Assessment of Trade on Growth in Sub-Saharan Africa from 2000 - 2016

By

KAYODE, Ibrahim Awofe

THESIS

Submitted to

KDI School of Public Policy and Management

In Partial Fulfillment of the Requirements

For the Degree of

MASTER OF DEVELOPMENT POLICY

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Committee in charge:

Professor Tabakis, Chrysostomos, Supervisor _____

Professor Han, Baran _____

Approval as of December, 2019

CHAPTER ONE

INTRODUCTION

1.0 Background to the Study

Africa consists of 54 countries which are usually classified into two, "the North" and "Sub-Saharan". This classification was motivated by the desire to progressively channel the course of development to Africa South of the Sahara since North African countries have relatively stable and sophisticated economies which are largely integrated into the world economy (Quora, 2012). At the turn of the millennium, Africa was tagged as "the hopeless continent" but over time, this has given way to the more friendly term "Africa Rising", due to the nature of the growth in the area of trade.

James (1992) asserted that the most theoretical argument linking trade to growth is the theory of comparative advantage by David Ricardo. Ricardo's theory was based on the premise that no nation is self-sufficient, as such, the need for trade liberalization is not only crucial but inevitable; and has been a subject of many studies since the time of David Hume. Notable in Hume's argument is his support for the growth in capital account, which was regarded an index of economic growth.

Since then, there has been support for growth-enhancing effect of trade openness on development from traditional and modern economists like Dollar, 1992; Dollar & Kraay, 2001; Ben-David, 1993; Sachs & Warner, 1995; Edwards, 1998; Frankel & Romer, 1999; Wacziarg, 2001 and Bhagwati & Srinivasan, 2002. While this has been subject to debate particularly for developing nations (especially Sub-Saharan Africa (SSA)) that trade largely in primary commodities, whether this discourse have been empirically answered is often contentious.

However, it can be argued that since World Trade Organization (WTO) was institutionalized in 1995, trade impediment has relatively been relaxed. This, in turn, has enhanced global integration and led to prosperity (measured in per capital GDP) except for the downturn in the global financial crisis and the recent gestures by the superpowers (the USA and China) downplaying the impact of trade (Vanoverbeke, 2018).

Data from WTO and United Nation (UN) (2010) reveals continuous rise in the ratio of manufacturing to trade from about 1.5 in 1900 to 5.8 in 2008. This has been empirical argued to include but not limited to; improving citizens' choices related to welfare implications which have been un-debated from all economist and lower prices of goods and services due to technological transfer and innovations.

However, these studies have highlighted the condition in which trade causes growth-trade causes growth only when appropriate political, social, economic and relevant institutional parameters are favoured. These includes but not limited to factors like governance, policies, competition and surge in inputs such as labour, capital, infrastructure and education (Dufrenot et. al., 2010).

However, the fact that SSA countries/region still lags behind other countries/regions despite thorough trade reforms to include amongst several objectives the desire for an export oriented economies prompted this research. The major thrust of this work is to reconsider the trade-growth link thereby, adding to previous contributions on the topic. The key poser the research address is whether trade has impact on income or standard of living in a significant manner.

1.1 Problem Statement

SSA countries which have been notable with traditional trade in commodities have recently experience rising growth in GDP with a recent structural change to the manufacturing sector (Elmorsy, 2016). According to the World Bank (2015), SSA has averaged an annual GDP of 3.6% from 1961 to date; while there was traction in the same year (2015) due to slump in commodity prices, the economy has got on a rebound now growing at 3.3% (Focuseconomics, 2018).

Technological transfer and the continual improving workforce are factors which explain SSA growing trade structural pattern and composition (Gackenholz, 2012). Despite such growth, the real effect on the population is contestable. This make Lopez (2005) affirmed that previous literatures seem not to have produced a definite answer on the causal effect of trade on growth.

For instance, over 80% of SSA still lags behind other regions in development indicators despite revisiting regional, continental and global trade policies to adopt the East Asia export-led strategy which led to the region's GDP growth average (11.6%) in 2004 (World Bank, 2015). Furthermore, international trade have an unintended consequence to distort the growing infant industrial setup in developing economies exclusively SSA countries, thereby leading to an extinction of such firms (Kehinde, 2017).

Although previous studies have been conducted on trade effect on growth in SSA, for instance, Iyoha and Okim (2017), Oyebanjo (2017); however, there are gaps in terms of methodology and geographical coverage. Rodrik (1998) assessed trade's policy effect on economic performance in SSA countries; however, the paper only focused on trade policy with shortcoming in estimation strategy.

More recently, Bruckner and Lederman (2012 & 2015) offers a new identification strategy in estimating trade effect on growth. The paper employs two instrumental variables (IV) techniques which corrected for endogeneity. However, the first IV (annual rainfall) estimate may not be true since data employed were not up to date and the variables of interest does not necessarily explain growth theories. As such, the causal estimates of trade on growth in SSA countries have not been properly addressed by previous literatures.

It is believed that this study will revive interest in this contentious topic and bridge the literature gap. The approach of this study is to extend the use of dynamic panel data model using IV (annual rainfall) with more recent data to estimate the causal effect of trade on growth in SSA. In addition, an effort is made to compare results from previous works by using different independent variables.

1.3 Research Questions

The following are the questions guiding this research:

i. Which of export and import really matters for growth?
ii. Do country's geographical characteristics affect per capita GDP?
iii. To what extent does institution affect growth?
iv. To what extent do capital formation and/or labour affect growth?

1.4 Research Objectives

Based on the above leading questions, the general objective of the study is to evaluate the causal effect of trade on growth in SSA. In accordance with this objective, the study will present claims on the following specific objectives:

i. To determine the role of export, import or both on growth in SSA countries;

ii. To assess the impact of geographical characteristics on growth in SSA countries;

iii. To assess the role of institutions on growth in SSA countries;

iv. To determine the extent to which capital and/or labour contributes to growth in SSA countries.

1.5 Research Hypotheses

Based on the study background, problem, questions and objectives, the study aims to test below listed claims:

Ho_1: There is no statistical significant relationship between export, import or both on per capita GDP in SSA

Ho_2: There is no statistical significant relationship between geographical characteristics and per capita GDP in SSA

Ho_3: There is no statistical significant relationship between institutions and per capital GDP in SSA

Ho_4: There is no statistical significant relationship between capital, labour and per capital GDP in SSA

1.6 Significance of the Study

It is believed that the practical outcome of the study will be useful to policy makers in Africa (exclusively SSA) as well as development partners in enhancing SSA countries global

value chain participation. It should also be useful in understanding how SSA paradigm can be shift beyond traditional trade in primary commodities.

It is also hoped that the outcome of the study will become a document to be consulted from for future strategic planning. For development actors involved in expediting trade projects, an understanding of the projects' dynamics and its effects on growth patterns is necessary in order to design sustainable yet inclusive development. In another vein, the results of the study will aid investors to understand the dynamics of the SSA countries before capital outlay decision.

1.7 Scope and Limitation of the Study

In pursuance of the objectives of the study, the researcher focused attention on seven SSA countries for the period 2000 – 2016 due to deficiency in data of other countries. Given the constraint in time, academic exploit of the study and other resources and data, the researcher limits the year to the country whose variables of interest are available for analyses.

