy.

In this study, the variables are real GDP, exports (total exports, manufactured goods and raw materials), and imports (total imports, manufactured goods and raw materials), the export concentration index; and labour force and gross fixed capital formation as control variables in accordance with Balassa (1978), Feder (1983), Ram (1987 and 1990), Fosu (1990), Khalid & Cheng (1997), Baharumshah and Rashid (1999), and Bbaale and Mutenyo (2011). All the variables are taken in natural logarithms so as to avoid the problems of heteroscedasticity.

- Productivity is proxied by real gross domestic product (GDP), which is a measure of the total market value of goods and services produced within a country's boundaries. While the annual GDP growth rate would capture economic performance year on year, periods of negative performance as well as high variability of GDP growth rate of countries in the study sample may distort the normalization method utilized in the estimation process. Hence, GDP in US dollar is adopted for this study in accordance with Njikam (2003), Kunda (2013), and Mushtaq *et al.* (2014).

- Exports approximate the total value of goods produced in the sample country but sold abroad. Total exports are disaggregated into raw material exports and manufactured exports. Raw material exports entail unprocessed portion of the total exports while manufactured exports comprise of intermediate good exports, capital good exports and consumer good exports. In this study, exports are measured in millions of US Dollars. Studies by Dunning (2005), Van der Ploeg (2011), and Gani and Clemes (2015) show that countries with large share of primary exports have bad growth records and high inequality, with conclusion drawn on countries characterized with weaknesses in judicial systems, poor enforcement in rule of laws and generally imperfect institutions.

Diao *et al*. (2007) argue that an increase in raw material (including agricultural) exports enhances total output through multipliers on economic activity, value added and employment through forward and backward linkages. In contrast, Torayeh (2011) and Amakom (2012) counter that manufactured exports are more productivity-enhancing and hence more growth-enhancing because they are normally more capital intensive and thus more human capital intensive. This implies that manufactured products are associated with greater latitude for spillovers and learning hence expected to have a more robust influence on economic growth (Bbaale and Mutenyo, 2011).

- The export concentration index is proxied by the Herfindahl-Hirschmann index (WITS, 2015), which measures the degree of export concentration within a sample country ranging from 0 implying equal distribution of exports market shares among several sectors to 1 indicating exports are concentrated in fewer sectors. Hesse (2008) shows a nonlinear relationship between export concentration and economic growth whereby developing countries benefit from export diversification while advanced countries benefit from export specialization.

- Imports are the total value of goods purchased from abroad by a sample country. Total imports are disaggregated into raw material imports and manufactured imports. Raw material imports entail unprocessed portion of the total imports while manufactured imports comprise intermediate goods, capital goods and consumer goods. In this study imports are also measured in millions of US Dollars. Humpage (2000) shows that there is a positive relationship between imports and economic growth.

- Capital stock is proxied using gross capital formation (GCF), which represents the value added to fixed assets and inventories in an economy. GCF is a component of the production factors for the GDP. GCF satisfactorily approximates growth rate in capital stock and demonstrates a long run support as a driver of economic growth (Kugler, 1991; Medina-Smith, 2001; Bakare, 2011).

- Labour force represents the supply of labour available for producing goods and services in an economy. Labour productivity refers to the quantity of labour input required to produce a unit of output. Raleva (2014) shows growth in labour input as one of the sources of the growth in national output but not a dominating factor.

3.1 *Data Sources*

This study uses annual data from the United Nations Conference on Trade and Investment Statistics (UNCTAD), and World Development Indicators (World Bank, 2015) over the period ranging from 1996 to 2015 for 18 countries in Sub-Saharan Africa including Benin, Botswana, Burkina Faso, Cameroon, Ethiopia, Gambia, Ghana, Ivory Coast, Kenya, Mauritius, Mozambique, Namibia, Nigeria, Rwanda, Senegal, South Africa, Tanzania and Uganda, which collectively account for around 90% of the GDP of SSA. For summary statistics on the selected variables, see Appendix A.

3.2 *Model Specification*

To evaluate the interrelationship between economic growth, exports and imports, the empirical investigation employs a neoclassical Cobb-Douglas production function (Cobb & Douglas, 1928):

$$Y_{it} = A_{it}.K_{it}^{\alpha}.L^{\beta}_{it} + \mu \qquad (1)$$

Where Y_{it} denotes total output of economy i at time t, and A_{it} is the productivity parameter which denotes the stock of knowledge, production technology. K_{it} and L_{it} are conventional factors of the production function denoting the stock of capital and labour for different economies, respectively. Since exports (*Exp*) and imports (*Imp*) affect growth via the productivity parameter (A_{it}), we can express this parameter as a function of various export and import components. Hence equation (1) is reformulated as follows:

$$Y_{it} = Exp_{it}.Imp_{it}.K_{it}^{\alpha}.L^{\beta}_{it} + \mu \qquad (2)$$

In addition, some other exogenous factors that also significantly impact on the level of GDP in Sub-Saharan Africa but cannot be determined by the model are captured by the random disturbance term (μ).

3.3 *Model Estimation*

Before estimating the model, it is necessary to examine the time series properties of the data. These are determined using the testing strategies recommended by Levin, Lin and Chu (2002), Breitung (2000), Im, Pesaran and Shin (2003), and Fisher-type tests using ADF and PP tests (Maddala & Wu (1999) and Choi (2001). These procedures will be utilized to detect unit roots in the data. The tests are carried out to test for stationarity as well as existence of a unit root. If the variable is found to be nonstationary at level, each test is then performed on the first difference of the log value of the variable. If the first difference of the variable is found to be stationary, the variable is concluded to be integrated at order one $I(1)$ and it has a unit root. These tests are more useful when the cross-sectional dimension (N) lies between 0 and 250, and when the time series dimension (T) lies between 5 and 250 as standard multivariate panel data procedures may not be computationally feasible or sufficiently powerful (Levin, Lin and Chu, 2002).

The panel data set used in this study has several observations integrated over eighteen cross-sectional data for 20-year period of 1996 – 2015. Hence, after testing for unit roots, the next step of the analysis is to test for cointegration among the variables. This is accomplished using the methodology proposed by Pedroni (1999), which involves four panel statistics and three group panel statistics to test the null hypothesis of no cointegration against the alternative hypothesis of cointegration. For the panel statistics, the first-order autoregressive term is assumed to be the same across all the cross sections, while for the group panel statistics the parameter is allowed to vary over the cross sections. The values calculated through the statistical tests must be smaller than the critical value if the null hypothesis for the absence of cointegration is to be rejected. If the null is rejected in the panel case, then the variables of the production function are cointegrated for all the countries. On the other hand,

if the null is rejected in the group panel case, then cointegration among the relevant variables exists for at least one of the countries.

The panel data model can be estimated using either fixed or random effect techniques. These two techniques have been developed to handle systematic tendency of individual specific components to be higher for some units than for others – the fixed effects estimator is used if the individual specific component is not independent with respect to the explanatory variables while the random effect estimator is used if the individual specific component is assumed to be random with respect to the explanatory variables (Dewan and Hussein, 2001).

According to Hsiao and Hsiao (2006), the fixed effects model (FEM) assumes that the slope coefficients are constant for all cross-section units, and the intercept varies over individual cross-section units but does not vary over time. Hence, the FEM can be written as:

$$y_{it} = \alpha_i + x_{it}\beta + u_{it} \qquad (3)$$

Where y_{it} can be one of our three endogenous variables, i is the I th cross-section unit and t is the time of observation. The intercept, α_i, takes into account the heterogeneity influence from unobserved variables which may differ across the cross-section units. The x_{it} is a row vector of endogenous variables. The β is a column vector of the common slope coefficients for the group of ten countries. The error term u_{it} follows the classical assumptions that $u_{it} \sim N(0, \sigma_u^2)$.

