



**Graduate School of Development Studies**

**The Effect of International Trade Openness on Economic Growth: A  
Cross Country Analysis of Sub-Saharan Africa.**

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## Dedication

*In living memory;*

*To my late brothers, Nelson Kipkogei and Paul Kipchirchir,*

*You are my strength and hope.*

*With Love;*

*To my mother, Rael Jeboo Bor,*

*You are the rock of our family,*

*To my wife Ruth Jepchumba Bivott,*

*You are the love of my life, the key to my heart,*

*To my daughter Natalia Jepkoech Bivott,*

*You are my gift from God, a spring and stream of my future.*

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## List of Acronyms

BMP	Black Market Premium
BPA	Bilateral Payment Arrangement
COMESA	Common Market for Eastern and Southern Africa
CTR	Collected Tax Ratio
EAC	East Africa Community
ECOWAS	Economic Community of West African States
EFW	Economic Freedom of the World
FDI	Foreign Direct Investment
FE	Fixed Effects
GATT	General Agreement on Tariffs and Trade
GCR	Global Competitiveness Report
GDP	Gross Domestic Product
GMM	Generalized Method of Moments
HDI	Human Development Indicators
IMF	International Monetary Fund
ISI	Import Substitution Industrialization
IV	Instrumental Variables
MDGs	Millennium Development Goals
MFN	Most Favoured Nation
NT	National Treatment
NTBs	Non-Tariff Barrier
ODA	Official Development Assistance
OLS	Ordinary Least Square
R&D	Research and Development
RE	Random Effects
SADC	Southern Africa Development Cooperation
SAPs	Structural Adjustment Programs
S&D	Special and Differential Treatment
SSA	Sub-Saharan Africa
UN	United Nations
USAID	United States Agency for Development
WDI	World Development Indicators
WTO	World Trade Organization



## **Abstract**

*Sub-Saharan Africa (SSA) countries have been experiencing poor economic performance since the 1960s. The reasons given in the trade openness-economic growth nexus literature to explain the lack of desired economic growth in SSA include underdeveloped human capital, infrastructure, poor policies, adverse climatic conditions and trade protectionism. Trade liberalization to increase the degree of international trade openness was prescribed to developing countries as a policy option that could reverse the trend of retarded economic performance. SSA is among these regions of the world that were under consideration when the Washington Consensus was coined by development economists in the late 1980s. International trade openness therefore has been a key reform agenda in SSA, but limited progress has been made on accelerating the pace of economic growth.*

*This paper empirically examines the effect of international trade openness on economic growth using panel models. Besides, the paper also examines other necessary conditions that can improve the effectiveness of international trade openness in increasing the growth of the SSA's economy. The paper finds that international trade openness enhances economic growth in SSA. In addition, improvement of contemporaneous policies and/or sectors will serve to increase economic growth. Therefore, the paper suggests the improvement of the investment environment that can increase the generation and expansion of both domestic and foreign direct investments (FDIs) in the region. Further, enhancement of industrial and technological capacity, human, physical and financial capital will give an impetus to the contribution of international trade openness to economic growth in SSA. The paper therefore concludes that these policies if well implemented can accelerate the pace of economic growth achievement to the desired levels that can propel SSA to higher GDP per capita status in a few decades.*

## **Relevance to Development Studies**

International trade openness is a key policy area in the achievement of the Millennium Development Goals (MDGs) by the year 2015. International trade openness is a development policy that can accelerate the pace of achievement of MDG global 8 of fostering global partnerships for development. International trade openness increases trade within and between countries which will increase the growth of the economy. Increase in trade can enhance access to affordable capital inputs and technology, increase industrial activity which can improve the people's welfare. Overall, international trade openness can lead to poverty reduction and therefore is an important area of consideration in development studies.

## **Keywords**

Trade liberalization, International Trade openness, Economic Growth, Developing countries, Developed countries, Contemporaneous Policies, and Sub-Saharan Africa

# Chapter 1 Introduction

## 1.1 Background

Sub-Saharan Africa (SSA) constitutes 47 countries that are located to the south of the Sahara desert in Africa. These countries experienced higher economic growth measured by GDP per capita in the 1960s as they gained their independence. According to the evidence documented in Development Economics literature, SSA potential at the time was considered to be greater than that of the East Asian economies. Easterly and Levine (1995: 2-4) highlights that Africa's growth potential in the 1960s was ahead of East Asia's with the growth rates' of GDP per capita that could reach or surpass 7 per cent annually. Same (2007: 1) adds that many countries in Africa were richer than the Asian counterparts in 1960s and the strong advantage of abundant natural resources buoyed optimism for future trade, growth and development. Instead, SSA's economic performance has been deteriorating over the years.

Currently, SSA is recording ranked lower in most human development indicators ratings. Easterly and Levine (1995) show that 16 of the 20 poorest countries in the world are from SSA. They argue that Africa and particularly SSA has experienced poor growth performance due to bad policies, poor education, political instability, inadequate infrastructure, ethnic strife and trade protectionism. Sachs and Warner (1997) attribute the slow growth in SSA to colonial legacy and ethnic divisions. They, however argue that poor policies and institutions are the greatest impediments to growth in SSA (*ibid.*). Rodrik (1997) finds that the poor economic performance in SSA is due to slow pace of international trade policy reforms.

SSA adopted structural adjustment programmes (SAPs) suggested by the international community through the Washington Consensus economic reform blue-print that was meant to set developing regions to the recovery path after inefficiencies created by among other factors, trade protectionism. A critical element of the SAPs was trade liberalization intended to enhance international trade

openness in order to spur economic growth in developing countries. Trade liberalization includes the reduction of trade barriers for example tariffs and non-tariff barriers (NTBs) that increases exposure of countries or regions to the rest of the world. Of the ten policy reforms that constitute the Washington Consensus, international trade openness attracts the most attention by policy makers and researchers in economics of development discourse. World leaders are also focused on international trade openness among other policy measures as a way of promoting global partnerships for development through the Millennium Development Goals (MDGs) ratified in 2000 (UN MDGs report 2008). International trade openness has also been identified by many studies (see chapter 2 below) as a key channel through which economic growth can be achieved by developing countries<sup>1</sup>.

The adoption of international trade openness policies was expected to reverse the trend of declining economic growth in SSA. However, the continued poor economic performance in the region has raised doubts whether indeed international trade openness can enhance economic growth among developing countries. Estevadeordal and Taylor (2008) argue that international trade openness might have had little or no impact on economic growth. Yannikaya's (2002) findings are in line with new trade and growth theories that indicate a positive effect of trade protection on economic growth in developing countries. The results support trade openness, but show that some degree of protection in selected sectors of the economy in a developing country or region can improve gains from specialization through comparative advantage (*ibid.*). Rodrik (1997) suggests that for long-term growth to occur, key areas of intervention also include human resources, physical infrastructure, macroeconomic stability, and the rule of law.

Through further literature review and empirical analysis, this research paper will investigate the effect that international trade openness has on economic growth

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<sup>1</sup> In this research, developing countries include low income, middle income and higher income developing countries.

in a sample of 10 countries in SSA. In addition, the paper will control for domestic credit and industry in order to establish whether they can improve the effectiveness of international trade openness in accelerating the pace of economic growth in the region. These are some of the contemporaneous policies and/or sectors which are improved together with international trade openness policy reforms to act as a support in increasing its effectiveness in accelerating the pace of economic growth in SSA. The neoclassical trade and growth theories provide a base for theoretical comparative analysis with the new theories hence also applicable to this research. I hope the findings will add to the stock of knowledge in this area and improve trade policy in SSA to the level that can catalyse economic growth through improved international trade.

## **1.2 The Sample of Sub-Saharan Countries**

SSA constitutes about 47 countries out of which 10 have been selected for this study. The selection was based on the following criteria;

- (i) The countries must be from the SSA.
- (ii) They must fall under the COMESA, SADC and ECOWAS to widely cover SSA's geographical locations.
- (iii) Availability of data on the selected variables for the period 1967 to 2006.
- (iv) A balanced mix of geographical characteristics that is five countries which are landlocked and five not landlocked.
- (v) Best and worst performers in SSA according to Rodrik (1997).

The selection criteria is shown in detail in table A1 in appendix A while table A2 show the best and worst performers in SSA. The criteria led to the selection of ten counties namely; Botswana, Malawi, Uganda, Zambia and Mali which are landlocked and Kenya, Mauritius, Tanzania, Ghana and Nigeria which are not landlocked.

## **1.3 Objectives and Research Questions**

The objective of this paper is to investigate the effect of international trade openness on economic growth in SSA. Then, the paper will investigate the

conditions necessary for the relationship to be beneficial for the region. As a result, the main research question and sub-question respectively are;

- (i) *What is the effect of international trade openness on economic growth in SSA, taking a sample of ten countries for the period 1967 to 2006?*
- (ii) *What conditions have to be met for the effect of international trade openness on economic growth to be beneficial to SSA?*

#### **1.4 Organization of the Research Paper**

The paper is organized as follows, Chapter 2 provides the theoretical framework and literature review where both neoclassical and new trade and growth theories and literature are discuss respectively. In Chapter 3, the empirical analysis discusses methodology and model specification, interpretation of the results and their policy implication to SSA and conclusions. At the end of the paper, references and appendices are shown.