More so, there may be inconsistencies in data gotten from different sources precisely the World Bank, Penn World Table (PWT) and the World Bank Climate Portal which may results to bias in making inferences. In addition, trade has series of implications on macroeconomics variables especially its relevance in growth, employment, inequality etc.; however, this paper does not discuss on inequality due to limitation in data and lack of time.

More recently is trade's implication on climate which has also not been captured in this paper. Nonetheless, this paper uses the best estimation strategy in IV especially using an instrument (annual precipitation data) particularly suitable for SSA countries.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter reviews important literatures on trade and growth. Quite a number of issues have been studied on trade with its discourse often inexhaustible. This chapter briefly appraises the link between trade and development, SSA trade performance in comparative perspective and the review of previous literature.

2.1 Appraisal of the Link Between Trade and Development

The earliest historical pattern of trade-growth linkage was dated prior to 15th century which was codify in Hume's book "Political Discourse" 1792. Hume's argument was synonymous with that of mercantilist which emphasized an export-led growth strategy. Both arguments were to improve capital and current account measured in gold standard thereby encouraging export than import.

This was further extended in the "Wealth of Nation" by Adam Smith in "1776" that encouraged trade in principle to the extent of countries absolute advantage. However, Ricardo (1817) opined in his work "Principle of Political Economy and Taxation" the fundamentals of "Comparative Advantage" simply put- specialization. He emphasize differences in the productivity of labour across countries (due to differences in technology) using the concept of opportunity cost as the fulcrum on which trade is based.

Connected with the preceding classical economist is the Marshallian model of specialization by the exploitation of increasing returns from serving larger markets; this exploitation makes it possible for firm to increase its size and raise the opportunity to exploit internal economies. However, since late 19th century, onus of growth has been extended beyond growth in capital account to a constructive welfare implication on the society. More so, growth in trade is now in tripartite arrangements- bilateral and multi-lateral trade relations of between and within regions across the globe.

More recently, development expert have focused on inclusive trade growth pattern tagged development. Though the paths of trade to a sustainable yet inclusive and ultimately to development is not a silver bullet approach. This make the World Bank advise that developmental approach should focus on the contextual variability of uncertainty enabling each country to tailor reform on specific country's context because specific developmental policy in an area might not prove successful in other (Rodrik, 2003).

Thus, trade policy is not an end in itself but support to other infrastructural development structure like institutions. While such structure are in place, this lead to rise in per capital GDP, which in turn enhance support structures of development goal and also, contributes to other macro objectives, improving global value chain participation and supports integration into the world economy.

2.2 Sub-Saharan African Trade Policies Performance in Comparative Perspective

The early 2000 ushered in another century of patterned growth in SSA. In other to achieve Millennium Development Goal (MDGs), review in a number of trade policies took

place. The thrust of which was to enhance local capacities against unfair trade practices, ensure sound macroeconomic policies, created fiscal space and strengthened political and economic institutions.

Since not all trade actors are better off (gains unevenly spread), stakeholders (labour union, industries, firms, political parties etc.) often emphasize government interventions through policies to help mitigate their losses from trade. As such, trade policies, particularly subsidies on exports, import quotas (quantity limits on imports) and tariffs (taxes on imports) offer remedies to these unfair practices.

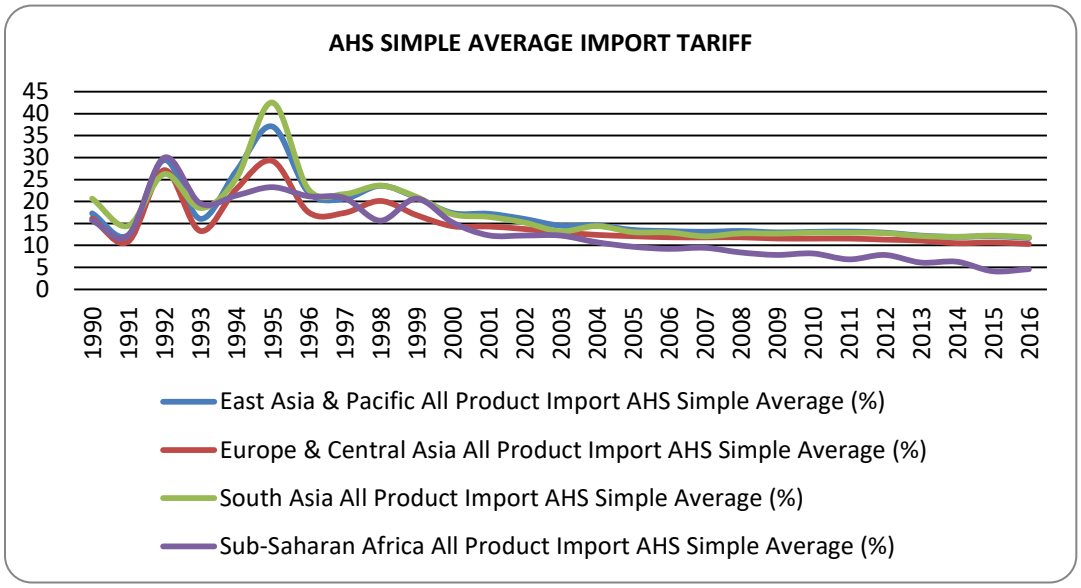
The most pronounced import tariff was first recorded in 1930's by Hawley in the U.S. The theme was to protect farmers from European agricultural export to the U.S, thereby incentivizing local farmers after World War I. Though, this led to retaliation and severity leading/extending to the Great Depression; however, the General Agreement on Trades and Tariffs (GATT) of 1948 replaced by World Trade Organization (WTO) of 1995 were initiated to foster trade and promotes global peace.

GATT provision encouraged raising tariffs for certain products using the safeguard/escape clause- importing country can temporarily raise its imports tariff amidst competition between foreign and domestic producers. This was more pronounced for developing SSA countries which deals in primary products.

Since quantifying trade policies may be difficult most especially in a comparative techniques to other region, simple averages of tariff rate and numbers of tariffs agreement will be evaluated. The SSA import tariff on all products from the 90s was about 18% converging with Europe and East Asia with exception to South Asia averaging over 20% (see figure 1 below).

However, further averages revealed decline in the subsequent year with the region of interest almost converging in 1993. There was a historical rise in 1995 with same pattern almost across the region till 2000. An important highlight of this trend was that each region have similar characteristics with unique pattern of trend for SSA averaging a marginally decline trend compared to other region.