The random effects model (REM) also assumes that the slope coefficients are constant for all cross-section units, but the intercept is a random variable, that is, $\alpha_i = \alpha + \varepsilon_i$, where α is the mean value for the intercept of all cross-section units, and ε_i is a random error term which reflects the individual differences in the intercept value of each cross-section unit and $\varepsilon_i \sim N(0, \sigma_\varepsilon^2)$.

We can modify equation (2) to obtain REM in equation (3) as follows:

$$y_{it} = \alpha + x_{it}\beta + \varepsilon_i + u_{it}$$
$$= \alpha + x_{it}\beta + v_{it} \qquad (4)$$

Where $v_{it} = \varepsilon_i + u_{it}$. It has been shown that v_{it} and v_{is} (t ≠ s) are correlated, so the REM is estimated by the method of generalized least squares.

In order to determine whether fixed effects or random effects estimation is most appropriate the analysis makes use of the Hausman test (Hausman, 1978). The null hypothesis of the Hausman test is that the correlated REM is efficient and consistent. The fixed effects estimator is consistent under both the null and the alternative hypothesis. If the null is true then the difference between the estimators should be close to zero. The calculation of test statistics (distributed χ^2) requires the computation of the covariance matrix of $\beta_1 - \beta_2$ (Dewan and Hussein, 2001). In the limit the covariance matrix simplifies to $Var(\beta_1) - Var(\beta_2)$, where β_1 is the fixed effects estimator and β_2 is the random effects. In this study, Hausman test results indicate that the use of the FEM to estimate the first equation $dEXP_{it}$ and the third equation $dRGDP_{it}$ and use the REM to estimate the second equation $dIMP_{it}$.

4. FINDINGS AND DISCUSSION

This study investigates the differential impact of the components of trade on economic growth in Sub-Saharan Africa over the period of 1996-2015 using pooled OLS and fixed-effect regression. The discussion begins with a review of the preliminary data analysis, consisting of the panel unit root tests, cointegration tests, and Hausman test, before moving on to an exploration of the panel regression results.

4.1 Preliminary Data Analysis

The first step of the empirical analysis involves testing for unit roots, which was accomplished using the approaches of Levin, Lin and Chu (2002), Breitung (2000), Im, Pesaran and Shin (2003), and Fisher-type tests using ADF and PP tests (Maddala & Wu (1999) and Choi (2001). The results are presented in Table 1 and as can be seen, only manufactured exports (ME), total exports (TEXP) and gross capital formation (GCF) are consistently non-stationary at level but first-difference stationary.

Table – 1: Panel unit root tests

(Exogenous variables: Individual effects, individual linear trends)

	Common Unit Root Test		Individual Unit Root Test		
	LLC	Breitung t-stat	IMP	ADF	PP
Levels					
LogGDP	-2.0222**	2.4007	-0.8470	42.0146	21.9253
LogME	1.2572	-0.6542	1.1144	31.1663	59.6012***
LogRME	-2.3801***	-2.1076**	-0.9076	40.4302	77.3652***
LogTEXP	-1.2571	-1.5850*	-0.4059	40.8417	72.3297***
LogMI	-1.9128**	0.1931	-1.4026*	47.8604*	63.5292***
LogRMI	-1.8701**	-0.9595	-1.2349	44.3896	86.0512***
LogTIMP	-1.7405**	-0.0988	-1.7401**	50.3188*	54.8192**
ECI	-2.2994**	-1.0497	-1.3144*	44.5358	67.8666***
LogGCF	-0.2678	0.5506	0.8859	26.5319	29.2678
LogLF	-8.5667***	-0.1680	-3.8278***	79.7002***	44.0755
1st differences					
LogGDP	-3.6127***	-1.3501*	-1.6000*	45.8483	60.8572***
LogME	-3.8916***	-1.6482**	-4.2813***	86.2407***	214.3750***
LogRME	-6.7028***	-3.6222***	-5.0592***	94.3529***	241.6610***
LogTEXP	-4.1825***	-1.7195**	-3.9227***	75.6806***	193.8960***
LogMI	-3.5908***	-2.2079**	-3.5997***	71.6084***	137.1170***
LogRMI	-8.3828***	-3.1255***	-6.7844***	112.8340***	224.3530***
LogTIMP	-4.5050***	-1.5776*	-3.1199***	66.3129***	143.1340***
ECI	-4.0816***	-2.3075**	-5.8644***	98.6379***	231.4310***
LogGCF	-4.3798***	-4.2138***	-3.4450***	73.4363***	172.9160***
LogLF	-1.8132**	-1.5228*	-1.1635	43.3610	54.4398**

***, ** and * denote rejection of the null hypothesis of unit roots for the unit root tests at the 1%, 5% and 10% significant levels respectively.

ME: Manufactured exports; RME: Raw material exports; TEXP: Total exports; MI; Manufactured imports; RMI: Raw material imports; TIMP: Total imports; LF: Labour Force

Having examined the stationarity properties of the data, the next step is to test for cointegration among the first-difference series, which is accomplished using the Pedroni (1999) panel cointegration tests. The results are presented in Table 2 and show that there is no

significant evidence of cointegration and thus there is no long run cointegrating relationship among the variables. [1]

Table 2: Pedroni Cointegration Test Results

Null Hypothesis: No cointegration		
	Intercept & Trend	
	Within Dimension	
		Weighted
Panel v-Stat	-2.4222	-2.9318
Panel rho-Stat	0.1559	1.2593
Panel PP-Stat	-4.6553***	-3.1620***
Panel ADF-Stat	-1.3595*	-0.9846
	Between Dimension	
Group rho-Stat	2.7223	
Group PP-Stat	-3.2504***	
Group ADF-Stat	-0.1623	

***, ** and * denote rejection of the null hypothesis of no cointegration at the 1%, 5% and 10% significant levels respectively.

Source: Author's secondary data analysis using Eviews

Having examined the unit root and cointegration properties of the data, the next step of the analysis is to run the regression models using equation (2) with the lagged dependent factor so as to compensate for possible serial correlation.[2] However, first, the Hausman test (Hausman, 1978) is applied to determine whether fixed or random effects are most applicable. The results presented in Table 3 reject the null hypothesis that the difference in the coefficient are not systematic, and thus it can be concluded that a fixed effects model is appropriate.

[1] From the correlation matrix shown in Appendix C, there is an evidence of multicollinearity in the panel data series, as the correlation coefficient between ME and RME exceed 0.80 (Gujarati, 2003). Hence, a stepwise approach was adopted such that ME and RME are not included in the same regression estimation.

[2] The regression estimation excluding the lagged dependent variable (see Appendix D) shows that ME, RME and MI are highly significant, RMI and LF are moderately significant while GCF is weakly significant. However, it shows a very low DW stat which may demonstrate serial correlation among the variables.

Table 3: Hausman Test Results

Null Hypothesis: Difference in coefficient not systematic		
Chi-Square Statistic	D.F	p-value
12.1079	8.0000	0.0000***

***, ** and * show level of significance at 1%, 5% and 10%, respectively.

Source: Author's secondary data analysis using Eviews

4.2 Fixed Effects Results

The fixed effects estimations presented in Table 4a and Table 4b show that although total exports and imports have a positive and significant relationship with GDP growth, only raw material exports and manufactured imports exhibit a relationship with GDP at different level of significance. Overall, raw material exports (RME) and gross capital formation (GCF) are highly significant, manufactured imports (MI) is moderately significant, and manufactured exports (ME), raw material imports (RMI) and labour force (LF) are insignificant.