## **Chapter 2 Theoretical Framework and Literature Review**

The international trade openness-economic growth relationship studies derive their theoretical base from the neoclassical trade and growth theories. The new theories of trade and growth build on them but adopt some changes in their assumptions and policy implications; they assume increasing returns to scale, for example and analyze the long term economic growth for developing countries. This research paper is based on endogenous growth theory in explaining the determinants of economic growth and their policy implications to developing countries. It however, borrows from the new trade theory and neoclassical trade and growth theories.

### **2.1 Theoretical Framework**

This section discusses trade and growth theories in detail and their implication on economic growth.

#### **2.1.1 Neoclassical Trade and Growth Theories**

Smith (1776: 593) advocated the power of the “invisible hand” which he argued will promote developing countries’ industries through links with the developed countries’ industries. This was his underpinning of trade international openness’ role in enhancing economic growth of developing countries. International trade and economic growth have been explained through “old” and “new” trade and growth theories that explain why countries trade among each other. The theories are discussed in detail to derive their applicability to the analysis of the relationship between international trade openness and economic growth in SSA.

##### **(i) Comparative Advantage and Heckscher-Ohlin Theories**

Neoclassical trade theories that explain the basis for trade include Comparative Advantage and Heckscher Ohlin-Samuelson theories. According to Ray (1998: 40, 643-44), comparative advantage theory states that countries will export commodities they can produce at low costs when compared to their trading partners. The Heckscher-Ohlin theory explains that developing countries exports labour-intensive tradables such as food and textile since they are endowed with

unskilled labour. On the other hand, developed countries endowed with modern technology export technology-intensive products such as machinery and computers. The implication of these theories is that international trade openness should be adopted in order to increase trade benefits to developing countries.

### **(ii) Harrod-Domar and Solow Models**

Neoclassical growth theories include the Harrod Domar and Solow models. The Harrod-Domar model advocates more savings to enhance economic growth among poor countries (Cypher and Dietz 2008: 130, 131). However, noting that these countries are insufficient in savings, foreign aid among other sources of savings would be required to fill the *financing gap*. They argue that increasing the savings rate by increasing the proportion of total output that is invested in physical capital, can spur economic growth (*ibid.*). On the contrary, in Solow model, savings rate have only level effect while population has both growth and level effects since it is a source of human resources as well as consumer of the produced products (Ray 1998).

The outstanding characteristic of the Solow model is the existence of the steady state level of per capita GDP to which the developing countries can converge. This is possible under the assumption of diminishing returns to scale. The model infers that regardless of the initial per capita capital stock, two countries with similar savings, depreciation and population growth rates, for example, can converge to similar standards of living in the long run (Ray 1998). Solow model postulates that increasing savings or investment rates only raises the steady state level of per capita GDP but does not promote its growth. Accordingly, growth can only be achieved through population and productivity growth and transnational growth associated with moving from one steady-state growth path to another, which is associated with improved efficiency and increased investment (Deepak and Myint 1998: 73). Harrison (1994) argues that international trade openness according to Solow model will lead to inflow of capital goods, technology, and imported inputs among others. Consequently, the neoclassical growth theory suggests that growth is determined exogenously.

International trade therefore is important to SSA since the availability of capital goods and technology, for example, can expand industrial activity and trade in manufactured tradables catalysing economic growth. The implication of endogenous growth on international trade openness will be discussed later in this section. An example of old trade theory is the infant industry argument.

### **(iii) Infant Industry Argument and the WTO**

Infant industry argument was used to justify protectionism intended to promote industrialization in developing countries. It states in part that developing countries suffer dynamic losses from free trade if they focus on sectors with poor dynamic learning externalities according to comparative advantage theory (Saure 2007). A country protects its market in order to improve competitiveness of its industrial sector and increase the market size of domestic firms enhancing productivity and profitability (USAID report: 2004). This in turn will increase international trade.

The infant industry argument was incorporated in multilateral trade arrangements under the WTO (Bora *et al.* 2000: 26). The WTO provisions under article XVIII (GATT: 1947) allow for protection of infant industries by developing countries to improve industrial competitiveness and improve boost international trade and consequently economic growth. The measures suggested under the WTO framework for trade protection are tariffs, NTBs, local content protection, and anti-dumping and countervailing measures (including safeguards) (Bora *et al.* 2000: 31). The critical role of the WTO, however, is to promote international trade openness among member states. The new trade and growth theories are discussed below.

### **2.1.2 “New” Trade Theories**

Krugman (1987: 131) questions comparative advantage theory which advocates for free trade through his advocacy for the adoption of the new trade theories. He argues that the theories challenges the “extent to which actual trade can be explained by comparative advantage”. In addition, the theories open the possibility that government can intervene in the market through trade protection. Krugman (1994: 184, 185), Kibritcioglu (2002) and Lehmann (2000: 4, 5) advocates for the



new trade theories which assumes imperfect conditions under increasing returns to scale, economies of scale and learning by doing benefits. These are the similarities that exist between the new trade and endogenous growth theories which imply that growth is a long run phenomenon.

Economies of scale and increasing returns to scale reduce the price of tradables due to mass production of variety of such goods (WTO report 2008: 43). Some trade theorists found out that some degree of protection is positively related to economic growth (Yanikkaya 2002). Alam (1994: 3) adds to this view although he cautions that protection distorts international trade and can reduce earnings. Kibritcioglu (2002) discuss two examples of new trade theories as the; (i) intra-industry trade and (ii) strategic trade policy. The strategic trade policy which is relevant to this study is discussed below.

#### **(i) The Strategic Trade Policy**

According to Krugman (1987: 136) arguments against free trade are based on the strategic trade policy and external economies arguments. The strategic trade policy argues for trade protection to encourage local production and supply of competitive products to the international markets (Milner and Yoffie: 1989). In addition, Krugman (1987) states that strategic trade policy argues that government's intervention to promote competitiveness of local firms can promote economic growth. Therefore, a certain degree of trade protection can improve trade through enhancement of local production capacity. However, he points out that international trade openness is a good policy option for economic growth of any country or region.

### **2.1.3 Endogenous Growth Theory**

The endogenous growth theory is critical to this study because of its new suggestions that economic growth is an endogenous process to any country or region. The theory provides a good policy direction to SSA to further open their international trade with a view to encourage, for example, the inflow of new technological ideas and capital inputs to supplement local technological knowledge. The theory is discussed below in detail.

### **(i) “Old Wine in New Bottles”**

Introduction of the endogenous growth theory according to Foss (1998) has seen a new wave of success in explaining how developing countries can enhance their economic prospects by generating home-grown solutions. The difference between endogenous and neoclassical growth theories is the endogenization of the determinants of growth that previously were exogenous, for example, technology, human capital and investment. The endogenous growth theory drops two assumptions of the neoclassical Solow model namely; the exogenous technological change and uniform technological opportunities in all countries (Mayer 1996: 7). Further, the assumption of decreasing returns is replaced by increasing returns to a broad measure of capital incorporating human and physical capital (*ibid.*).

However, endogenous growth theory strongly suggests like neoclassical growth theory that international trade openness is a channel through which new technology can supplement and upgrade locally generated technology. Therefore, in part endogenous growth theory like Foss (1998: 225) claims is to some extent “old wine in new bottles”. The new developments in endogenous growth theory, presents policy opportunities for SSA through international trade openness that can boost innovations, inventions, generation, acquisition, transmission, adaptation and upgrading of new technology and access to capital imports from the developed countries. This will accelerate the realization of the desired economic growth in the region.

### **(ii) Endogenous Growth Model**

This section illustrates briefly endogenous growth model developed by Romer (Romer 1994: 16). Through this model, Romer show what he called “persistent endogenous growth”. The model is shown below;

$Y=F(R, K, H)$ ; where R is research and development (R&D) undertaken by all firms in the economy; K is the stock of accumulated stock of physical capital; and H is the stock of accumulated human resources (Cypher and Dietz 2008: 250). Romer further aggregates R, K, and H to generate a single measure of capital, C. The endogenous equation above collapses into  $Y=F(C)$  which can be re-written as  $Y=aC$ , a transformation to a linear equation. When a fraction of Y is assumed to be

used to produce more C, the model generates persistent endogenous growth. Cypher and Dietz (2008: 251) re-writes further the equation into the following;  $Y_t = a(C)_t C_t$ ; where  $a(C)_t$  is the endogenous technological change originating from within an economy. They thus argue that technological development in a country is dependent on accumulating the stock of human capital, capital accumulation, production of product varieties, strong government policy at micro and macro levels, social and physical infrastructure development, and so on. For neoclassical theory, R, K and H are determined exogenously. The implication of endogenous growth theory on development policy direction for SSA is discussed below.

### **(iii) Implication of Endogenous Growth Theories on Economic Growth**

The endogenous growth theory can provide a base for SSA to generate long term economic growth from within rather than exogenously as predicted by the neoclassical growth theory. This is achievable due to the assumption of increasing returns to scale according to literature discussed earlier in this section. Giving examples of the transformational experience of Singapore and South Korea, Lucas (1988: 41) introduced international trade openness in the endogenous growth theory. Chen and Gupta (2006: 4, 5) argue that endogenous growth theory predicts the economy can grow indefinitely due to the assumption of increasing returns to scale and suggest that international trade openness results in knowledge spillovers across countries, increasing productivity, and human capital hence stimulating economic growth.