Figure 1

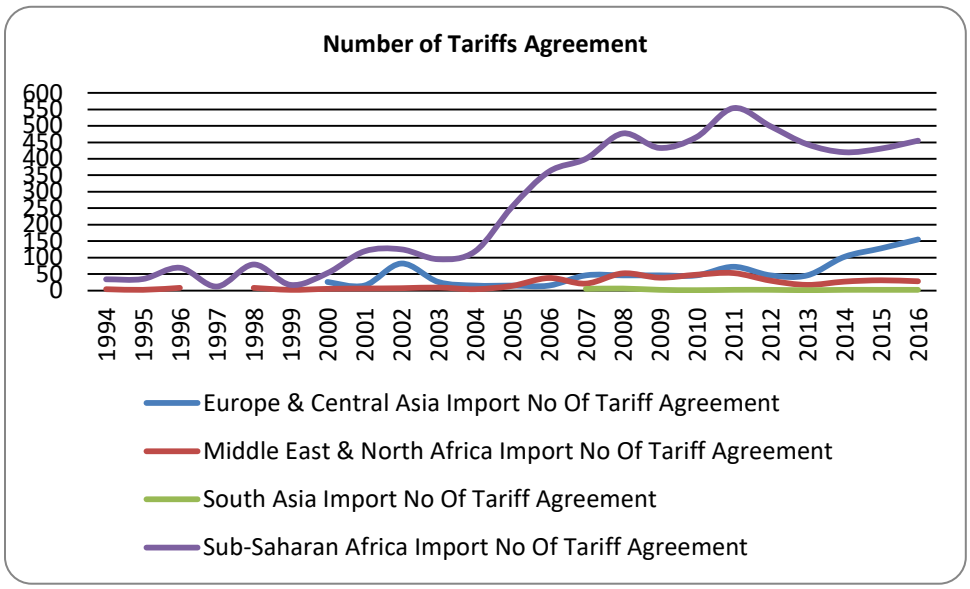


Source: Author's Secondary Data from World Integrated Trade Solution (WITS), 2019.

The SSA number of tariffs agreement revealed a positive (incremental) trend from 1994 which seems to be the year where data were available (See Figure 2 below). In comparison to other region from the graph, it was evident that SSA partner with more countries and region. This may be due to other regions robust value chain and manufacturing sector compared to SSA. More so, we can from the graph infer the nature of industrial complex in other regions and the

extent to which each region may be self-sufficient. Nonetheless, the trend for SSA also revealed fair share of openness which was corroborated in the simple tariff averages in figure 1 above.

Figure 2



Source: Author's Secondary Data from World Integrated Trade Solution (WITS), 2019.

2.3 Review of Empirical Literature

While there has been contentious debate on trade effect on growth in developing countries, there have been convergences in results since the '90s amongst researchers. Rodrik (1997) was amongst the early scholars who empirically addressed growth-enhancing effect of international trade in SSA. Using cross-sectional sample and a pooled sample methodology, the study focused on the role of trade policy and/or trade and in achieving sustained long-term growth in SSA countries and utilized data related to Ghana, Mauritius, Botswana, Mali, Uganda and the Gambia from 1970 to 1996. The study found that openness increase trade volume by 0.08 percentage point.

In the same vein, Sachs and Warner (1995) evaluated the impact of trade on the growth of 122 countries across 4 continents. The authors reported that open countries exhibited higher growth rates than protectionist countries. Rodriguez (2006) stated that Sachs and Warner only recorded countries that have been counted adjustment in Africa World Bank program and ignored non-African countries and African countries which have not been concerned by the adjustment plan.

Kneller (2002) centered on whether the effects of trade liberalization on per capita GDP growth are offset by changes in fiscal policy, founds that government's increases welfare spending in response to greater exposure to foreign trade. It was also found that for a sample of developing economies that this is not the case. Though countries that liberalized their trade regimes increase their welfare spending, but once fiscal policy is control for, trade liberalization has no effect on growth rate. However, the results would have been considered robust had it taken into consideration other growth dependent variables like labour and capital formation which affect trade; the justification of countries classified as non-liberalism (common trend assumption) is not value-free; as such, the estimate may be bias.

Olivier et. al., (2015) employ the gravity model approach to estimate if trade facilitation contribute to the reduction of the spatial agglomeration of SSA's economic activity. Results suggested that economic activity have agglomerated away from SSA's borders, but that this agglomeration effect was lessen by trade facilitation. This effect is strongly present and has reinforced itself over time. This paper is also not free from methodological shortcoming highlighted in Frankel and Romer, 1999.

Mahabir (2015) employ a static model of panel data to explore the relationship between the roles of trade in Africa's recent growth trajectories. The analysis was conducted in stages,

which makes it possible to test the assumptions made in the paper. Pooled-OLS regressions and fixed effect techniques were used in the paper for a period 1990-2009. However, the study did not control for unobserved state and time-specific factors. As such, result may be bias.

Iyoha and Okim (2017) addressed unobserved time-varying characteristics by analyzing the impact of openness on per capital GDP using data from the ECOWAS countries. The dynamic panel regression model for 15 ECOWAS countries revealed that investment, exchange rate and exports were significant determinants of per capita GDP. From regional consideration, West African countries seems to have common historical, cultural and social trait which may not makes this result generalizable for other regions in SSA.

Though the study by Brueckner and Lederman (2015) estimated trade openness effect on economic growth in SSA by employing two incisive IV techniques (annual precipitation and a bilateral-trade-weighted GDP growth rate of the trading partners in OECD countries). Result revealed that openness cause increase in per capital GDP. They found that an increase in openness by 1 percentage point increase growth by 0.5 and 0.8 per cent/year in a short run and long run respectively with robust result controlling for institution, fixed and time effect .

However, the annual precipitation data used in the study were only available till 2009 which this research extends till 2016. Moreso, the result of their first instrumental variable (annual precipitation) which posits negative estimate of trade openness on growth needs to be double checked and with current data (see table 4.3 and 4.4 in chapter 4). More so, the theoretical trade growth theories of labour and capital formation were also not captured in the study of Brueckner and Lederman (2015). Thus, though employing similar methodology, this study fills these gaps by making usage of more recent data thereby enabling a reliable causal inference of trade on growths during the era of the Millennium Development Goals to be drawn.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This section explained the methods of data collection used in this study. An overview of the research design and the detail methods for the quantitative study in terms of secondary data and the estimation strategy approach used in this research work.

3.2 Study Design

The relationship between openness to trade and economic growth has been empirically model in previous literatures (e.g. Edwards, 1998; Wacziarg, 2001; Frankel and Romer, 1999; Sachs and Warner, 1995; Bhagwati and Srinivasan, 2002; Dollar, 1992; Dollar and Kraay, 2001; Ben-David, 1993) to mention but few.

In the same vein, to estimate the causal effect of trade on growth in SSA, this study has adapted the method by Brueckner and Lederman (2012 and 2015) and a dynamic panel model approach. Unlike Brueckner and Lederman (2012 and 2015), the estimation strategy was partially different in terms of the independent variable of interest and model. However, the study employ similar IV (yearly variation in precipitation i.e. annual rainfall) as our identification strategy to estimate trade's effect on GDP growth in SSA.

3.3 Data Source and Sample Size

This study covers seven SSA countries (Nigeria, Botswana, Mauritius, Senegal, Mauritania, Tanzania and Zimbabwe) for a seventeen-year period 2000 - 2016 with data obtained

from different sources. These countries trade partners comprises about 70 per cent of Western counterparts for export and over 85 per cent for her import (WTO, 2018).

The countries are chosen on the basis of institutional dynamism, political swift, within regional representation, and importantly the availability of the required data. Three countries were selected from West Africa (Nigeria, Senegal and Mauritania), two from South Africa (Botswana and Zimbabwe), one from both East Africa (Tanzania) and the India Ocean (Mauritius) which is about 1,200 miles from the Southeastern coast of Africa.