On a more detailed level the findings show that raw material exports are positively and significantly associated with GDP growth. However, the link between growth in manufactured exports and GDP growth is weak as the estimated coefficients are not statistically different from zero at conventional levels of significance. Therefore, a growth-enhancing effect can be attributed to raw material exports and not manufactured exports for the case of countries in the study sample, which accords with Bbaale and Mutenyo (2011). However, this finding is contrary to the widely held theoretical view that manufactured exports are more productivity enhancing and therefore more growth-promoting. The evidence found in studies conducted in other parts of the world particularly developed economies and Asian countries attribute a growth-enhancing effect to sophisticated rather than non-sophisticated exports (Wörz, 2005; Herzer et al., 2004; and Ghatak et al., 1997). These studies argue that manufactured exports are more capital intensive and hence more human capital intensive such that knowledge and its dynamic benefits to the economy is expected to be more imperative in this sector. In the case of SSA, this contrary finding can possibly be explained by three regional characteristics. First, the region enjoys a comparative advantage of raw

material exports relative to more developed countries. Second, most countries in the region are populated with low-skilled labour force who are more engaged in raw material exports relative to manufactured exports (Szirmai, et al, 2013). Third, the region suffers from a low level of industrialization, which hampers manufacturing exports (Bbaale and Mutenyo, 2011). Despite these short-comings, the overall effect of export-led growth is positive and highly statistically significant, supporting the ELG hypothesis in accordance with Sentsho (2002) and Musonda (2007).

With regards to imports, the results show that contrary to manufactured exports, manufactured imports exhibit a positive and significant link with GDP growth while raw materials imports have a negative but insignificant relationship with GDP growth. Overall, total imports demonstrate a strongly positive influence on growth in GDP as manufactured imports constitute a major portion of total imports in Sub-Saharan Africa.

This result strongly supports the widely held theoretical view that manufactured imports integrate current knowledge and technology in accordance with Kim et al. (2007) and Osei (2012); and have a positive and significant effect on economic growth, as noted by Bbaale and Mutenyo (2011), and Gossel and Biekpe (2013). The contributions of imports to economic growth has not been given the needed recognition as only few empirical studies have focused on it. Imports plays a very important function by offsetting short supply, alleviating trade friction, inducing domestic demand, and stimulating technical know-how (Osei, 2012). The positive functional relationship between imports and economic growth suggests that when guided with appropriate economic policies, it greatly promotes economic growth. Thus, individual and regional authorities should adopt policies that focus not only on import expansion, but also emphasize import quality. The government of individual country should increase substantially the import scale of strategic products and mainly import the products and technology that cannot be competitively source within the region which are urgently needed for national economic development, especially advanced technology and key equipment that domestic and intra-regional market are lacking (Calì, 2009; Osei, 2012).

The effect of gross capital formation is positive and significant across all models, meaning that capital stock has a strong positive association with economic growth in Sub-Saharan

Africa, which accords with Gossel and Biepke (2013) and Zahonogo (2017). This supports the theoretical tenets of the neoclassical growth model, which asserts that an increase in the capital stock has a positive effect on the national output and hence economic growth (Harrod, 1939). There are several challenges impeding the capital formation process in Sub-Saharan Africa. In the last decade, several countries in Sub-Saharan Africa have experienced political and macro-economic instabilities such as in exchange rate, interest rate and inflation rate volatility (Alley, 2017). These have dissuaded foreign investment and crowded out domestic investment, resulting in low capital formation. Authorities within the region need to implement appropriate fiscal and monetary policies in order to attract foreign investment and propel domestic investment which is the much needed for financing the infrastructural development (Fosu, 1990).

The estimated coefficient on labour force is negative and insignificant across the various models. A possible reason for this is the preponderance of lowly skilled labour force in Sub-Saharan Africa (Szirmai, et al, 2013). According to the International Labour Organization's (ILO) global employment trend (2014), despite the rapid economic growth in Sub-Saharan Africa in the last decade, the region has the second highest unemployment rate in the world, next to Middle East and North African region. Sub-Saharan Africa also has the highest vulnerable employment in the world (77.4% in 2013). This finding however contrasts with the neoclassical growth model's assertion that an increase in the labour input has a positive effect on the economic output (Fei and Ranis, 1964; Raleva, 2014. Unlike several other regions, Sub-Saharan Africa is still endowed with a surplus of cheap labour. It is therefore prudent for the government to achieve economic growth through labour-intensive industrialization, focused on its export sector. The agricultural sector provides the region with a good platform for launching such a labour-driven GDP growth agenda processing its primary export commodities into consumer goods exports (Nafar, 2017). There is an urgent need to improve the quality of the labour force, building the skill of its labour force in order to increase and sustain economic growth. This can be achieved by providing technical training and improving the quality of education, particularly at the tertiary level (Newiak, 2016). In addition, improving the health status of the labour force enhances the quality of labour force. In the last decade, HIV/AIDS have negatively affected the quality of labour force and hence

slowed down economic growth in southern African countries (Haacker, 2002; Maijama et al, 2015). Also, Ebola virus has significantly affected economic activities in Sierra Leone, Guinea and Congo in the last fouryears (Davis, 2015). In order to achieve a sustainable labour-driven economic growth, the authorities within the region need to improve the health system within the region (Gyimah-Brempong and Wilson, 2004).

The coefficient of the export concentration index is negative but statistically insignificant using both aggregated and separated models. Studies by Agosin (2007), Lederman & Maloney (2007), and Hesse (2008) find export diversification to be an important determinant of economic growth across countries. However, this relationship is found to be non-linear with a critical level of export concentration. These studies find the relationship between export concentration and economic growth to be negative for developing countries and positive for developed countries. The divergence in the level of development in the study sample may account for the less robust finding of this variable. Songwe and Winkler (2012) also find that export diversification of products and markets increase value added and labour productivity in Sub-Saharan Africa. Hence, it will be imperative for Sub-Saharan African countries to increase the diversification of exports not just the products but also the export destination to harvest more value-add.

Table 4a: Results of the aggregated regression model using the fixed effects within growth estimator

Dependent Variable : LogGDP	
LogGDP(-1)	0.6882*** (16.9964)
LogME	0.0144 (0.9556)
LogRME	0.0538*** (3.1134)
LogMI	0.0714** (2.0759)
LogRMI	-0.0118 (-0.6747)
ECI	-0.0491 (-0.6185)
LogGCF	0.1716*** (6.1309)
LogLF	-0.1667 (-1.4300)
R^2	0.9953
Adjusted R^2	0.9949
F-stat	2230.88***
DW stat	1.5590

Notes: Values in bracket are t-statistics. ***, ** and * represent significance at the 1%, 5% and 10% level, respectively.

Source: Author's secondary data analysis using Eviews

Table 4b: Results of the separated regression models using the fixed effects within growth estimator

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
LogGDP(-1)	0.7503*** (19.4747)	0.7222*** (19.1751)	0.7222*** (19.1751)	0.7512*** (19.4153)	0.7465*** (19.5425)	0.7456*** (19.9117)	0.6845*** (17.4816)
LogME	0.0197 (1.2791)						
LogRME		0.0609*** (3.8043)					
LogMI			0.0988*** (3.0865)				
LogRMI				0.0147 (0.9420)			
ECI					-0.0132 (-0.1822)		
LogTEXP						0.0441** (2.1416)	
LogTIMP							0.1582*** (4.4157)
LogGCF	0.2045*** (7.4539)	0.1992*** (7.5867)	0.1786*** (6.3141)	0.2087*** (7.6703)	0.2143*** (7.7814)	0.2040*** (7.4857)	0.1647*** (6.1766)
LogLF	-0.1208 (-1.0166)	-0.1010 (-0.9245)	-0.1831 (-1.6888)	-0.0890 (-0.8030)	-0.0465 (-0.4092)	-0.1878** (-1.6176)	-0.2636 (-2.5689)
R^2	0.9950	0.9952	0.9952	0.9950	0.9948	0.9951	0.9954
Adjusted R^2	0.9946	0.9949	0.9948	0.9946	0.9944	0.9947	0.9950
F-Stat	2523.63***	2647.18***	2639.69***	2536.62***	2480.19***	2567.35***	2788.13***
DW Stat	1.5681	1.5817	1.6066	1.6154	1.5774	1.5553	1.5338

Notes: Values in bracket are t-statistics. ***, ** and * represent significance at the 1%, 5% and 10% level, respectively.