Grossman and Helpman (1990) developed endogenous growth theory which shows that international trade openness stimulate economic growth through for example importation of capital inputs, technology and intermediate goods that will enhance the welfare of the citizens. Through trade openness, FDI inflow can increase and spur economic growth. The model predicts that reduction of trade barriers and subsidization of imports (or exports) can improve the rate of economic growth (*ibid.*). Grossman and Helpman (1994: 38), Kibritcioglu (2002: 3) and Jones (1995: 495) suggest that countries' interdependence on international trade will enhance acquisition of technology through importation and inflow of FDI into a

country's internal market. They suggest that international trade openness contribute to technological change which stimulates economic growth (*ibid.*)

The endogenous growth theory, for example, suggests policy stimulus on economic growth through an open trade policy, development of strong financial markets, industrial base, and investment environment (Renelt 1991: 5, 11, 13). Chang (2006: 207) underpins endogenous growth model's dependence on increasing returns to scale and argues that the bigger the economy, the higher is its level of productivity explaining why the developed countries have an advantage over the developing countries. They add that savings and investment in the endogenous growth model lead to economies of scale (*ibid.*). Cypher and Dietz (2008: 239, 254) argue that in endogenous growth theory, a higher level of investment increases economic growth without necessarily increasing savings or investments. They add that the theory lays great emphasis on long term effect of international trade openness, savings, investment, institutions, knowledge creation (on the job training), technology and educational attainment (*ibid.*)

In his empirical analysis, Barro (1991) argues that improvement of human capital, investment and international trade openness will increase the rate of economic growth in developing countries. In addition, he finds that trade barriers slows down economic growth. Human capital fosters economic growth through generation of new ideas or products that underlie technological progress. Therefore, the quantity and quality of human capital per person enhances investment in human and physical capital stimulating economic growth (*ibid.*). A contradicting view of implication of endogenous growth theory to developing countries was advanced by Baldwin *et al.* (2001). They developed a stages-of-growth model, where international trade is driven by lower transportation cost and market opening triggers global divergence processes, in which the North industrializes and grows fast, diverging from the South. They show that agglomeration generates incentives for investment and innovation in the North, driving global divergence, which spurs economic growth in the North (*ibid.*). Baldwin's *et al.* (2001) findings can explain why SSA is still experiencing low economic growth about two decades after trade liberalization was adopted in the 1990s.

The economic theories above provide answers to the research question on the effect of international trade openness in enhancing the growth of the SSA's economy. Accordingly, international trade openness improves the pace of economic growth of developing countries. In addition, the endogenous growth theory suggests that contemporaneous policies and/or sectors should be improved so that the desired economic growth can be achieved by developing countries, in this case SSA. But, they add that trade protection in certain sectors of the economy can be growth enhancing for the developing countries. It is evident that the neoclassical and the new trade and growth theories differ in many aspects, but agree that international trade openness can stimulate economic growth among the developing countries.

## **2.2 Literature Review**

This section will discuss the findings of the past studies on the effect of international trade openness on economic growth. It first discusses various measures of international trade openness that are commonly used in the literature.

### **2.2.1 Measures of International Trade Openness**

There are many measures used to investigate the relationship between international trade openness and economic growth. This section discusses some of them. Wacziarg (2001: 5) identifies three broad categories of international trade openness measures namely; outcome openness measures; policy openness measures and measures of effective protection. The outcome openness measure “describes the volume of existing trade or its components”. He argues that the trade share of GDP reflect the level of integration with trading partners regionally and internationally (Rodrik 2001). Wacziarg (2001) adds that policy openness measures including tariffs and NTBs describe the institutional features of a country's attitude towards the rest of the world as far as trade and factor flows are concerned. Finally, the effective protection measure reflects restrictiveness of a trade regime from the deviations of actual trade volume from the estimated trade volume under a free trade regime.

Rruka (2004) uses the Economic Freedom of the World (EFW) trade policy openness index (policy). The policy index is derived from the Fraser Institute's

EFW data on the index called “freedom to trade internationally”. The index is constructed from the following constituent variables; (i) taxes on international trade; revenues from trade taxes (% of trade sector); mean tariff rate; and standard deviation of tariff rates; (ii) regulatory trade barriers; NTBs (GCR<sup>2</sup>); compliance cost of importing and exporting (DB<sup>3</sup>); (iii) size of trade sector relative to expected size; (iv) black-market exchange rates; and (v) international capital market controls; foreign ownership/investment restrictions and capital controls (EFW 2008: 5). Further details are discussed in Chapter 3, section 3.1.

Sachs and Warner (1995: 22) developed a criterion to identify periods when developing countries became open to international trade. This is the Sachs and Warner (SW) openness index; a binary measure widely used in the study of the relationship between international trade and economic growth. According to the SW index, an open economy would have none of the five conditions stated below applicable while a country would be closed to international trade if it has at least one of them namely; (i) NTBs covering 40 percent or more of trade; (ii) average tariff rates of 40 percent or more; (iii) a black market exchange rate that depreciated by 20 percent or more relative to the official exchange rate, on average, during the 1970s or 1980s; (iv) a socialist economic system; and a state monopoly on major exports and (v) A state monopoly on major exports (*ibid.*). This index is restrictive, therefore showing majority of countries as closed despite the achieved level of trade openness. It does not appreciate the depth of international trade openness such that a country either fully liberalize or it is qualified as closed to trade. A country that for example has achieved four of the five conditions will be considered closed.

Trade Policy and outcome openness measures defined by Wacziarg (2001) have also been used by Yanikkaya (2002: 61) and Edwards (1998). Rodriguez and Rodrik (2000) criticized the “distortion” and “variability” indices constructed by Dollar (1992) claiming that they don’t measure international trade openness but macroeconomic stability. They therefore argued that Dollar’s results do not reflect

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<sup>2</sup> GCR - Global Competitiveness Report.

<sup>3</sup> DB - Doing Business Reports.

the effect of international trade openness on the economic growth of the economy. In addition, Rodriquez and Rodrik (2000) argue that use of binary indices yield weak results in international trade-economic growth relationships.

The choice of trade policy openness and trade share of GDP as my key variables is informed in part by their critical policy relevance to SSA; a region that emerged from a restrictive and inward looking trade regime that can be attributed to their low economic performance in past decades. SSA like many developing regions of the world is focusing on improving exports to enhance economic growth. Studying trade shares of GDP can shade light on the significance of trade volumes in improving economic growth in SSA.

Trade policy and the outcome openness measures are interrelated. Reducing trade barriers such as tariffs and NTBs can lead to an increase in the trade share of GDP, the outcome openness measure and show how much a country is interacting with the rest of the world. The binary indices of international trade openness such as SW index have not been used because of their restrictive nature. The EFW policy index has been used since it covers a wide range of trade barriers and NTBs and can be assumed to be representative, comprehensive and less restrictive. In addition, the availability of data for both EFW policy and outcome openness measures of trade supported their choice. Finally, this paper uses openness measures to undertake a comparative analysis to check sensitivity and robustness of the effect of international trade openness on economic growth in SSA.

### **2.2.2 International Trade Openness and Economic Growth**

The relationship between international trade openness and economic growth has been a topic of verification by academics and researchers in recent decades (Harrison 1994). International trade openness is a channel through which for example, FDI, capital inputs, goods, services and technology flow to the recipient countries or regions. These are sources of economic growth to developing countries. The results from the literature reflect three different views that international trade openness; (i) is good for economic growth; (ii) is good for economic growth but trade protection is necessary to some extent; and (iii) contributes to economic

growth more when contemporaneous policies and/or sectors are improved. Those who suggest that there is need for some degree of trade protection argue that local production processes can be inhibited by external shocks such as the 2008 financial crisis and unfair competition from international players enjoying economies of scale. Detailed discussions of these views are provided below.

### **(i) International Trade Openness is Good for Economic Growth**

The first group of economic literature are those that argue that international trade openness is good and needed for economic growth to occur. This provide literature answers to the main research question; *What is the effect of international trade openness on economic growth in SSA?* The first is Edwards (1993) who reviewed studies from the 1970s and 1980s and concluded that international trade openness spurs the growth of the economy while trade barriers inhibits growth. Easterly and Levine (1997: 7, 8), Karski (2001), Rruka (2004) and Harrison (1994) also found that international trade openness is economic growth enhancing. Wacziarg (2001: 2-4) argues that international trade openness is good because it improves government policy through, for example, creation of strong macroeconomic policies and domestication of international trade agreements. This will create international policy coherence through which SSA can obtain best practise policy alternatives that complement their endogenous policies. I agree with Wacziarg (2001) because the countries under this study are members, for example, of the WTO and are required to domesticate agreements that will enhance international trade openness.

Wacziarg (2001) and Ben-David and Loewy (1998: 1) argues that international trade openness accelerates the inflow of FDI through which technological transmission can occur in a developing country's or region's economy. Wacziarg (2001) adds that international trade openness can improve allocation and distribution of resources within an economy to where they can be optimally utilized, for example, technological development. This way, a country or region can import essential goods and services that are not produced locally such as capital inputs and technology that are needed to growth the economy (*ibid.*). Ben-David and Loewy (1998: 1) suggested therefore that trade barriers should be reduced for



the economy to grow. They add that the greater the growth effect, the more the countries enact trade barriers reduction policies(*ibid.*).