According to Alcala and Ciccone (2004), trade openness is measured as the sum of imports and exports (in constant $US) divided by GDP PPP (Sachs and Warner, 1995; Dollar, 1992; Frankel and Romer, 1999; Chang and Mendy, 2012); landlocked (Frankel and Romer, 1999), area and latitude (Sachs, 2012, Acemoglu et. al, 2001) were obtained from CEPII Research and Expertise on the World Economy database; polity2 (Bruckner and Lederman, 2012; Mullings and Mahabir, 2015) were obtained from Penn World Table 9.0 database and finally, annual precipitation rate were obtained from the World Bank Climate Change Knowledge Portal.

3.4 Model Identification and Specification

3.4.0 Model Identification

Instrumental variable (IV) estimation strategy using a dynamic panel model was employed to assess trade's effect on growth in SSA. The analysis is conducted in stages, making it possible to carefully test the hypotheses, and the assumptions regarding panel data and the estimation techniques applied. In reality, however, the spanned cross-section data observed over

several time periods across different countries (panel data) result in more useful information than time series data.

The advantages of this method are: first, panel data helps to highlight any significant relationships among variables over time; second, it monitors peculiar country's unobservable effects. Thus, this paper used panel data, instrumental variable and a dynamic panel model estimate as an identification strategy. Several estimation approaches such as the fixed and random effect techniques were also analyze from the data.

3.4.1 Specification

To estimate the causal effect of trade on growth in SSA, this study employ a panel data model techniques of seven (7) SSA countries (Nigeria, Botswana, Mauritius, Senegal, Mauritania, Tanzania and Zimbabwe) for the period of seventeen (17) years (2000-2016) and also, employs a two-stage least square (2SLS) using an instrumental variable (annual rainfall data) adapted in the work of Brueckner and Lederman (2015):

First Stage Regression:

$$Open_{it} = \alpha_0 + \alpha_1 Rainfall_{it} + \kappa_i t + + \tau X_{it} + \mu_{it} \text{ ---------- (1),}$$

Where;

$Open_{it}$	regressor of interest, openness to trade in country i at time t
$\alpha_1 Rainfall_{it}$	instrumental variable, annual rainfall in country i at time t.
$\kappa_i t$	country's peculiar time trend which captures supplementary within-country variation,

X_{it} includes within country variations (control factors) such as political/economic institutions e.g. inflation rate, population growth rate, foreign direct investment, polity2, gross fixed capital formation, labour and geographical dynamics e.g. landlocked, area and latitude,

μ_{it} error term is discretionary clustered at country level to allow for serial correlation.

From equation (1) above, the study estimated the part of openness ($Open_{it}$) that is uncorrelated with μ_{it} (error term) by regressing to get the predicted value of openness. Thus, since the instrument ($Rainfall_{it}$) is uncorrelated with the μ_{it} (error term), then openness ($Open_{it}$) is uncorrelated with μ_{it} (error term).

Second Stage Regression (2SLS):

$$\Delta \ln(y)_{it} = \alpha_i + \beta_t + \gamma_i \aleph_1 + \kappa_i t + \tau X_{it} + \mu_{it} \text{ ---------- (2),}$$

Where,

$\Delta \ln(y)_{it}$ change in log of per capita GDP,

α_i accounts for country's fixed effects and cross country differences in ethnicity, shared beliefs, customs and traditions, history, geography and other time-invariant growth stimulus e.g. an initial income per capita levels,

$\aleph_1$ (X one hat)- called the predicted value of our regressor of interest i.e. trade openness

β_t accounts for the year shock that affect both openness and GDP PPP across all countries e.g. political event shock like cold war and military coup de' tat and business cycle such as world oil glut, global financial crisis,

The study employs an instrumental variable (two-stage least squares (2SLS)) estimation techniques. This instrument was used in previous work by Brueckner and Lederman (2015), Brueckner and Ciccone (2011) and Miguel et al. (2004). As such, in equation (1), the estimation technique focuses only on exploring the relationship between the instrument and openness while in equation (2), the exclusion restriction is contingent on GDP PPP i.e. the only channel through which rainfall affects per capita GDP is through trade openness.

More so, in equation (1), the residual variation in trade openness undue to growth in the error term μ_{it}, is used as a predicted value for trade openness in equation (2). This variation eliminates bias that arises due to reverse causality of per capita GDP on openness (Brueckner and Lederman, 2015).

3.5 Discussion on Instrument Quality and Validity

The quality and validity of rainfall as an instrument for trade openness on per capita GDP is reasonable in terms of first-stage fit (Brueckner and Lederman, 2015) and suitable for SSA countries (Barrios et al., 2010). The IV effect estimate on GDP growth is positive and significant (1% level); and the joint first-stage F-statistic of rainfall is 24.22. Thus, the instrument (rainfall) is strong and relevant since its test (F-statistic) exceeds 10 (Stock and Yogo, 2002).

	F-Statistics (F)
Rainfall	24.22

Source: Author's Secondary Data Stata 15.0 Output (2019)

Instrument Relevance: The first assumption that the instrument (annual precipitation) is correlated with the regressor of interest (trade openness) is valid in this work. We expect that rainfall is the premise for agricultural oriented SSA; as such, exacts a strong positive influence in determining her openness. Though relative, Barrios et al. (2010), Brueckner and Lederman (2015) affirmed a large agricultural sector in SSA economies. World Development Indicators (2011) database supported such claim with estimate revealing 1/3 of GDP is generated from agriculture output and also, the agricultuaral sector employed over 2/3 of the population. Thus, the assumption $(Z_1, X_1) \neq 0$ is true for this paper. As such, the higher the rainfall which influences agricultural output (discourages subsistence farming for entire produces) and incentivize exchanges, the lesser SSA trade impediments.

Instrument Exogeneity: The second assumption (exogeneity of within-country variations in openness on per capita GDP) of instrument exogeneity is valid in this paper. To clearly illuminate this, the $(Z_1, \varepsilon) = 0$ i.e., the instrument (annual precipitation) must not correlate with the error term in our regression of interest. Annual rainfall used in estimating causal effect of trade on growth has no correlation with any variables constituting the error term. It important to reiterate that the study approached variable of interest carefully, employing fixed, random and unique time specific country effect. More so, the dynamic panel estimate, carefully capture lag of dependent variable in respect to the entire time path of the independent variables.

Exclusion Restriction: The exclusion restriction in our estimation is contingent on GDP (PPP); the instrumental variable (annual rainfall) has no other channel to the outcome variable (per capital income) except through the treatment variable (trade openness). In other word, the instrumental variables only affect GDP through its effect on trade openness. SSA countries are predominantly an agriculture economy with priority on subsistence farming for daily livelihood

and barter this for other agricultural and specific needs. Rainfall therefore, incentivizes the economic aspect of agricultural produces for wealth creation to improve the standard of living. Rainfall which is seasonal- often between March – September (called the raining season) encourages trade openness since agricultural output will be surplus for trade. Thus, exogenous i.e., there are no other means through which our instrument affects the dependent variable except through trade openness in economic sense (GDP/PPP).

CHAPTER FOUR

DATA PRESENTATION

4.1 Introduction

This section present and discuss the summary statistics and pair-wise correlation matrix. Next, we presented results for first and second stage regression. In the second stage regression, we presented results on the four claims guiding this paper, also, the fixed and random effect, country specific effects and the dynamic panel regression estimate were presented. Last, the discussion of the findings.