Source: Author's secondary data analysis using Eviews

5. ASSUMPTIONS AND RESEARCH LIMITATIONS

5.1. Data Assumption

- It is assumed that correction of outliers using log transforming will eliminate potential heterogeneity.

5.2. Data Limitations

- Due to limited data availability, which impedes a random sampling process, the study focusses on 18 countries for the period ranging from 1996 to 2015.
- Some of the countries have missing data-points for export and import components, thereby making the full sample an unbalanced panel for the estimation process.
- Only trade in goods are covered in the study. Services which may account for a sizeable share of national exports and imports (WTO, 2015) are excluded due to lack of data.

5.3. Methodological Assumption

- The methodology assumes that all unobservable factors correlate with the included variable and that the unobservable factors are time invariant, implying that the factors mimic the individual specific constant term, and the variance of the each of the unobservable factor is constant.
- The explanatory variables are assumed not to be perfectly collinear, that they have non-zero within-variance.

5.4. Methodological Limitations

- The fixed effects estimation investigates the associations between the factors but does not provide information on the direction of causation between the variables.

6. CONCLUSIONS

Over the last three decades, development economists have explained the importance of international trade promotion (exports and imports) alongside capital and labour on economic growth. Most Sub-Saharan African countries as a result, have implemented trade policies aimed at stimulating economic growth, with the ultimate aim of improving the standard of living of the citizenry, and alleviate poverty. Empirical studies conducted in several different countries however report conflicting findings. These inconsistencies have thus raised questions about the validity, universality, and robustness of the export and import led growth hypotheses.

A number of studies have been undertaken to investigate the impact of exports and imports on economic growth of Sub-Saharan African countries. However, this study specifically examined the impact of the export and import components on economic growth in 18 Sub-Saharan African countries over the period from 1996 to 2015.

The empirical findings show that both exports and imports in general contribute significantly to economic growth. On a more detailed level, the findings show that raw material exports are positively and significantly associated with GDP growth while growth in manufactured exports has no significant relationship.

The findings on total imports also show a positive impact on economic growth. However, manufactured imports demonstrate a positive and significant effect on economic growth while raw material imports are insignificant. The export concentration index is found to be insignificant, which implies that a widely varied structure in the export composition in the countries selected. Among the control factors, capital formation is found to exhibit the most significant and positive influence on economic growth, suggesting that capital stock is a dominate factor needed to drive economic growth in Sub-Saharan Africa.

Hence, this study not only confirms the validity of export-led growth and import-led growth hypotheses but also goes further to show that raw material exports rather than manufactured exports and manufactured imports rather than raw material imports exhibit the growth promoting impact.

Furthermore these results imply that in order to benefit from ELG, governments in Sub-Saharan Africa will need to build up capacities by investing in technologies and infrastructures so that the region's rich primary export commodities can be processed at a comparative advantage, boosting its export quality and increasing revenues to the region. Thus, countries in Sub-Saharan Africa could promote raw material exports in the short to medium term while scaling up industrialization so as to increasing manufactured exports in the long term. This will however require overcoming the regions erratic power supply (World Bank, 2012) and integrating the fragmented intraregional trade regulations (Chea, 2012).

With respect to imports, this study supports the ILH. However, it is imperative for countries in Sub-Saharan Africa to improve the quality of imports, as well as focus on strategic products especially advanced technologies and key equipment that are unavailable locally and within the region but are needed for urgent national economic development by improving domestic production for local use and exports (Osei, 2012).

7. RECOMMENDATIONS FOR FUTURE RESEARCH

Having examined the effect of disaggregated exports and imports on economic growth in Sub-Saharan Africa in detail, this study recognizes the need to investigate the direction of causation between the aforementioned variables in order to enhance evidence-based policy making as regards to trade-driven economic development agenda.

In addition, the framework in this study captures some important growth determinants but other variables may also have a strong connection to economic growth. Some of these variables such as human capital (education level) and macro-economic policy stability, were not included in the estimation process due mainly to lack of available data for the period of this study. It may however be insightful to include an expanded set of socio-economic indicators in the analysis.

REFERENCES

Agosin, M. R. (2007). "Export Diversification and Growth in Emerging Economies", Working Paper No. 233, Departamento de Economía, Universidad de Chile.

Alley, I. (2017). Capital flow surges and economic growth in sub-Saharan Africa: Any role for capital controls? Working Paper No. 252, Office of the Chief Economist, African Development Bank Group.

Amakom, U. (2012). Manufactured Exports in Sub-Saharan African Economies: Econometric Tests for the Learning by Exporting Hypothesis. *American International Journal of Contemporary Research*, 2(4), 195-206.

Anderson, D., Ivan Canales Kriljenko, J., Drummond, P., Espaillat, P. and Muir, D. (2015). "Spillovers from China onto Sub-Saharan Africa: Insights from the Flexible System of Global Models", IMF Working Paper WP/15/221, (Washington D.C., International Monetary Fund).

Anwer, M.S. and Sampath, R.K (1997). Exports and Economic Growth, paper presented at the Western Agricultural Economics Association 1997 Annual Meeting, July 13-16, Reno/Sparks, Nevada.

Awokuse, T.O. (2005), "Exports, economic growth and causality in Korea", *Applied Economics Letters*, 12 (11), 693-696.

Awokuse, T.O. (2007). "Causality between Exports, Imports, and Economic Growth: Evidence from Transition Economies." *Economics Letters*, 94: 389-395.

Awokuse, T.O. (2008). Trade Openness and Economic Growth: Is Growth Export-led or Import-led? *Applied Economics*, 40 (2), 161–173.

Baharumshah, A.Z., and S. Rashid. (1999). "Exports, Imports and Economic Growth in Malaysia: Empirical Evidence Based on Multivariate Time Series." *Asian Economic Journal*, 13 (4): 389–406.

Bakare A.S. (2011). The Impact of Capital Formation on the Growth of Nigerian Economy: Causality Approach. *Far East Journal of Psychology and Business*, 13(1), 2-13.

Choi, I. (2001). Unit Root Tests for Panel Data. *Journal of International Money and Finance*, 20, 249–272.

Balassa, B. (1978). "Exports and Economic Growth: Further Evidence." *Journal of Development Economics* 5 (2), 181–189.

Barış Tekin, R. (2012). Economic growth, exports and foreign direct investment in Least Developed Countries: A panel Granger causality analysis. *Economic Modelling*, 29, 868–878.

Bbaale E and Mutenyo J. (2011).Export composition and economic growth in Sub-Saharan Africa: a panel analysis. Consilience: *The Journal of Sustainable Development*, 6(1), 1–19.

Bokosi, F.K. (2015). Export Trade and Economic Growth in Malawi: A Disaggregated Approach. *International Journal of Economics and Financial Research*, 1 (7), 97-105.

Breitung, J. (2000). The local power of some unit roots for unit roots for panel data. In: *Non-stationarity Panels, Panel Cointegration, and Dynamic Panels*, Baltagi, B.H.(Ed.), Elsevier, Amsterdam. pp. 161-177.