Developing countries should increase manufactured exports to local and foreign markets and speed up the process of economic growth (Temple 1999: 142). Increasing the exports of manufactured products can therefore accelerate the pace of economic growth in SSA. Temple (1999) gives the example of the East Asian economies that increased manufactured exports and experienced rapid economic growth to become newly industrializing economies of the world. Wacziarg and Welch (2003) updated the study by Sachs and Warner (1995) and replicated it. They find similar results showing that international trade openness stimulate the process of economic growth. They show that open economies experience unconditional convergence while closed economies do not (*ibid.*: 28). Low initial per capita GDP and high initial level of schooling ratio were associated with a more rapid economic growth as were a higher investment ratio and favourable terms of trade movement (Greenaway *et al.* 1998). In addition, a higher population growth can slow down economic growth; and trade liberalization accelerates economic growth in years following its implementation (*ibid.*).

Frankel and Romer (1999) and Yanikkaya (2002) find that international trade openness is growth enhancing but provide a counter-argument for the suggestion by Greenaway *et al.* (1998) that population growth slows economic growth. They argue that a large population in a country reflects a larger market. Therefore, population density can be used as a measure of international trade openness (Yanikkaya 2002). Countries like China for example can have more within country trade as well as trade with other countries. Higher population growth can also lower income per capita which can reflect declining economic growth fortunes for developing countries. Thus population density can have both positive and negative effect on economic growth depending on the angle of approach stated above.

The neoclassical growth theory predicts that population growth has both growth and level effect since it is a factor of production and at the same their market (Ray 1998). Edwards (1998) argues that open countries have a greater ability to

capture new ideas being developed in the rest of the world as international trade expands. Rodriguez and Rodrik (2000) criticized the studies by Dollar (1992), Sachs and Warner (1995), Ben-David (1993), Edwards (1998), and Frankel and Romer (1999) studies all of which finds that international trade openness is economic growth enhancing. They observe that most of their findings are less robust and/or weaker due to “difficulties in measuring openness, statistically sensitive specifications, collinearity of protectionist policies, and other econometric difficulties” in addition to “dubious and noisy data” (*ibid.*).

### **(ii) International Trade Openness is Good for Economic Growth but Protection is Necessary**

This section answers the main research question in (i) above, but the main focus in part is the sub-question; *what conditions have to be met for the effect of international trade openness on economic growth to be beneficial to SSA?* It examines literature view of trade protection which is suggested by trade and growth theories. The neoclassical and “new” trade theories have provided a mixed policy direction on how international trade openness can cause economic growth. They suggest both international trade openness and some degree of trade protection as good for economic growth of developing countries.

The current multilateral trading system also allow for some degree of trade protection especially by developing countries as provided for in article XVIII of the WTO rules. However, international trade openness is suggested by theory and literature and indeed the WTO as the best policy option for developing countries to grow their economies. This can be attributed to the role international trade openness has and continue to play in accelerating the realization of MDGs goal 8 of global partnerships for economic development. This MDG goal is a global concerted effort to increase economic growth of developing countries by the year 2015.

Contrary to the euphoric support for international trade openness, some development economists have found that trade protection to a limited degree can be good for economic growth. But, the same economists strengthen the argument

that international trade openness has more benefits than trade protection in the 21<sup>st</sup> century and beyond. Yanikkaya (2002: 74, 77) and Vamvakidis (2002: 60) findings show that international trade openness enhances economic growth; but also finds that trade protection to some extent too can promote economic growth. This is a complete contrast to the majority of the economic literature that show trade protection as an impediment to economic growth, but it is commensurate to the suggestions by in particular, the new trade and growth theories.

Yanikkaya (2002) argues that the new growth theory, the theory of strategic trade policy, and the infant industries arguments for example provide theoretical basis for the claim that trade protection can promote economic growth among the developing countries. Some level of trade protection intended to nurture infant industries can stimulate economic growth (Vamvakidis (2002). Krugman (1994: 185) also argues for trade protection showing that it can lead to increased interaction of a country or region to the rest of the world through international trade. He coined the theory *import protection as export promotion*. Sachs and Warner (1995: 53) elaborate that according to the theory of “import protection as export promotion”, manufacturing sector can expand under a protective trade policy; open economies promotes exports of manufactured products than a closed economy. One possible explanation given for the positive relationship between trade barriers and economic growth is that it shifts resources to sectors that have high positive externalities for the whole economy generating growth effects. International trade openness has more growth effects compared to trade protectionism. Protecting the entire economy will inhibit economic growth for developing countries, but selective intervention of industries or sectors in which a country has a comparative advantage can be beneficial (*ibid.* 79).

### **(iii) International trade openness and contemporaneous policies good for Economic Growth**

This group of literature argues that more have to be done in terms of contemporaneous policy interventions to provide an impetus to the process of economic growth in developing countries. This is the ultimate answer to the research sub-question; *what conditions have to be met for the effect of international trade openness on economic*

*growth to be beneficial to SSA?* The literature in this section has shown that international trade openness promotes economic growth; but improvement of contemporaneous policies and/or sectors will enhance the effectiveness of international trade openness in fostering economic growth. Rodrik (1997: 38) undertook a study about SSA and found that international trade openness contribution to growth is moderate. For international trade openness contribution to be strong in SSA, he suggested the improvement of human capital, physical infrastructure, macroeconomic stability and the rule of law (*ibid.*).

International trade openness establishes linkages between countries of the world as well as effectively enabling governments to accelerate reforms that will enhance the growth of the economy and income convergence particularly of developing countries (Sachs and Warner 1995: 2, 4, 12). International trade openness therefore has a significant positive relationship with economic growth. The results above underpin the importance of contemporaneous policies and/or sectors that improves the effectiveness of international trade openness in stimulating economic growth in developing countries. Other policies they find important in the quest for sustained economic growth include macroeconomic stability, private sector development as the engine of economic growth, strong property rights, freedom and safety from violence, human and physical capital accumulation (*ibid.*).

The importance of international trade openness coupled with improvement of contemporaneous sectors is critical if SSA has to achieve economic success. The other development economist suggesting the importance of contemporaneous policies and/or sectors in enhancing the contribution of international trade openness on economic growth is Chang *et al.* (2005: 2, 5, 7). First, they find that international trade openness promotes economic growth, but not to the desired levels. Then, they suggest the enhancement of infrastructure, human resources, macroeconomic environment, investment and financial sectors to propel economic growth to desired levels (*ibid.*). Chen and Gupta (2006: 4) and Rodriquez (2007) findings strengthens the case for international trade openness and the role of contemporaneous policies. These policies can turnaround and sustain the pace of economic growth in SSA. This research examines the importance of investment, industry, population

and domestic credit, as examples of contemporaneous policy options that will enhance the contribution of international trade openness on economic growth.

Table 1 below show a summary of the results obtained by some of the studies discussed in literature above.

**Table 1: Summary of results of contributors in the literature**

Openness measures and Variables/Regions	Independent Variable coefficients of eight literature contributors				
	World Bank (1993a)	Sachs and Warner (1995)	Wacziarg (2001)	Yanikkaya (2002)	Chang <i>et al.</i> 2005 (logs)
Methodology Used	Panel models	Cross sectional methods (Logit, OLS)	Panel models (Fixed Effects)	Panel methods (Fixed Effects, IV etc)	Dynamic models (GMM-IV)
Openness (trade/GDP)	-	-	-	0.018* (5.45)	1.1959** (0.16)
Trade Policy Openness measures (tariffs)	-	-	0.073 (2.93)	-	-
SW Open index	-	2.203** (4.721)	-	-	-
Export duties (XTAX)	-	-	-	0.074* (2.42)	-
Import duties (TARIFF)	-	-	-	0.042* (1.88)	-
Tax on International Trade (TAXTRD)	-	-	-	0.023* (1.87)	-
Bilateral Payments arrangements (BPA)	-	-	-	0.31* (0.91)	-
Current account transactions (CURRENT)	-	-	-	-0.22* (0.48)	-
Initial Per Capita GDP	-0.0320** (0.0110)	-	-0.086 (-0.23)	-5.38 (6.50)	-3.1713** (0.18)
Primary School Enrolment	0.0272** (0.0065)	0.145 (0.155)	-	-	-
Secondary School Enrolment	0.0069 (0.0131)	2.756 (1.464)	0.164 (2.05)	-	1.1621** (0.15)
Investments	0.0285 (0.0207)	6.302 (1.896)	0.045 (5.12)	-	-
Domestic credit (fin)	-	-	-	-	1.0272** (0.11)
Population	0.0998 (0.2023)	0.008 (0.097)	0.020 (6.05)	0.0009 (3.86)	-
OECD Dummy	-	-	-1.438 (-3.71)	-	-
HPAEs	0.0171** (0.0058)	-	0.970 (1.77)	-	-
Latin America	-0.0131** (0.0039)	-	-2.198 (-6.74)	-	-
Sub-Saharan Africa (SSA)	-0.0099* (0.0041)	-	-3.090 (-5.70)	-	-
Adjusted R <sup>2</sup>	0.4821	-	-	-	-
R <sup>2</sup>	-	0.550	0.45	0.33	-
Sample Size	113	79	57	61	82

Source: Own construction from respective literature contributors.

-\*\*\* Significant at 1% level; \*\* Significant at 5% level; \*Significant at 10% level.  
- Standard errors in parentheses

The World Bank (1993) study investigated the sources of growth to the East Asian countries that led to rapid economic growth called *the East Asian Miracle*. A growth model without international trade openness measures is used.