4.2 Data Presentation

Illustrated are the various data and diagnostic tests as well as the regression output of each of the models. The residual values were obtained after the variables were subjected to various diagnostic tests and regressed to test hypotheses and drawing up inferences and conclusion.

4.3 Data Analysis

Data analyses were carried out to test trade effect on per capita GDP in SSA. This is achieved by employing the models described in the methodology. Each theoretical methodology components were regressed against growth theory covering the period of 2000 - 2016.

4.3.1 Descriptive Statistics

This paper uses fourteen variables in testing for the hypotheses raise. One dependent variable (GDP per capita PPP) and thirteen independent variables (inflation, population growth rate, foreign direct investment, export value, import value, land lock, polity2, trade openness (import plus export divided gdp), area, latitude, gross fixed capital formation, labour and rainfall). Table 4.1 shows the descriptive statistics for the variables employed in this paper.

Table 4.1 Descriptive Statistics

VARIABLES	(1) N	(2) sum	(3) mean	(4) median	(5) sd	(6) skewness	(7) kurtosis
inftn	119	901.9	7.579	7.579	12.89	4.921	33.35
pop_g	119	256.2	2.153	2.153	0.906	-0.887	2.540
fdi	119	464.1	3.900	3.900	4.871	4.298	25.32
lndloc	119	34	0.286	0.286	0.454	0.949	1.900
polity2	119	427	3.588	3.588	5.090	-0.364	1.751
lat	119	-469.8	-3.948	-3.948	16.56	0.112	1.317
gfcf	119	2,761	23.20	23.20	11.39	0.788	4.301
lgdp	119	891.1	7.488	7.488	0.911	0.585	1.810
lopen	119	2,670	22.43	22.43	1.264	0.00883	8.433
limp	119	2,690	22.60	22.60	0.869	0.706	3.781
lexp	119	2,678	22.50	22.50	1.132	1.401	4.164
lrainfall	119	678.9	5.705	5.705	0.110	0.137	1.325
larea	119	1,485	12.48	12.48	2.065	-1.759	4.509
labor_sc	119	13,523	113.6	113.6	160.6	1.573	4.150

Source: Author's Secondary Data Stata 15.0 Output (2019)

Table 4.1 above provides details of the sum, average, median, measure of dispersion, skewness and kurtosis of our variable of interest. As can be seen, the mean and median of the respective variables are the same which reveals a symmetrical distribution- a distribution whose mean and median are the same. The standard deviation of foreign direct investment, polity2, latitude, gross fixed capital formation and area were greater than 2, while other variables are less

than 2. However, it is alarming to see how far labour is dispersed from the mean. The skewness of the distribution also reveals that inflation rate, foreign direct investment, latitude, landlocked, gross fixed capital formation, per capital GDP, trade openness, import, export, rainfall and labour are positively skewed with the inflation rate haven a long tail to the right; while, population growth rate, polity2 and area are negatively skewed. Kurtoses (measure of peakedness or flatness) of the distributions are flat relative to the normal. While, the inflation rate and foreign direct investment are leptokurtic i.e. the distributions are peaked relative to the normal.

4.3.2 Correlation

The result of the pair-wise correlation coefficient matrix below indicate that there is a strong positive relationship between openness, import, export, labour and vice versa. More so, there exist a strong positive degree of association between latitude and rainfall. The correlation coefficient in all is greater than +0.60. Thus, there is a thesis that trade (proxy by import and exports) will positively impact income.

Table 4.2 Correlation Matrix

	lgdp	lopen	limp	lexp	labor_sc	gfcf	pop_g
Lgdp	1.0000						
Lopen	0.2530* 0.0055	1.0000					
Limp	0.2152* 0.0188	0.7981* 0.0000	1.0000				
Lexp	0.2605* 0.0042	0.7994* 0.0000	0.9348* 0.0000	1.0000			

labor_sc	-0.1849* 0.0441	0.6857* 0.0000	0.8117* 0.0000	0.8697* 0.0000	1.0000		
gfcf	0.0957 0.3007	-0.2449* 0.0073	-0.2829* 0.0018	-0.3625* 0.0001	-0.4049* 0.0000	1.0000	
pop_g	-0.7404* 0.0000	0.0378 0.6835	0.0810 0.3810	0.0660 0.4756	0.3821* 0.0000	0.2277* 0.0128	1.0000
	polity2	lndloc	lat	larea	lrainfall	inftn	fdi
polity2	1.0000						
lndloc	-0.0037 0.9684	1.0000					
lat	-0.3273* 0.0003	-0.6653* 0.0000	1.0000				
larea	-0.6033* 0.0000	0.1889* 0.0396	0.3947* 0.0000	1.0000			
lrainfall	-0.0369 0.6901	-0.7115* 0.0000	0.9272* 0.0000	0.1187 0.1985	1.0000		
inftn	-0.0835 0.3665	-0.0215 0.8166	0.0335 0.7177	0.1666 0.0702	0.0077 0.9342	1.0000	
fdi	-0.3162* 0.0005	-0.1691 0.0661	0.2896* 0.0014	0.1954* 0.0332	0.2592* 0.0044	-0.0256 0.7822	1.0000

Source: Author's Secondary Data Stata 15.0 Output (2019)

Note: * rejection region (of the null hypothesis- no statistical significant relationship at 5% significance level).

4.4 Hypothesis Testing

In attempting to quantify the causal estimate of trade effect on growth as discussed in previous chapters, we present an IV approach to effectively estimate the effect; thereby, construct a series of theoretical relevance model of an exogenous trade effect on growth.

The first stage least square and 2SLS estimates of the result are reported below in Table 4.3 and 4.4 respectively. The results are positive and statistically significant for most specifications. However, our results in Table 4.3 revealed the correlation between the instruments, regressor of interest and other variable of interest.

Table 4.4 (2SLS) below shows the four hypotheses presented , the fixed and time effect, country's peculiar effect and the dynamic panel estimates in this paper using instrumental variable (annual precipitation) to estimates the exogenous effect of openness to trade on per capita GDP.

Column (1) reports estimates that evaluate the relevance of either export, import or both influences on per capita income. Column (2) estimates the geographical argument for growth, column (3) indicate the extent to which institutions matter for growth, column (4) demonstrate the influence of either capital formation, labour or both have on per capital income.

Column (5) reports estimates that control for fixed effects at country level using our various control variables of interest, Column (6) adds time effects, column (7) adds a country-specific linear control variable. Column (8) reports dynamic panel model estimates of panel data.

This paper found that that trade openness exacts a positive statistical significant impact on per capita GDP. Our estimated coefficient in table 4.4 (column 6 and 8), implies that a one percentage point increase in per capita GDP is associated with 0.09 percentage points higher than trade openness.

Column (7) also corroborated the above evidence that trade openness have a positive significant effect on per capita GDP controlling for county's specific time trend (inflation as used in the paper). In the dynamic panel specification of column (8), openness to trade exact about 0.09 effects on per capital GDP; this positive significant result corroborates our results in both column (6) and (7).

Therefore, according to the below dynamic panel model estimate, there is a proportional relationship between trade openness and per capital GDP (in this regard, a one-to-one relationship) (Bruckner and Lederman, 2015).