Busse, M. and Königer, J. (2012). Trade and Economic Growth: A Re-examination of the Empirical Evidence. Hamburg Institute of International Economics, paper 123.

Calì, M. (2009). Impediments to Intra Regional Trade in Sub-Saharan Africa, Mimeo.

Carbaugh, R.J. (2005) International Economics. New York, Addison Wesley.

Chea, A.C., (2012). Sub-Saharan Africa and Global Trade: What Sub-Saharan Africa needs to do to maximize the Benefits from Global Trade Integration, Increase Economic Growth and Reduce Poverty? *International Journal of Academic Research in Business and Social Sciences*, 2 (4), 359-384.

Cobb, C. W. and P. H. Douglas. (1928). A theory of production. *American Economic Review*, 18(1):139–165.

Davis, P. (2015). Ebola in Sierra Leone: Economic Impact & Recovery. *Adam Smith Intl.*, July 2015. Retrieved: http://www.adamsmithinternational.com/documents/resource uploads /Ebola_in_Sierra_Leone.pdf

Diao, X., Hazell, P., Resnick, D., and Thurlow, J., (2007), "The Role of Agriculture in Development: Implications for Sub-Saharan Africa." International Food Policy Research Institute, research Report 153.

Dickey, D.A. and Fuller, W.A. (1979). "Distribution of Estimators for Time Series Regressions with a Unit Root." *Journal of American Statistical Association,* 74 (366): 427–431.

Dickey, D.A. and Fuller, W.A. (1981). "Likelihood Ratio Statistics for Autoregressive Time Series with a Unit Root." *Econometrica*, 49: 1057–1072.

Din, M. (2004). Exports, Imports, and Economic Growth in South Asia: Evidence Using a Multivariate Time-series Framework. *The Pakistan Development Review*, 43(2), 105-124.

Dorado, S. (1993). Exports and growth: a reconsideration of causality. *Journal of Developing Areas*, 27, 227–244.

Drummond, P., & Liu, E. X. (2013). Africa's Rising Exposure to China : How Large Are Spillovers through Trade ? Working Paper WP/13/250, African Department, International Monetary Fund, November.

Dunning, T. (2005). Resource Dependence, Economic Performance, and Political Stability. *Journal of Conflict Resolution*, 49(2), 451-482.

Edwards, S. (1998) "Trade, Productivity and Growth: What do We Really Know?" *Economic Journal*, 108, 383-398.

Elmorsy, S.A. (2016). Sub-Saharan Africa's engagement with emerging partners: opportunities and challenges. *Journal of Global South*, 3 (2), 2-22.

Engle, R. F. and Granger, C. W. J. (1987). Cointegration and error correction representation, estimation and testing. *Econometrica*, 5, 251–276.

Esfahani, H.S. (1991). "Exports, Imports, and Economic Growth in Semi-Industrialized Countries." *Journal of Development Economics*, 35 (1): 93–116.

Feder, G. (1983), "On Exports and Economic Growth". *Journal of Development Economics*, 12 (1), 59-73.

Fei, J.C. and Ranis, G. (1964). Development of the Labour Surplus Economy: Theory and Policy. Homewood, Illinois: Irwin.

Fosu, A.K. (1990). "Exports and Economic Growth: The African Case." *World Development*, 18, 831–835.

Gani A. and Clemes, M.D. (2015). Natural Resource Exports and Corruption. *International Advances in Economic Research*, 21, 239–240.

Ghatak, Subrata, and Stephen Wheatley Price. (1997). "Export Composition and Economic Growth: Cointegration and Causality Evidence for India" *Review of World Economics*, 133 (3), 538–53.

Granger, C. W. J. (1969). Investigating causal relations by econometric models and cross spectral methods, *Econometrica*, 40, 424–438.

Gossel, S.J. & Biekpe, N. (2013). Economic growth, trade and capital flows: A causal analysis of post-liberalised South Africa. *The Journal of International Trade & Economic Development: An International and Comparative Review*, DOI:10.1080/09638199.2013.786118

Grossman, G. and Helpman, E. (1991). *Innovation and Growth in the Global Economy.* MIT Press, Cambridge, MA.

Gujarati, D. N. (2003). Basic Econometrics, McGraw-Hill Inc.

Gyimah-Brempong, K. and Wilson, M. (2004). Health human capital and economic growth in Sub-Saharan African and OECD countries. *The Quarterly Review of Economics and Finance*, 44, 296 – 320.

Haacker, M. (2002). The Economic Consequences of HIV/AIDS in Southern Africa. Working Paper. African Department, International Monetary Fund, February.

Hachicha, N. (2003). "Exports, Export Composition and Growth: A Simultaneous Error-Correction Model for Tunisia." *International Economic Journal*, 17(1), 101-120.

Harrod, R.F. (1939). An Essay in Dynamic Theory. *Economic Journal*, 49(10), 5-20.

Hausman, J. A. (1978). Specification tests in econometrics. *Econometrica: Journal of the Econometric Society*, 1251-1271.

Helpman, E., and P. Krugman. 1985. *Market Structure and Foreign Trade.* Cambridge, MA: MIT Press.

Herzer, D., Nowak-Lehmann, F. and Siliverstovs, B. (2004). Export-Led Growth in Chile: Assessing the Role of Export Composition in Productivity Growth. Ibero America Institute for Economic Research (IAI) Discussion Papers number 103, Ibero-America Institute for Economic Research.

Hesse, H., (2008). "Export Diversification and Economic Growth", Working Paper No. 21, Commission on Growth and Development, World Bank, Washington, D.C.

Hsiao, C. (1979). Autoregressive Modelling of Canadian Money and Income Data. *Journal of American Statistical Association*, 74, 553-60.

Hsiao, and Hsiao, M. C. W. (2006), "FDI, exports, and GDP in east and south east Asia: Panel data versus time series causality analysis," *Journal of Asian Economics*, 17, 1082-1106.

Humpage, O.F. (2000). Do Imports Hinder or Help Economic Growth? Economic Commentary, Federal Reserve Bank of Cleveland.

Im, K.S, Pesaran, M.H. and Shin, Y. (2003) Testing for unit roots in heterogeneous panels. *Journal of Econoometrics*, 115, 53-74

Jacques, J. (2016, August 12). Dried Up: Southern and Eastern Africa Suffer Worst Drought in Decades. Retrieved from https://www.thetrumpet.com/article/14134.19.0.0/world/dried up-southern-and-eastern-africa-suffer-worst-drought-in-decades.

(Accessed 01 March, 2017).

Johansen, S. (1988). Statistical analysis of cointegration vectors. *Journal of Economic Dynamics and Control*, 12, 231–254.

Johansen, S. and Juselius, K. (1990), Maximum likelihood estimation and inference on cointegration with applications to the demand for money. *Oxford Bulletin of Economics and Statistics*, 52, 169–210.

Jordaan, A.C. and J.H. Eita, 2007. Export and economic growth in Namibia: A Granger causality analysis. *South African Journal of Economics*, 75(3), 540-547.

Jung, S. W. and Marshall, P. J. (1985). Exports, growth and causality in developing countries, *Journal of Development Economics*, 18, 1–12.

Kaberuka, W., Rwakinanga, E.T. and Tibesigwa, W. (2014). Is export-led-growth hypothesis valid in Uganda? A cointegration and causality analysis. *Issues in Business Management and Economics*,2 (4), 60-73

Keho, Y. (2015). Foreign Direct Investment, Exports and Economic Growth: Some African Evidence. *Journal of Applied Economics and Business Research*, 5(4), 209-219.