The result of initial GDP per capita show neoclassical Solow-type models that predict that poor countries grow faster and hence can converge. The other variables also show a positive relationship and effect on economic growth with that of human capital development represented by the primary enrolment statistically significant at 5% significance level. The dummy variables show that SSA economic growth rate is lower by 0.99% all else constant (Cypher and Dietz 2008). Sachs and Warner (1995) show that international trade openness significantly generates economic growth. Yanikkaya's (2002) results shows that international trade openness has a positive relationship showing its growth effect on economic growth when either outcome or policy openness measures are used. Both Wacziarg (2003) and Chang *et al.* (2005) results show international trade openness growth effects which are insignificant and significant respectively. The sample size however varies between each of the studies.

The literature review has been able to answer my research questions. According to literature, international trade openness is economic growth enhancing. However, for it to stimulate the desired economic growth levels, contemporaneous policies and/or sectors should be improved to meet international standards. International trade openness can promote the importation of capital inputs *inter alia* that improves productivity, promote industrialization and enhance economic growth.

## **2.3 Econometric Weaknesses and Remedial Measures**

This section discusses the problem associated with cross country studies such as endogeneity and shows how they can be resolved.

### **2.3.1 The “Chicken and Egg” Endogeneity Problems.**

Many international trade openness and economic growth studies are faced by measurement errors and problems of endogeneity or reverse causality as indicated above and this has impeded robustness of many econometric results. Rodriquez and Rodrik (2002) argue that cross country studies are based on unreliable data which causes measurement errors. Endogeneity and/or causality problem can be

likened with the proverbial and legendary myth about which between the chicken and the egg was created first. This is because a claim that the chicken was created first before the egg or the egg first before the chicken can be valid. These pose endogeneity or reverse causality problems. This has become a serious problem in international trade openness-economic growth relationship studies because it can be true that increase in international trade can stimulate economic growth and *vice versa*. In their study on the relationship between international trade openness and economic growth, Billmeier and Nannicini (2007: 6) points out that cross country studies are faced with two major weaknesses; reverse causality and endogeneity. These problems can be addressed as described below.

### **2.3.2 Endogeneity Remedial Measures**

Econometric studies suggest the use of instrumental variables (IV) to deal with endogeneity problems (Wooldridge, 2009: Chapter 15). Frankel and Romer (1999) developed a mechanism to deal with the endogeneity problem using IV. They suggested that an instrument on international trade can be constructed through bilateral trade equation estimation. Fitted values are generated then aggregated in order to estimate a geographic component of a country's overall trade. They further suggest that contrary to the conventional gravity equations, the bilateral trade equation include only geographical characteristics, assumed not correlated with economic growth hereby measured by GDP per capita. They include; country's size, their distance from each other, whether they shared a border or landlocked which are important determinants of international trade (*ibid*). The instrument is then used within the context of IV. Of all the measures to deal with endogeneity, it is evident from the literature that Frankel and Romers' (1999) contribution is a major contribution in the study of the effects of international trade openness on economic growth.

Yannikaya (2002) suggested lagging of endogenous variables and use of IV as Frankel and Romer (1999) suggested although she argues that they are not perfect solutions for endogeneity problems. Billmeier and Nannicini (2007) also proposed use of IV to deal the problem of endogeneity. They argue that IV suggests using regressors that have an impact on international trade openness but not corre-

lated with GDP per capita (*ibid.*). Cameron and Trivedi (2009: 60) also suggest IV to deal with endogeneity, but argue that it is difficult to find a valid variable that does not correlate with the regressand. Rodriquez and Rodrik (2002) argue against the use of geographical characteristics because they determine income through many other ways, for example, natural calamities such as drought or floods can slow the economic growth. They thus conclude that the geographical instrument is invalid (*ibid.*).

Rodriquez and Rodrik (2002) criticism of Frankel and Romer's (1999) procedure to deal with endogeneity problems can be valid, but they should have suggested an alternative methodology. Their criticisms have not therefore contributed to finding a solution proper to deal with endogeneity problem. The inconclusive debates in literature on ways to deal with the problem of endogeneity show the lack of consensus in addressing the problem. This research has lagged the variables in trying to deal with endogeneity, yet this method is not a perfect way in this case. It however helps to mitigate the effects of endogeneity problem in this study for now. Future research can invent new methods of solving the endogeneity and reverse causality problems improving the clarity, precision and robustness of estimation results.

This section has provided answers to the research questions of this study. The findings show that international trade openness enhances economic growth of the developing countries. However, trade protection has been suggested by Yanikkaya (2002) among other development economists, as a possibility. This result is in line with the theoretical underpinnings and provisions in the WTO on trade protectionism. Finally, the literature suggests that contemporaneous policies and/or sectors should be improved in order to enhance the effectiveness of international trade openness in accelerating the pace of economic growth. Chapter 3 below examines graphically and empirically whether these suggestions are true for SSA.



## Chapter 3 Empirical Analysis

The empirical analysis entails the construction of data, methodology and model specification, ensuing regression results, their interpretation and policy implications for SSA.

### 3.1 The Data and Variables Description

The objective of this research is to investigate the effect of international trade openness on SSA's quest to realize rapid economic growth using cross-sectional time series (panel) data for the period 1967 to 2006 for a sample of ten SSA countries. The data which runs for 40 years is averaged in four decadal periods which are 1967-1976, 1977-1986, 1987-1996 and 1997-2006 to capture the long-run endogenous growth model effects derived in part, from international trade openness in SSA.

The sources of data used in the study are the World Development Indicators (WDI 2008), Economic Freedom of the World (EFW 2002-08), and Penn World Tables 6.3 (PWT 2009). The variables derived from the endogenous growth theory are investment, population, human capital, technology and/or R&D. The focus of this research is on investment and population whose data is readily available from these sources. The rest have been omitted due to data scarcity. The control variables are the domestic credit and industry. Table B1 in appendix B describes in details the variables and show the data sources. The main variables for this study are the GDP per capita and international trade openness measures. Brief discussions of each of these variables are provided below;

#### (i) GDP Per Capita (Growth)

The regressand is the GDP per capita which Cypher and Dietz (2008: 32, 33) like many development economists argue that it is a better measure of a country's income of the population compared to the aggregate economic growth. They concur like many in the development discourse that the use of Human Development Index (HDI) is another better measure of economic growth. However, the complexity of coming up with a measure of economic growth using the broader view of economic development such as HDI has made it necessary to use GDP per capita index as a

measure of economic growth. They state that they “can thus use per capita income as a means to rank countries from the richest to the poorest, with differences in the quality of life, which is the rationale behind using income or GDP per capita or a proxy for overall welfare” (*ibid.*).

Cypher and Dietz (2008) further argue that using GDP per capita allows determination over time if changes in the level of aggregate income of any particular economy; (i) are just sufficient to keep up with population growth, so that per capita GDP remains constant over time; (ii) are more than sufficient to keep up with population growth so that per capita income is rising over time; and (iii) are insufficient to keep pace with population growth, such that per capita income is falling over time. Finally, they argue that using per capita GDP allows for the measure of whether average income and/or the average standard of living is growing or not in a particular economy (*ibid.*: 36).

#### **(ii) Trade Policy Index and Outcome Openness Measures**

The international trade openness measures used are; (i) outcome measure (trade share of GDP) by the World Bank (*openwb*); and (ii) trade policy index openness measure (*policy*) derived from the EFW Index. Both the measures are expected to be growth enhancing. The choice of the trade openness measures have been discussed in section 2.2.1 above. The trade policy index ranges from 1 to 10 showing lower to higher degree of trade openness respectively. Therefore, in this case, the trade policy index is positively correlated to economic growth rather than the usual negative correlation of trade barriers to economic growth. This is because when the index increases, it shows a reduction of trade barriers and *vice versa*. Table B2 in appendix B show some of the indices including the trade policy index measure of openness used to construct the EFW index.

#### **(iii) Investments**

Investment includes local investments and FDI generation, expansion and inflow into SSA. Investment is in part, a channel through which knowledge and technology transfer can occur. Investments can also build local capacity in terms of physical infrastructure and social amenities that can improve the quantity and quality of hu-

man capital. This can increase the levels of productivity in the economy. Thus investment is expected to positively contribute to economic growth.

**(iv) Domestic credit**

This is the domestic credit provided by the banking sector as a percentage of GDP. Domestic credit is the financial support that is offered to the private sector as the engine of economic growth. Slow growth of investments in SSA can be attributed in part to lack of affordable credit to finance their expansion. Financial development therefore can lead to economic growth. The expected effect of this variable is positive.

**(v) Industry**

This is the industrial share of GDP. Industry includes manufacturing and is used to proxy for industrialization process and technological capacity or depth in SSA. The level of industrialization can symbolize the level of technological capacity in SSA. Therefore, industrialization is expected to have a positive effect on economic growth.

**(vi) Population**

Population growth is a critical variable in the endogenous growth theory. In this study, population proxy for both growth of the stock of human resources and market for tradables which are important for economic growth in developing countries according to endogenous growth theory. A rapid increase in the rate of population growth that surpasses the rate of economic growth shows a deteriorating GDP per capita. A large population density has also been used as an international trade openness measure by Yanikkaya (2002) and Frankel and Romer (1999) because it symbolizes a large market demand that can increase international trade leading to the growth of the economy.