Our finding is robust when controlling for country's geographical characteristics, political institutions. While latitude and area are negatively correlated with trade openness, Polity2 estimate is positive and significantly correlated with openness (see table 4.4, column 8). More so, capital formation (gfcf) and labour (labor_sc) has a positive significant effect on SSA countries' openness to trade.

Table 4.3: First Stage Regression: Trade Openness on the Instrumental Variable

VARIABLES	(1) lopen	(2) lopen	(3) lopen	(4) lopen	(5) lopen	(6) lopen
lrainfall	10.90*	3.043	-0.0814	8.881**	8.881**	11.17**
	(6.185)	(3.426)	(2.526)	(4.486)	(4.486)	(4.481)
limp				0.971***	0.971***	1.058***
				(0.348)	(0.348)	(0.341)
lexp				-0.0661	-0.0661	-0.204
				(0.377)	(0.377)	(0.372)
lndloc	-1.440			0.0638	0.0638	-0.0166
	(2.075)			(0.536)	(0.536)	(0.525)
lat	-0.116			-0.0626*	-0.0626*	-0.0812**
	(0.0768)			(0.0360)	(0.0360)	(0.0360)
larea	0.431			0.151	0.151	0.209
	(0.387)			(0.173)	(0.173)	(0.171)
polity2		0.0601		-0.0385	-0.0385	-0.0439
		(0.0417)		(0.0325)	(0.0325)	(0.0318)
gfcf			0.0291**	0.00915	0.00915	0.00750
			(0.0121)	(0.0129)	(0.0129)	(0.0127)
pop_g			-0.336	-0.216	-0.216	-0.253
			(0.249)	(0.364)	(0.364)	(0.356)
labor_sc			0.00947***	0.00209	0.00209	0.00281
			(0.00164)	(0.00243)	(0.00243)	(0.00239)
fdi			-0.0268	-0.0230	-0.0230	-0.0233
			(0.0213)	(0.0210)	(0.0210)	(0.0205)
inftn						-0.0139**
						(0.00565)
Constant	-45.20	4.858	21.97	-50.60**	-50.60**	-63.12**
	(37.16)	(19.55)	(14.28)	(25.66)	(25.66)	(25.59)
Observations	119	119	119	119	119	119
number of var	7	7	7	7	7	7

Source: Author's Secondary Data Stata 15.0 Output (2019). Note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 4.4 Two (2) Stage Least Square Effect of Trade Openness on Per Capital GDP (Growth)

VARIABLES	(1) lgdp	(2) lgdp	(3) lgdp	(4) lgdp	(5) Lgdp	(6) lgdp	(7) lgdp	(8) lgdp
lopen	-0.0311	0.0457	0.0453	-0.233	0.00622	0.0973***	0.630**	0.0972***
	(0.0915)	(0.111)	(0.107)	(0.371)	(0.0107)	(0.0283)	(0.247)	(0.0311)
lndloc		0.265				-0.327**	-0.284	
		(2.992)				(0.160)	(0.324)	
lat		-0.0126				-0.0103***	-0.0129**	
		(0.0876)				(0.00295)	(0.00610)	
larea		-0.233				-0.0524	-0.144	
		(0.534)				(0.0513)	(0.111)	
limp	0.0559				0.178***	-0.691***	-1.166***	0.0569**
	(0.0739)				(0.0469)	(0.104)	(0.297)	(0.0284)
lexp	0.450***				0.308***	1.309***	1.247***	0
	(0.0785)				(0.0491)	(0.105)	(0.215)	(0)
polity2			0.0154		0.00442	0.0308***	0.0332*	0.00565*
			(0.0103)		(0.00484)	(0.00849)	(0.0172)	(0.00293)
gfcf				0.0115**	-0.00364**	0.0151***	0.00916	-0.00163*
				(0.00574)	(0.00172)	(0.00384)	(0.00824)	(0.000985)
pop_g				-0.218*	-0.237***	-0.260**	0.0114	0.0128
				(0.117)	(0.0388)	(0.105)	(0.242)	(0.0313)
labor_sc				0.00760	0.000725*	-0.00512***	-0.00589***	2.59e-05
				(0.00651)	(0.000416)	(0.000704)	(0.00146)	(0.000254)
fdi				-0.00804	0.00249	0.0183***	0.0276**	0.00216*
				(0.00745)	(0.00226)	(0.00624)	(0.0133)	(0.00124)
inftn							0.00912**	7.37e-05
							(0.00435)	(0.000314)
L.lgdp								0.653***
								(0.0520)
Constant	-3.206***	9.249	6.417	12.08	-3.125***	-7.230***	-6.403	-0.887**
	(1.125)	(6.778)	(4.909)	(7.730)	(0.725)	(2.046)	(4.152)	(0.417)
Observations	119	119	119	119	119	119	119	105
Number of var	7	7	7	7	7	7	7	7

Source: Author's Secondary Data Stata 15.0 Output (2019). Note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Ho$_1$: *There is no statistical significant relationship between export, import or both on per capita GDP in SSA*

The 2SLS result of our first analysis as shown by the data in table 4.4 column (1) above instrumented by annual precipitation shows the regression coefficient of within variation which explains that 71% of the variation in GDP per capita PPP is difference from the mean of export and import volume. The rho coefficient of 99% explains the percentage of variation that is explained by the individual variable specific effect which indicates our model is strongly significant. Also, the table reveal that a 1% point increase in per capita GDP will inversely affect trade openness by about 3% point (Brueckner and Lederman, 2015).

However, a 1% point increase in per capita GDP is associated with about 45% point positive significant effect on export. Simply put, export enhance per capital GDP. Import on the other hand also has a positive association with per capital income but result isn't significant. Based on the findings, we therefore, reject our null hypothesis which state there is no statistical significant relationship between export, import or both on per capita income in SSA at 0.05 significance level.

This result is corroborated with the work of Iyoha and Okim (2017), findings that exports were significant determinants of per capita GDP in ECOWAS countries. More so, Oyebanjo (2017) also found that both exports and imports contribute significantly to economic growth. He argued specifically that growth in raw material exports, and not manufactured exports significantly impact GDP while growth in manufactured imports and not raw material imports significantly impact GDP. Abiodun (2017) also found that export value affect positively the composition of change in economic growth at 1 % significant level.

Ho$_2$: *There is no statistical significant relationship between geographical characteristics and per capita GDP in SSA*

The 2SLS result of our second analysis as shown in table 4.4 column (2) above instrumented by annual precipitation shows the regression coefficient of within variation which explains that 28% of the variation in per capita GDP is the difference from the mean of landlocked, latitude and area. While the variables are time invariant, the rho coefficient of 99% explains the percentage of variation that is explained by the individual variable specific effect which indicates our model is strongly significant.

Also, the result indicates that a 1% point increase in per capita GDP will directly affect trade openness by about 5% point (Rodrik, 1992, 1998, 1999; Greenaway *et al*, 1998; Rodriguez and Rodrik, 2000; Milner and Morrissey, 1999; Morrissey and Nelson, 1998; Sachs and Warner, 1997).

As can be seen in column (2) above, a 1% point increase in per capita GDP is associated with about 1% negative effect on latitude. This means that, the farther a country is away from the equator, the decline in her per capital income by about 1%. However, this result is not significant which is synonymous with area and landlocked.