Khalid, A., and Cheng, B.T. (1997). "Imports, Exports and Economic Growth: Cointegration and Causality Tests for Singapore." *Singapore Economic Review*, 42 (2): 32–39.

Kim, S., H. Lim, and D. Park. (2007). "Imports, Exports and Total Factor Productivity in Korea." *Applied Economics* 41: 1819–1834.

Kugler, P. (1991). Growth, Exports and Cointegration: An Empirical Investigation. Weltwirtschaftliches Archiv, Bd. 127, 73-82.

Kundu, A. (2013). Bi-directional Relationships between Exports and Growth: A Panel Data Approach. *Journal of Economics and Development Studies*, 1(1), 10-23.

Lall, S. (2000). “Selective Industrial and Trade Policies in Developing Countries: Theoretical and Empirical Issues”. Working Paper No. 48, Queen Elizabeth House, University of Oxford.

Lawrence, R.Z., and Weinstein, D.E. (1999). “Trade and Growth: Import-Led or Export-Led? Evidence from Japan and Korea.” NBER Working Paper no. 7264. Washington, DC: National Bureau of Economic Research.

Lederman, D., and Maloney, W. F. (2007). “Trade Structure and Growth”, Natural Resources: Neither Curse nor Destiny, D. Lederman and W.F. Maloney, eds. Palo Alto: Stanford University Press.

Lee, J. (1995).”Capital Goods Imports and Long-run Growth”, *Journal of Development Economics*, 48, 105-115.

Levin, A., Lin, C.F. and Chu, C-S.J. (2002). Unit root tests in panel data: Asymptotic and finite sample properties. *Journal of Econometrics*, 108, 1-22.

Maddala, G.S. and Wu, S. (1999). A Comparative of Unit Root Tests with Panel Data and New Simple Test. *Oxford Bulletin of Economics and Statistics*, 61, 631-652.

Maijama, D., Samsudin, S. & Mohd Khan, S. (2015). HIV/AIDS and Economic Growth: Empirical Evidence from Sub-Saharan Africa. *Research in Applied Economics*, 7 (4), 30 – 47.

Marin, D. (1992). “Is the Export-Led Growth Hypothesis Valid for Industrialized Countries?” *Review of Economics and Statistics*, 74, 678–688.

Medina-Smith, E. J. (2001), “Is The Export-led Growth Hypothesis Valid for Developing Countries? A Case Study of Costa Rica.” University of Sussex, United Kingdom and Universidad de Carabobo, Venezuela, United Nations, New York and Geneva.

Michelis, L and Zestos, G.K. (2004). Exports, Imports and GDP Growth: Causal Relations in Six European Union Countries. *The Journal of Economic Asymmetries*, 1(2), 71-85.

Mishra, P.K. (2012). The Dynamics of the Relationship between Imports and Economic Growth in India. *South Asian Journal of Macroeconomics and Public Finance* 1(1), 57–79

Musonda, I. (2007). Is economic growth led by exports in Zambia? Ministry of Finance, National Planning and Economic Management. Lusaka, Zambia.

Mushtaq, M., Nazir, R., Bashir, I., Ahmed, S. and Nadeem, M. (2014). Panel Cointegration

Analysis of Government Spending, Exports, Imports and Economic Growth. *International Review of Research in Emerging Markets and the Global Economy*, 1(2), 81-89.

Nafar, N. (2017). How Can Sub-Saharan Africa Harness the Demographic Dividend? Regional Economic Outlook: Sub-Saharan Africa. Available at: https://www.imf.org/external/pubs/ft/reo/2015/afr/eng/pdf/chap2 (Accessed 23 June, 2017)

Newiak, M., (2016). IMF Survey: Weakening Growth in Sub-Saharan Africa Calls for Policy Reset. Available at: http://www.imf.org/en/News/Articles/2015/09/28/04/53/socar050316a (Accessed 21 January, 2016).

Njikam, O. (2003). Exports and Economic Growth in Sub-Saharan Africa: Is There a Connection? Faculty of Economics & Management. University of Yaoundé II, Yaoundé http://www.csae.ox.ac.uk/conferences/2004GPRaHDiA/papers/3f-ousmanou-csae2004.pdf (Accessed 20 October, 2016).

Osei, V. (2012). Import Demand and Economic Growth Analysis in Ghana. *Journal of Economics and Sustainable Development*, 3 (14), 73-90.

Phillips, P.C.B. and P. Perron. (1988). "Testing for a Unit Root in Time Series Regression." *Biometrika*, 75 (2): 335–346.

Pedroni, P. (1999). Critical values for cointegration tests in heterogeneous panels with multiple regressors. *Oxford Bulletin of Economics and Statistics*, 61, 653–670.

Pop – Silaghi, M.L (2009). Exports-Economic Growth Causality: Evidence from CEE Countries. *Romanian Journal of Economic Forecasting*, 2, 105-117.

Raleva, S. (2014). Impact of Labor on Economic Growth in Bulgaria. *Economic Alternatives*, 3, 5-14.

Ram, R. (1987) "Causality relationship between Exports and Economic Growth". *The Journal of Development Economics*. 9 (1), 152-158.

Ram, R. (1990). 'Import and Economic Growth: A Cross Country Study', *Economica Internazionale*, 43 (1), 45-66.

Riezman, G. R., Whiteman, C. H. and Summers, P. M. (1996). The engine of growth or its handmaiden? A time-series assessment of export-led growth. *Empirical Economics*, 12, 77–110.

Rodriguez, F. and Rodrik, D. (2001). “Trade Policy and Economic Growth: A Skeptic's Guide to the Cross-National Evidence”. In Bernanke, B. and Rogoff, K. S. (eds.). Macroeconomics Annual 2000. Cambridge, MA: MIT Press.

Sheridan, B.J. (2014). Manufacturing exports and growth: When is a developing country ready to transition from primary exports to manufacturing exports? *Journal of Macroeconomics*, 42, 1–13.

Sentsho, J. (2002). Exports Revenue as determinant of Economic growth: Evidence from Botswana. University of Botswana, Gaborane, Botswana.

Serge Constant N’Guessan Bi Zambe (2010), “Export-led growth hypothesis: evidence from Cote d’Ivoire”, MPRA Paper 22970, University Library of Munich, Mu¨nchen.

Sharma, S. C., Dhakal, D. (1994). Causal analysis between exports and economic growth in developing countries. *Journal of Applied Economics,* 26, 1145-1157.

Sjoeholm, F. (1999). “Exports, Imports and Productivity: Results from Indonesian Establishment Data. World Development, 27, 705–15.

Solow, R. M. (1956). A contribution to the theory of economic growth. *Quarterly Journal of Economics*, 70, 65-94.

Songwe, V. and Winkler, D. (2012). Exports and export diversification in Sub-Saharan Africa: A strategy for post-crisis growth. Africa Growth Initiative working paper 3, December.

Szirmai, A., Gebreeyesus, M., Guadagno, F. and Verspagen, B. (2013). Promoting Productive Employment in Sub-Saharan Africa. Knowledge Platform Development Policies of the Ministry of Foreign Affairs of the Netherlands. Available at: http://www.merit.unu.edu/aqsg/docs/Productive%20employment%20in%20Africa_ ESzirmai.pdf

Tang, T.C. (2006), “New evidence on export expansion, economic growth and causality in China”. Applied Economics Letters, 13 (12), 801-803.

Thirlwall, A.P. (2000), “Trade, Trade Liberalisation and Economic Growth: Theory and Evidence”. AfDB Economic Research Paper No. 68, The African Development Bank Abidjan, Côte d’Ivoire.

Toda, H. Y., & Yamamoto, T. (1995), “Statistical inference in vector autoregressions with possibly integrated processes”, *Journal of econometrics*, 66(1), 225-250.