In neoclassical growth theory, population growth has both level and growth effects. In the endogenous growth model, initial human capital is a critical requirement for endogenous economic growth to occur. A country with large population can have increased within and between countries trade. This is in part, the reason

why countries join regional trading arrangements such as the EAC, COMESA, ECOWAS and SADC to expand access to a larger market.

Population growth can lead to generation of more investments locally and inflow of FDI to take advantage of a wide market. For example FDI locating in Kenya will have access to about 400 million COMESA people in terms of market for their products (COMESA 2009). The same applies to China and SSA with a population of over 1.3 billion and over 800 million (WDI 2008) people respectively. The large population also can reflect a large pool of unskilled and skilled human capital to provide labour for industrial development. Population can thus have either a positive or a negative effect on economic growth.

#### **(vii) Landlockedness**

Geographical features can also affect a countries degree of international trade openness and prospects for enhanced economic growth. Countries with coastlines are expected to experience more trade due to possible high degree of trade openness. The landlocked countries constituting the sample under this study include Botswana, Malawi, Mali, Uganda and Zambia.

Landlocked countries can experience low economic growth due to in part low trade as a result of trade barriers such as high tariffs and NTBs including high costs of transport. The countries that connect Zambia to the rest of the world are South Africa, Mozambique and Tanzania. Table B4 show in detail the entry countries for the sample landlocked countries in this study. Zambia's exports and imports can be exposed to high tariffs, and NTBs in these entry countries. Such costs reduce competitiveness of tradables lowering international trade and hence economic growth prospects of Zambia. Such costs are also encountered by Botswana, Malawi, Mali and Uganda, just as landlocked countries in the rest of the world. Landlockedness lower economic growth prospects of countries.

#### **(viii) Interaction Variable**

Interactions of variables help in examining the effect of contemporaneous policies and/or sectors can enhance the effectiveness of international trade openness in in-

creasing economic growth. The variable to be interacted with international trade openness is investment. Improvement of the investment environment can improve the effectiveness of international trade openness in fostering rapid economic growth in SSA.

#### **(ix) Income Convergence**

Initial GDP per capita has been used to investigate whether SSA can experience income convergence. This is the prediction of the neoclassical Solow model. The result is expected to show a negative relationship to prove that SSA countries can experience income convergence at a steady state.

### **3.2 Descriptive Analysis**

This section will start with analysis of correlations of the variables, and then discuss the relationships that exist between international trade openness and economic growth using graphical presentations. It provides an answer for the research question determining the effects of international trade on economic growth in SSA. The graphical relationship can be used to deduce whether international trade openness is economic growth enhancing or not. Table 2 show correlation relationships between the regressand and regressors significant at 5% levels. There is a positive partial relationship between GDP per capita and outcome and policy measures of 0.4926 and 0.5390 respectively.

Further, the relationships between economic growth, investment, industry and credit are statistically significant at 5% level while population growth, initial growth and landlocked variables are insignificant. In addition, table 2 shows that international trade openness measures have statistically significant relationships with investment, and industry except domestic credit which is insignificant. Finally, the relationship between trade share of GDP and population growth is statistically significant at 5% level except the policy measure which is insignificant. The correlation results show that international trade openness contribution to economic growth in SSA is average.

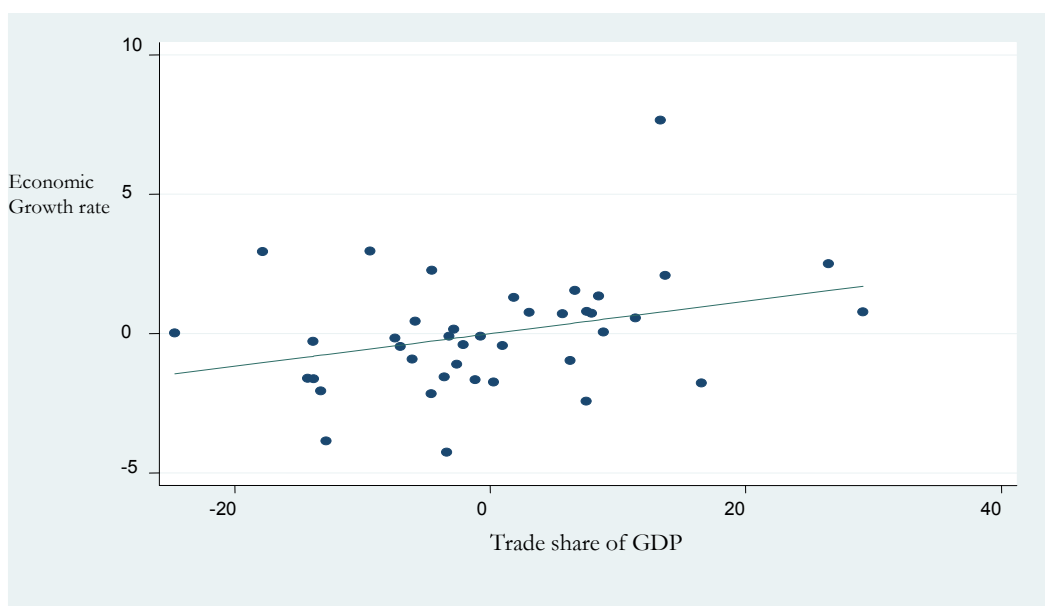
**Table 2: Correlation Coefficients**

	gdpcap~a	inv	fin	industry	pop	policy	openwb
gdpcapita	1.0000						
inv	0.4092**	1.0000					
fin	-0.3242**	-0.1361	1.0000				
industry	0.3470**	0.5967**	-0.2110	1.0000			
pop	-0.1976	0.0330	-0.2856	-0.1079	1.0000		
policy	0.4926**	0.3847**	-0.1211	0.4896**	-0.1692	1.0000	
openwb	0.5390**	0.5243**	0.1515	0.6762**	-0.4528**	0.6279**	1.0000
landlocked	0.0467	0.2565	-0.2931	0.1771	0.2276	0.2307	-0.0083
gdpcap67	0.1294	0.0730	0.6487**	0.0345	-0.6549**	0.0377	0.5361**
	landlocked	gdpcap67					
landlocked	1.0000						
gdpcap67	-0.3609**	1.0000					

\*\* Shows correlation coefficients significant at 5%

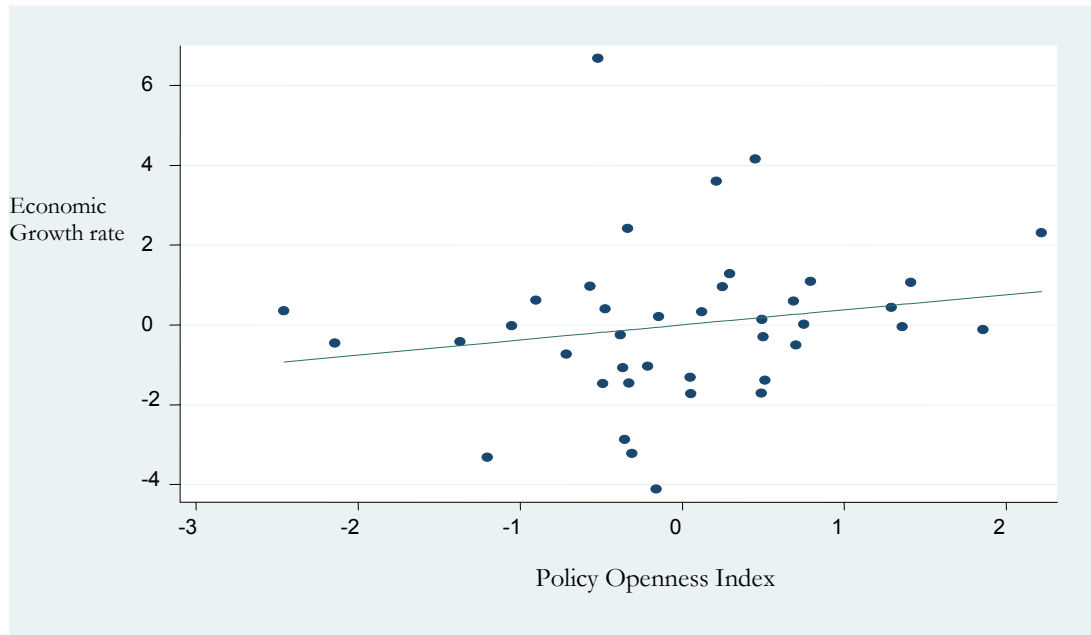
Figure 1 and 2 below show similar results as table 2 above. The trade share of GDP and policy openness measures show a positive relationship with economic growth in SSA. Figure D1 in appendix D also shows in detail the relationships that exist between the regressand and regressors.