Based on the findings, we therefore fail to reject our null hypothesis which states there is no statistical significant relationship between geographical characteristics and per capita GDP in SSA. The analysis reveals that geographical characteristics do not really matter for growth in SSA.

This result is corroborated with the work of Acemoglu et. al. (2001), findings that geography characteristics were insignificant determinants of per capita real income growth. More so, Rodrik (2003) also finds that geographical characteristics (latitude and area) do not affect the

growth in per capital income. Engerman and Sokoloff (2004) also corroborated this evidence that geography does not matter for growth.

Ho$_3$: *There is no statistical significant relationship between institutions and per capita GDP in SSA*

The 2SLS result of our third analysis as can be seen from table 4.4 column (3) above instrumented by annual precipitation shows the regression coefficient of within variation which explains that 27% of the variation in per capita GDP is the difference from the mean of polity2. The rho coefficient of 99.9% explains the percentage of variation that is explained by the individual variable specific effect which indicates our model is strongly significant.

The table indicates that a 1% point increase in per capita GDP will directly affect trade openness by about 1%. Based on the findings, we therefore fail to reject our null hypothesis that state there is no statistical significant relationship between institutional and income in SSA. The analysis reveals that polity2 as an institutional characteristic does not matter for SSA's per capital income.

This result conform with the work of Brueckner and Lederman (2015), findings that a polity2 characteristic was not a significant determinant of real per capita income growth. More so, Mahabir and Mullings (2015) also found that institutional characteristic (polity2) don't affect the growth in per capital GDP.

Ho$_4$: *There is no statistical significant relationship between capital, labour and per capita GDP in SSA*

The 2SLS result of our fourth analysis as shown by the data in table 4.4 column (4) above instrumented by annual precipitation shows the regression coefficient of within variation which explains that 4.4% of the variation in per capita GDP is the difference from the mean of population growth, gross fixed capital formation, foreign direct investment and labour. The rho coefficient of 99% explains the percentage of variation that is explained by the individual variable specific effect which indicates our model is strongly significant.

As revealed in column (4) above, a 1% increase in gross fixed capital formation is associated with about 1% point rise per capita GDP at 5% significance level. This means that, a proportionate change in capital formation exact same influence on income. More so, a 1% point increase in per capital income has an inverse relationship with population growth rate by 22% at 10% significance level. Simply put population growth rate negatively effects income.

This result conform with the work of Iyoha and Okim (2017), findings that gross fixed capital formation has a positive significant effect on per capita GDP while population growth rate has a negative significant effects on income. More so, Mahabir and Mullings (2015) also found an insignificant relationship between FDI and per capital GDP.

Table 4.5: Linear Regression Effect of Trade Openness on Per Capita GDP (Growth)

VARIABLES	(1) lgdp	(2) lgdp	(3) lgdp	(4) lgdp	(5) lgdp	(6) lgdp	(7) Lgdp	(8) lgdp
lopen	0.0227**	0.105***	0.101***	0.0706***	0.0973***	0.0973***	0.0772***	
	(0.0109)	(0.0158)	(0.0160)	(0.0190)	(0.0283)	(0.0283)	(0.0264)	
lrainfall							6.177***	-0.0313
							(1.255)	(0.351)
limp	0.0183				-0.691***	-0.691***	-0.581***	0.0598**
	(0.0344)				(0.104)	(0.104)	(0.0971)	(0.0287)
lexp	0.412***				1.309***	1.309***	1.135***	0.100***
	(0.0416)				(0.105)	(0.105)	(0.101)	(0.0313)
lndloc		0.332			-0.327**	-0.327**	-0.293**	0
		(1.567)			(0.160)	(0.160)	(0.143)	(0)
lat		-0.0106			-0.0103***	-0.0103***	-0.0578***	0
		(0.0459)			(0.00295)	(0.00295)	(0.0100)	(0)
larea		-0.247			-0.0524	-0.0524	-0.0280	-0.0585
		(0.280)			(0.0513)	(0.0513)	(0.0468)	(0.164)
polity2			0.0140*		0.0308***	0.0308***	0.00888	0.00610**
			(0.00792)		(0.00849)	(0.00849)	(0.00874)	(0.00298)
gfcf				0.0118***	0.0151***	0.0151***	0.0133***	-0.00131
				(0.00257)	(0.00384)	(0.00384)	(0.00345)	(0.00102)
pop_g				-0.265***	-0.260**	-0.260**	-0.129	0.00685
				(0.0580)	(0.105)	(0.105)	(0.0972)	(0.0324)
labor_sc				0.00135**	-0.00512***	-0.00512***	-0.00434***	1.73e-05
				(0.000547)	(0.000704)	(0.000704)	(0.000656)	(0.000257)
fdi				-0.00885**	0.0183***	0.0183***	0.0147***	0.00192
				(0.00428)	(0.00624)	(0.00624)	(0.00562)	(0.00126)
inftn							0.00143	6.33e-05
							(0.00158)	(0.000322)
L.lgdp								0.639***
								(0.0535)
Constant	-2.715***	8.079**	5.164***	6.083***	-7.230***	-7.230***	-41.32***	0
	(0.696)	(3.373)	(0.462)	(0.435)	(2.046)	(2.046)	(7.164)	(0)
Observations	119	119	119	119	119	119	119	105
Number of var	7	7	7	7	7	7	7	7

Source: Author's Secondary Data Stata 15.0 Output (2019). Note: standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 4.4 (2SLS) and 4.5 linear regression (non-instrumented) estimates of the results above can be used for comparison. The results (table 4.4) are positive and significant for most of our specifications. However, our results in Table 4.5 non-instrumented revealed for most estimates, higher results compared to the IV estimates reported in table 4.4 above. These may be due to endogeneity, reverse causality bias and/or omitted variable bias: if openness to trade has a positive effect on per capita GDP than ordinary least squares, the estimates are upward bias.

Thus, our IV estimates of openness on per capita GDP do not suffer from the three above mentioned possible biases because annual rainfall variations are exogenous to economic paradigm in SSA. More so, SSA national accounts statistics are plagued by measurement error which may be another cause for the larger estimation effect in Table 4.5.

4.5 Implication of the Findings

The conclusion on the findings implies that, trade openness is linked to growth. Impliedly from the Ricardian model or the theory of comparative advantage, which emphasizes differences in productivity of labour due to differences in technology, explains that the opportunity cost of producing goods is a determinant of trade. The theory further emphasizes that countries producing similar goods can still benefit from trade. As such, more trade engagement is encouraged within SSA countries. Though trade dynamics is changing from its traditional composition in SSA, openness to her counterpart may be key to unlocking the vast potential of SSA countries. The AfCTA (Africa Continental Free Trade Agreement) mandate may need to be ratified by members' nation to begin with.

Specifically, the findings in respect to openness suggest that SSA countries should relax her stringent trade restrictions. The finding above empirically claim the ratio of openness will exact same ratio on per capital income is significant (see table 4.4 column 8). As such, openness to trade has a significant relationship with per capita GDP. This implies that when trade barriers are relax, the movement of capital and labour across national frontiers will affect GDP/PPP because it therefore becomes cheaper to trade thereby, resulting in efficient resources allocation amongst competing ends. More so, it becomes relatively cheaper to do business abroad and also encourage capital inflow via portfolio investment and foreign direct investment in the region.