Torayeh, M.N., (2011). Manufactured exports and economic growth in Egypt: Cointegration and causality analysis. *Applied Econometrics and International Development*. 11 (1), 111-135.

Van der Ploeg, F. (2011). "Natural Resources: Curse or Blessing?" *Journal of Economic Literature*, 49 (2), 366-420.

Verdoorn, P. (1949), "Fattori che Regolano lo Svilluppo della Produt-tivit_a del Lavoro," L'Industria, 1, 45-53.

Were, M. (2015). Differential effects of trade on economic growth and investment: A cross country empirical investigation. *Journal of African Trade*, 2 (1-2), 71-85.

WITS, (2015). Data retrieved October, 2016, from World Integrated Trade Solution Online database. Available at: http://wits.worldbank.org/

World Bank. (2015). Data retrieved October, 2016, from World Development Indicators Online (WDI) database.

Wörz, J. (2005), "Skill Intensity in Foreign Trade and Economic Growth", Empirica, 32(1), 117-144.

WTO, (2015). Trade in Services. Publication of World Trade Organization. Date retrieved April 21, 2017.

Yee Ee, C., 2015. Export-Led Growth Hypothesis: Empirical Evidence from Selected Sub-Saharan African Countries. *Procedia Economics and Finance*, 35, 232 – 240.

Yüksel, S. and Zengin, S. (2016). Causality relationship between Import, Export and Growth rate in developing countries. International Journal of Commerce and Finance, 2 (1), 147-156.

Zahonogo, P. (2017). Trade and economic growth in developing countries: Evidence from sub-Saharan Africa. *Journal of African Trade*. Available at: http://dx.doi.org/10.1016/j.joat.2017.02.001 (Accessed 01 March, 2017).

APPENDICES

Appendix A: **Descriptive Statistics by Country**

Country		GDP	ME	RME	TEXP	MI	RMI	TIMP	ECI	GCF	LF
	Min	2.27	0.02	0.12	0.19	0.49	0.03	0.55	0.07	0.41	2.34
	Max	9.71	0.54	0.42	0.97	3.22	0.47	3.70	0.23	2.77	4.27
Benin	Mean	5.34	0.14	0.21	0.35	1.21	0.16	1.38	0.12	1.25	3.04
	Median	4.97	0.10	0.20	0.29	0.87	0.08	0.95	0.12	0.99	3.09
	Std. Dev.	2.47	0.13	0.10	0.22	0.82	0.14	0.96	0.04	0.70	0.91
	Min	4.79	0.33	2.18	2.53	1.63	0.09	1.81	0.13	1.14	0.69
	Max	15.88	1.95	6.20	7.92	6.13	3.22	8.03	0.79	5.92	1.13
Botswana	Mean	9.69	0.97	2.83	3.81	3.06	0.77	3.92	0.42	3.13	0.86
	Median	10.03	1.03	3.05	4.12	3.30	0.25	3.67	0.41	2.76	0.88
	Std. Dev.	3.90	0.67	1.77	2.38	1.89	1.00	2.70	0.22	1.52	0.23
	Min	2.45	0.04	0.13	0.17	0.53	0.01	0.55	0.05	0.39	4.41
	Max	12.26	2.05	0.79	2.85	4.28	0.08	4.37	0.44	3.91	7.74
Burkina	Mean	6.44	0.57	0.32	0.89	1.55	0.04	1.60	0.17	1.73	5.62
Faso	Median	5.65	0.06	0.28	0.36	1.05	0.04	1.08	0.11	1.26	5.72
	Std. Dev.	3.46	0.78	0.20	0.96	1.16	0.02	1.19	0.13	1.23	1.62
	Min	9.29	0.36	0.87	1.73	1.00	0.20	1.20	0.07	1.39	5.03
	Max	32.05	1.67	3.63	5.16	5.54	1.99	7.56	0.13	6.65	8.78
Cameroon	Mean	18.36	0.82	1.69	2.59	2.70	0.81	3.54	0.10	3.43	6.40
	Median	17.27	0.76	1.38	2.21	1.95	0.48	2.94	0.10	3.09	6.54
	Std. Dev.	7.62	0.49	0.98	1.39	1.51	0.60	2.00	0.02	1.67	1.84
	Min	7.70	0.06	0.29	0.40	1.06	0.03	1.11	0.09	10.26	24.59
	Max	61.54	2.64	2.98	5.67	24.21	0.94	25.82	0.56	26.22	45.16
Ethiopia	Mean	22.63	0.62	1.03	1.65	6.42	0.37	6.90	0.24	4.50	32.12
	Median	13.84	0.47	0.49	0.98	4.30	0.27	4.65	0.19	16.24	32.91
	Std. Dev.	17.18	0.72	0.89	1.59	6.50	0.30	6.92	0.14	8.24	9.56
	Min	0.49	0.00	0.00	0.00	0.12	0.01	0.13	0.05	0.04	0.43
	Max	0.97	0.11	0.02	0.12	0.37	0.04	0.39	0.10	0.26	0.77
Gambia	Mean	0.79	0.03	0.01	0.04	0.23	0.01	0.25	0.06	0.14	0.55
	Median	0.83	0.01	0.01	0.01	0.24	0.01	0.26	0.06	0.18	0.56
	Std. Dev.	0.14	0.04	0.01	0.04	0.09	0.01	0.09	0.01	0.08	0.16
	Min	4.98	0.60	0.39	1.16	2.09	0.18	2.48	0.05	1.20	6.91
	Max	47.81	11.59	6.54	18.15	12.27	1.71	13.58	0.08	13.33	10.90
Ghana	Mean	20.50	2.68	1.48	4.29	4.46	0.64	5.39	0.06	5.19	8.31
	Median	15.57	1.51	0.88	2.46	2.74	0.47	3.71	0.06	3.76	8.45
	Std. Dev.	14.51	3.16	1.96	5.01	3.65	0.49	3.92	0.01	4.09	2.21