**Figure 1: The Relationship between Outcome Openness Measures and Economic Growth**



Source: Authors own Construction

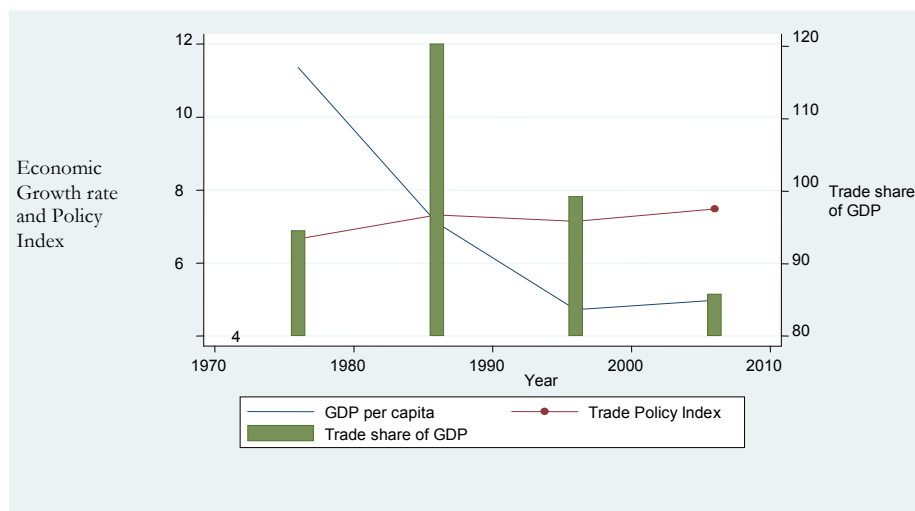
**Figure 2: The Relationship between Policy Openness Measure and Economic Growth.**



Source: Authors own Construction

In addition, figures 3 to 12 below are used to illustrate the relationship that exists between international trade openness and economic growth in the sample SSA countries under study. The country figures are discussed below for Botswana, Ghana, Kenya, Malawi, Mali, Mauritius, Nigeria, Tanzania, Uganda and Zambia respectively.

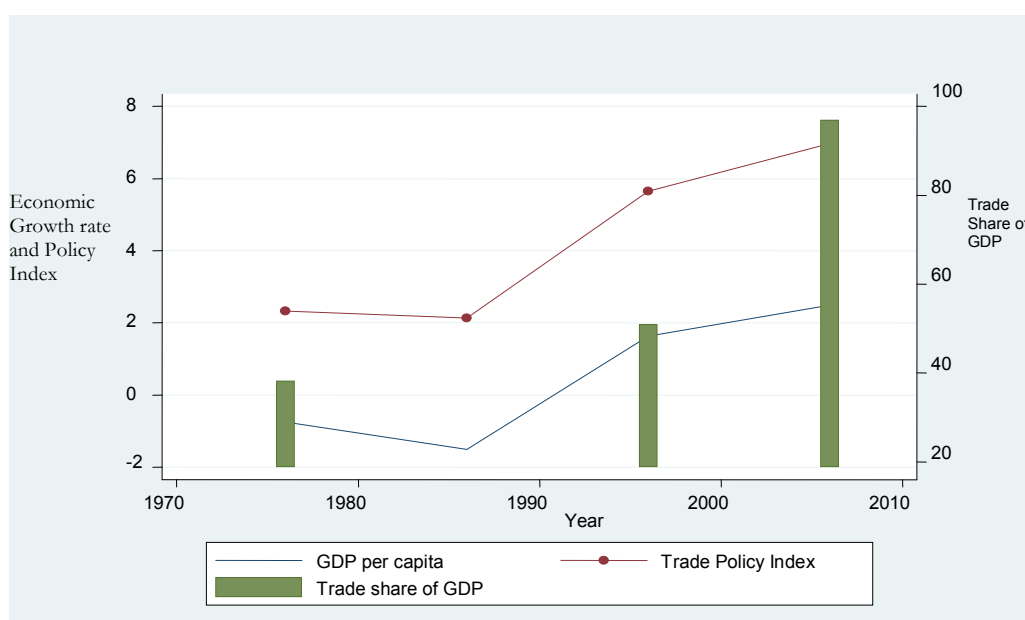
**Figure 3: Botswana**



Source: Authors own Construction

For figures 3 to 12, the economic growth rate and trade share of GDP are in percentages while the trade policy index range between 1 and 10. Figure 3 above show declining economic growth performance of Botswana over the decades under study. In the recent decade however, economic growth is recovering. The policy measure shows that Botswana has been improving the degree of international trade openness. The economic growth decline could be associated with the decline in outcome measures of international trade openness which reflect a decline in trade share of GDP. International trade openness has a weaker relationship with economic growth for Botswana.

**Figure 4: Ghana**



Source: Authors own Construction

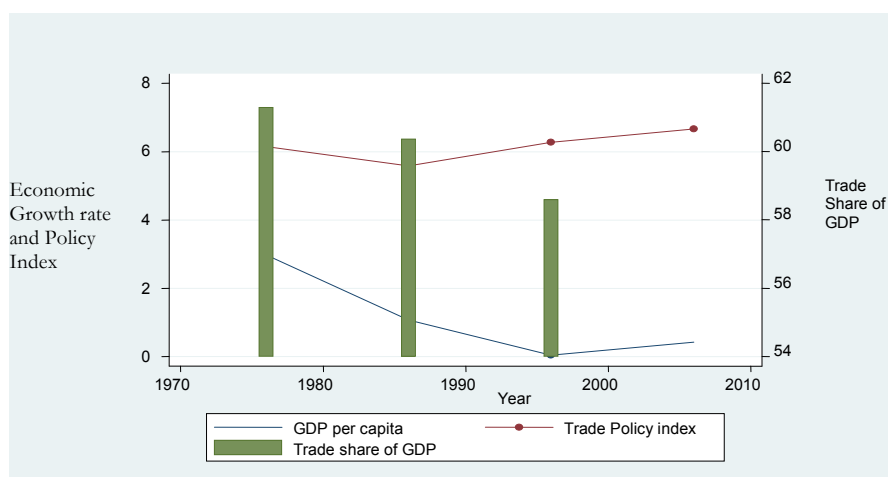
The performance of Ghana shown by figure 4 above indicates that trade shares of GDP declined in the first decade and rose in the following decades. Economic growth in Ghana has been improving and this can be associated with improving international trade openness as shown by the rising trend of policy and outcome openness measures. The positive association between international trade openness and economic growth is evident from the figure.

Kenya's performance is shown by figure 5 below. The policy measure show that the degree of openness in Kenya has been improving. Yet there is a worsening



trend in Kenya’s performance in economic growth and international trade. The trade share of GDP has been declining throughout the decades even in years after trade liberalization in the 1990s. However, in the last decade, the country’s economic performance is on a recovery path. The positive relationship between international trade openness and economic growth is evident but weaker for both trade share of GDP and policy openness measures.

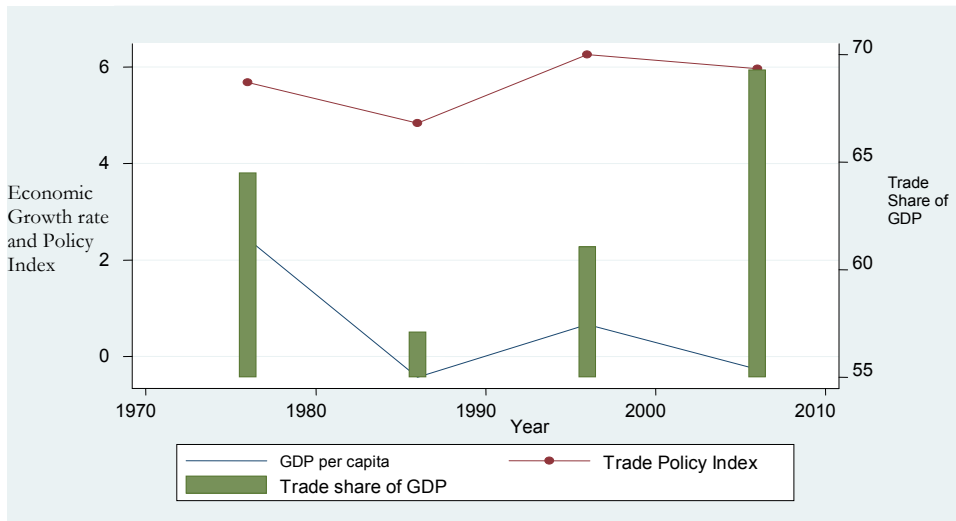
**Figure 5: Kenya**



Source: Authors own Construction

Figure 6 below shows that Malawi’s economic growth performance has been fluctuating similar to the degree of international trade openness as shown by the trade policy openness measure. The trade share of GDP declined in the initial decade then rose in the following decades. Overall, economic growth seems to have been experiencing a decline in Malawi. The positive relationship between trade policy openness measures with economic growth is stronger while for the outcome measure there is a weaker relationship.