The findings in respect to export and/or import suggest that increase in export corroborate evidence as stated above. Why import is insignificant, evidence revealed correlation and not causality. SSA countries should encourage export more than import to harness her potential. As such, trade impediment, infrastructural capacity, finance to would be entrepreneur, stable macroeconomics condition may foster export drive in SSA countries. The more export, the more the potential to influence world price for her goods thereby enabling SSA countries to be in control of her future.

The findings in respect to geographical characteristics and per capita income suggest that latitude and area (i.e. size) affect per capita GDP. Though not statistically significant, the direction of relationship gives an idea of pattern of direction which suggests that geographical factors inhibit the pace of development. More specifically, SSA countries have been hindered in growth by her default positioning. However, the trajectories (composition of SSA trade) have been changing due to technology transfer.

Also, the finding as regards GDP/PPP and polity2 is positive. This does conform to our prior expectations because institution is expected to affect GDP/PPP. However, considering that institution have been highlighted as one of the crucial premise of economic performance and an indispensable factor in understanding the broad cross-country differences in prosperity. SSA countries are further encouraged to set constraint that are inclusive and limit politicians and elites, encourage mass participation in economic fundamentals, reward innovation, enforce property rights, an efficient legal system and discourage corruption.

More so, the findings relating to capital formation, labour and per capital income are positive. Capital formation (gross fixed capital formation) isn't only positive but significant. This evidence support the classical economics argument that savings is fundamental to growth. As

reiterated that physical capital differences are distinguishing features of rich and poor nation (i.e. poor countries don't save enough). Therefore, SSA countries are encouraged to inject back money into the formal economy through savings.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary

This study evaluated effect of openness to trade on per capital GDP in SSA countries from 2000 - 2016. To accomplish this, the study conducted conceptual, theoretical, as well as the review of literatures on trade and growth policy studies. Various techniques and measurement were also considered. Before literature review, the study made four objectives, questions and claims.

In consonance with priori expectations, there is strong evidence that support the thesis that openness to trade exacts a positive significant impact on per capita GDP from this study as indicated by our dynamic panel model estimate. Specifically, in testing for hypothesis one, the result reveal that the coefficient of export is positive and significant at 1%, indicating that as export increases, per capita income increases. The second hypotheses revealed geographical attributes of a nation affects her income. Our empirical evidence support this claim with latitude and area negatively correlated with income though insignificant. The third hypothesis indicated a positive degree of association between institutional measure (polity2) and per capita income, indicating that country's constraints are fundamental premise to growth in income. Also, our fourth hypothesis confirmed the classical argument for capital and labour as the fulcrum to economy growth of any society with result of gross fixed capital formation statistically significant at 5%. It's important to highlight also from our result that population growth inhibit growth with result statistically significant at 10%. Although, one cannot ignore the crucial role played by labour (i.e. human capital development) in engineering growth.

The fixed effect estimate support the claim that trade openness affects income but result not significant. The interesting claim of our fixed effect regression is that both import and export positively affect income with result statistically significant at 1%. Institutional factor (polity2) also influences growth; though result insignificant. More so, capital formation and labour affect per capita income with result significant at 5% for gross fixed capital formation which tends to be negative, population growth rate at 1% also negatively affect income, labour at 10% positively influence income while only foreign direct investment proved insignificant. However, there exist positive degrees of association with income.

The random effect estimates also support the thesis that trade openness affects income, geographical factors of nation affect her income, and latitude also negatively affects income. All these are significant at 1%. The result also supported the claim that import negatively impacts trade while export enhances income. Similarly, institution, capital formation, labour and foreign direct investment were proven to have positively affected income of SSA at 1% while population growth was found to have inhibited income with result also significant at 5%.

5.2 Conclusion

From the preceding panel data estimates in chapter 4, findings still remain contentious. Our evidence (see openness in column 1 to 4 of table 4.4) still raised concerns of cross-country effect of trade on growth. Thus, it remains unclear whether to agree on positive or negative causation between openness and growth.

However, this study found that results depend on the researcher's variable of interest (see column 2 and 3 of table 4.4). However, irrespective of the variable of interest, the debate has

been carefully addressed in this paper with dynamic panel model and a new IV (annual precipitation) particularly suitable for SSA.

For individual specific hypothesis, we instrumented to get causal estimate that correct for reverse causality bias. Going further, we report fixed effect, random effect, unobservable time specific effect that correct for omitted variable biases of any kind and a dynamic panel estimate which in turn allowed us to control for any lagged dependent variable which automatically allow for partial adjustment mechanism.

The results appear to be robust controlling for country's fixed and time effects, country-specific linear trends and our IV is valid, suitable and relevant. The estimates on average posits that openness to trade have a positive significant effect on SSA's per capital GDP.

5.3 Policy Recommendations

From the findings in this study, the following recommendations are made:

A. In respect to export, government of SSA countries should:

1. Introduce export strategy with both qualitative and quantitative objectives, in order to assess already identified market for her produce
2. Develop an adequate and reliable infrastructure for mobilization, logistics, warehousing and branding her produces for exports
3. Remove agricultural input tariffs on all product destined for national, regional and international market
4. Liberalize input markets in agriculture- remove barriers on importation and distribution of high performing planting materials and

5. Assist and help effectively domestic companies in upgrading procedures with international certification processes.

B. Geography

In the light of geographical factors such as landlocked, latitude and area that hinder income in SSA countries, government should:

1. Encourage and push for regional integration for instance the AfCTA (African free Continental Trade Agreement) in view, and at the same time,
2. Revisit objectives of sub-regional integration such as Common Market for Eastern and Southern Africa (COMESA), Union Economique et Monétaire Ouest Africaine (UEMOA), Economic Community of West African State (ECOWAS), Eastern African Community (EAC) and Southern African Development Community (SADC).
3. Harmonize and improve customs operations by simplifying procedures and leveraging information technology.

C. Institution

1. SSA government should set constraints on policymakers, politicians, elites and stakeholders in the country that will encourage level playing ground for all, meritocracy, and shape economic and political incentives; and
2. Enforce propriety right.

D. Capital Formation and Labour

To address issues of capital accumulation and labour since the region show very limited economic power with rising population growth, the followings are recommended:

1. Education, training and development of labour should be further strengthened to boost the growth trajectories of the region; its potential spillover in the economy cannot be overemphasized
2. Facilitate access to finance by SME's and would-be entrepreneurs
3. Encourage savings to enhance resource mobilization and efficient allocation by the financial institutions
4. Establish an entrepreneur university in SSA where would-be entrepreneurs will be taught by leading entrepreneurs in Africa and world and
5. Finally, enhance strategic partnership with expatriate and potential investors to lure capital (FDI and portfolio investment) and technology to the region.

5.4 Contribution to Knowledge by the Study

While there have been series of empirical literature on trade effect on growth, this study is unique in that, it highlighted other theoretical relevance (export, import or both, geographical factors, institutional relevance and capital accumulation and labour) to support the empirical arguments. The study was the first to use a recent annual precipitation data up until 2016 as an identification strategy to control for endogeneity and also use a dynamic panel model estimates. Unlike other studies, the study further control for time specific factor using a unique variable inflationary trend of the countries. Lastly, the paper explores countries in SSA which have been empirically unpopular.

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