Country		GDP	ME	RME	TEXP	MI	RMI	TIMP	ECI	GCF	LF
	Min	10.72	1.99	1.57	3.63	1.52	0.71	2.48	0.05	1.12	5.34
	Max	34.22	7.19	6.17	12.99	8.56	3.86	12.48	0.10	7.00	8.16
Ivory	Mean	19.66	4.09	3.58	7.70	3.88	1.95	5.88	0.07	2.68	6.28
Coast	Median	17.44	4.50	3.11	7.66	3.62	2.13	5.84	0.06	1.80	6.44
	Std. Dev.	7.47	1.69	1.56	3.14	2.06	1.08	3.08	0.02	1.85	1.65
	Min	12.05	1.12	0.24	1.40	2.33	0.30	2.79	0.05	1.81	10.24
	Max	63.40	4.68	0.83	5.54	14.98	1.72	16.39	0.08	13.78	16.82
Kenya	Mean	29.18	1.88	0.42	2.32	4.27	0.66	4.96	0.07	5.78	12.36
	Median	22.28	1.47	0.45	1.94	2.90	0.59	3.39	0.07	4.06	12.43
	Std. Dev.	17.40	1.52	0.29	1.81	4.02	0.54	4.55	0.01	4.03	3.44
	Min	4.17	1.47	0.02	1.49	1.78	0.16	1.99	0.07	0.94	0.49
	Max	12.80	2.45	0.20	2.66	4.88	0.82	5.77	0.18	2.84	0.58
Mauritius	Mean	7.67	1.85	0.10	2.00	3.03	0.45	3.51	0.14	1.81	0.51
	Median	6.71	1.82	0.11	1.93	2.98	0.40	3.40	0.16	1.68	0.53
	Std. Dev.	3.07	0.27	0.06	0.35	1.05	0.24	1.30	0.05	0.67	0.12
	Min	3.52	0.20	0.14	0.23	0.56	0.05	0.76	0.06	0.64	7.17
	Max	16.96	3.94	0.79	4.73	9.63	0.45	10.10	0.15	9.39	11.73
Mozambique	Mean	8.93	1.45	0.33	1.87	2.88	0.17	3.40	0.10	2.83	8.85
	Median	8.02	1.37	0.26	1.95	1.86	0.15	2.64	0.09	1.62	9.15
	Std. Dev.	4.22	1.19	0.26	1.40	2.88	0.14	2.89	0.02	2.65	2.42
	Min	3.36	0.38	0.63	1.28	1.19	0.10	1.31	0.07	0.62	0.53
	Max	13.02	3.18	3.21	6.34	7.57	1.21	8.53	0.32	4.24	0.87
Namibia	Mean	7.66	1.37	1.51	2.90	2.84	0.32	3.20	0.13	1.90	0.68
	Median	7.62	1.24	1.37	2.64	2.28	0.15	2.47	0.11	1.60	0.72
	Std. Dev.	3.53	1.19	1.17	2.36	2.45	0.36	2.81	0.06	1.15	0.18
	Min	32.00	0.13	6.68	6.87	3.71	0.57	6.87	0.06	2.52	33.63
	Max	568.50	27.37	115.73	143.15	53.61	9.82	143.15	0.25	89.84	53.14
Nigeria	Mean	202.59	6.58	39.70	46.35	18.39	1.92	46.35	0.17	27.33	40.03
	Median	128.84	1.41	25.08	25.58	10.84	1.02	25.58	0.16	9.37	40.55
	Std. Dev.	183.76	9.69	34.85	43.44	16.58	2.21	43.44	0.06	30.92	10.81
	Min	1.38	0.00	0.01	0.01	0.02	0.01	0.23	0.06	0.20	2.91
	Max	8.10	0.37	0.31	0.65	1.31	0.14	1.99	0.61	2.19	5.51
Rwanda	Mean	3.92	0.11	0.12	0.23	0.47	0.04	0.82	0.16	0.87	4.05
	Median	2.85	0.05	0.10	0.17	0.33	0.01	0.47	0.10	0.47	4.21
	Std. Dev.	2.38	0.12	0.10	0.21	0.42	0.05	0.67	0.13	0.71	1.19

Country		GDP	ME	RME	TEXP	MI	RMI	TIMP	ECI	GCF	LF
Senegal	Min	4.67	0.26	0.07	0.34	1.15	0.22	1.55	0.06	0.59	3.51
	Max	15.28	2.16	0.58	2.75	5.43	1.36	6.55	0.15	4.19	6.10
	Mean	9.52	1.21	0.29	1.52	3.12	0.69	3.83	0.10	2.28	4.43
	Median	9.03	1.14	0.32	1.48	3.02	0.65	3.58	0.09	2.22	4.52
	Std. Dev.	3.99	0.69	0.15	0.84	1.57	0.35	1.90	0.02	1.28	1.28
South Africa	Min	115.48	11.32	5.63	19.59	18.73	2.91	24.09	0.04	18.80	14.15
	Max	416.42	76.81	30.63	107.95	78.14	19.82	104.14	0.12	82.12	20.02
	Mean	249.25	38.45	14.37	53.61	44.41	10.54	59.83	0.06	48.90	16.20
	Median	264.71	36.92	11.53	49.80	44.04	10.23	59.40	0.05	51.02	16.80
	Std. Dev.	99.62	21.03	8.51	29.00	22.37	6.13	30.01	0.03	22.50	4.02
Tanzania	Min	6.50	0.15	0.36	0.60	1.14	0.05	1.25	0.04	1.08	14.37
	Max	48.20	3.44	2.35	5.85	14.21	0.56	14.71	0.13	14.52	24.18
	Mean	22.23	1.43	0.98	2.44	5.44	0.25	5.73	0.07	5.97	17.81
	Median	17.77	1.03	0.74	1.77	3.71	0.20	3.89	0.07	4.24	18.17
	Std. Dev.	13.64	1.19	0.69	1.90	4.32	0.16	4.50	0.03	4.53	5.02
Uganda	Min	5.84	0.14	0.26	0.40	0.75	0.03	0.80	0.04	1.08	8.42
	Max	27.76	1.53	0.90	2.41	5.77	0.25	6.07	0.08	7.45	14.49
	Mean	13.27	0.67	0.52	1.21	2.86	0.12	3.03	0.06	3.19	10.48
	Median	9.48	0.43	0.49	0.89	2.13	0.11	2.31	0.06	2.06	10.56
	Std. Dev.	7.88	0.51	0.22	0.75	1.92	0.07	2.01	0.01	2.27	2.98

Source: Author's secondary data analysis

Appendix B: **Map of Sub-Saharan Africa**

Source: World Bank, 2015

Appendix C: **Correlation matrix of coefficients of explanatory variables in the regression model**

	LogME	LogRME	LogMI	LogRMI	ECI	LogGCF	LogLF
LogME	1.0000						

LogRME	0.7491***	1.0000					
	(19.4199)	-----					
LogMI	0.9115***	0.7332***	1.0000				
	(38.0591)	(15.8758)	-----				
LogRMI	0.6937***	0.6868***	0.6013***	1.0000			
	(14.2133)	(12.6455)	(11.9406)	-----			
ECI	- 0.0827	0.0875	- 0.0567	- 0.1162**	1.0000		
	(- 1.4246)	(1.5094)	(- 0.9752)	(- 2.0096)	-----		
LogGCF	0.6733***	0.6375***	0.6471***	0.6449***	-0.0394 **	1.0000	
	(13.7929)	(12.3238)	(12.5884)	(12.4258)	(-0.6772)	-----	
LogLF	0.4113***	0.5969***	0.5241***	0.4212***	-0.2318***	0.6248***	1.0000
	(7.7505)	(11.7784)	(10.5698)	(7.9753)	(-4.0934)	(13.7449)	-----

Notes: Values in bracket are t-statistics. ***, ** and * represent significance at the 1%, 5% and 10% level, respectively.

Source: Author's secondary data analysis using Eviews

Appendix D: **Results of the aggregated regression model using the fixed effects within growth estimator without lagged dependent variable**

Dependent Variable : LogGDP	
LogME	0.1103***
	(4.6805)
LogRME	0.0922***
	(3.1473)
LogMI	0.2929***
	(4.7157)
LogRMI	0.0614**
	(1.9946)
ECI	-0.1674
	(-1.0771)
LogGCF	0.1250*
	(1.6725)
LogLF	0.4253**
	(2.2130)
R^2	0.9852
Adjusted R^2	0.9839
F-stat	727.14***
DW stat	0.6204

Notes: Values in bracket are t-statistics. ***, ** and * represent significance at the 1%, 5% and 10% level, respectively.

Source: Author's secondary data analysis using Eviews

Appendix E: **Results of the aggregated regression model using the random effects within growth estimator**

Dependent Variable : LogGDP	
LogGDP(-1)	0.8300***
	(30.4084)
LogME	-0.0037
	(-0.3901)
LogRME	0.0266***
	(3.5812)
LogMI	0.0210
	(0.9317)
LogRMI	-0.0008
	(-0.0798)
ECI	-0.0752
	(-1.0857)
LogGCF	0.1118***
	(5.3547)
LogLF	0.0258**
	(2.5474)
R^2	0.9935
Adjusted R^2	0.9933
F-stat	5312.18***
DW stat	1.6345

Notes: Values in bracket are t-statistics. ***, ** and * represent significance at the 1%, 5% and 10% level, respectively.

Source: Author's secondary data analysis using Eviews