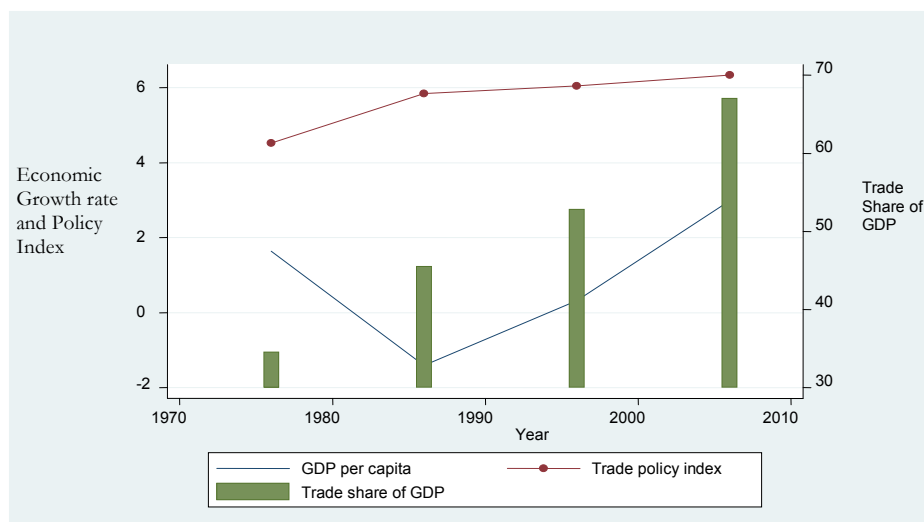
**Figure 6: Malawi**



Source: Authors own Construction

Figure 7 below illustrates that Mali's economic growth has been improving after the first decade where it had experienced a decline. The trade openness measures show that the degree of openness has been improving throughout the decades. The positive relationship existing between international trade openness and economic growth is evident for Mali.

**Figure 7: Mali**

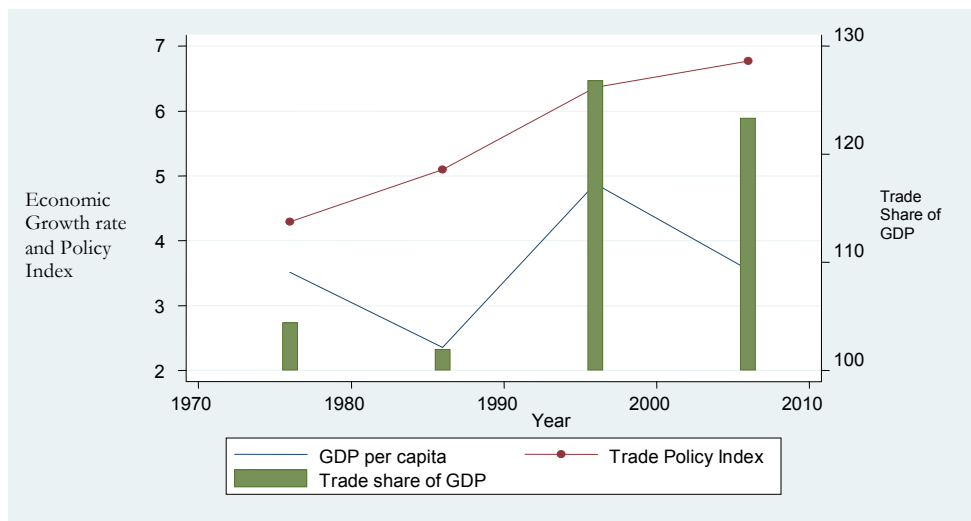


Source: Authors own Construction

Figure 8 below shows that the degree of international trade openness in Mauritius has been improving throughout the decades. The economic growth of

Mauritius declined in the first decade, improved in the following decades and then declined in the last decade. The positive effect of trade policy openness on economic growth is evident but weaker for Mauritius, contrary to expectation given that the country is a free trade zone (Rodrik 1997). However, the trade share of GDP is showing a stronger relationship with economic growth showing a similar trend over the decades.

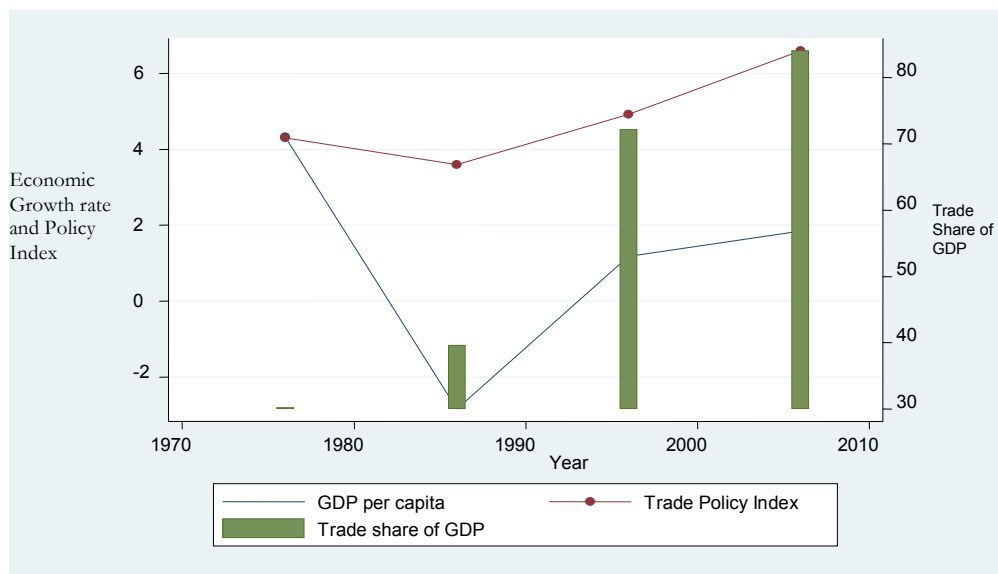
**Figure 8: Mauritius**



Source: Authors own Construction

For Nigeria in figure 9 below, outcome measure, shown by the trade share of GDP has been increasing continuously. The policy measure also show an increasing trend in the degree of international trade openness that can be attributed to a reduction in trade barriers. Economic growth declined in the initial decade and later shows an increasing trend. It is evident from the figure that international trade openness is growth enhancing.

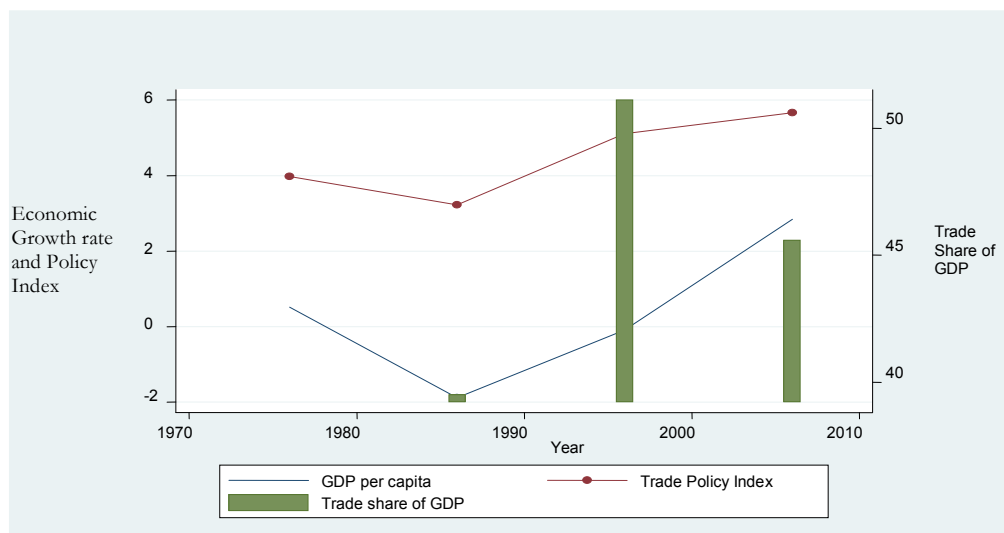
**Figure 9: Nigeria**



Source: Authors own construction.

Overall, as shown in figure 10 below, Tanzania experienced lower trade in the initial decades of the study, but later experienced more trade, although the 1997-2006 decade trade was lower compared to the 1987-1996 decade.

**Figure 10: Tanzania**



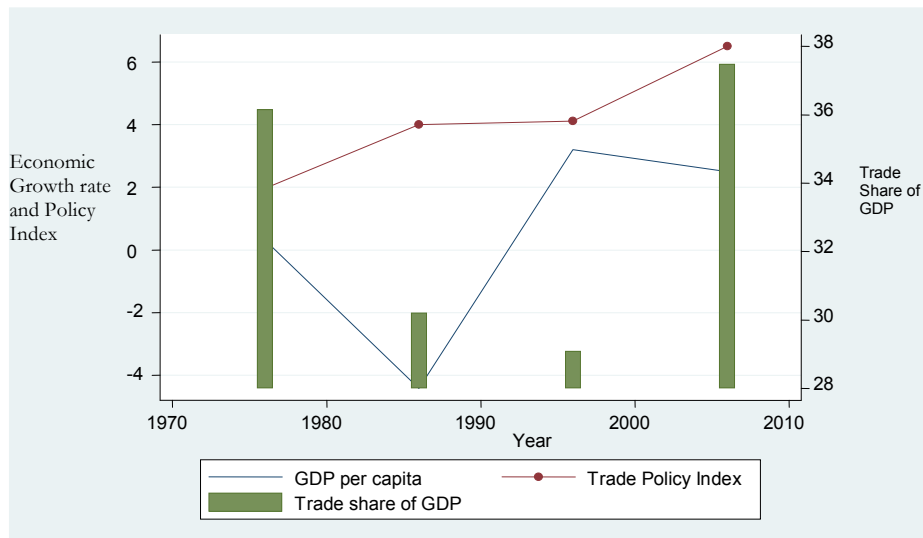
Source: Authors own construction.

The policy measure show declining degree of international trade openness that later improves. The growth of the economy was poor in the 1967-1976 decade

but later improved. International trade openness is also shown to be growth enhancing. The relationship between trade policy openness and economic growth is stronger while that of the outcome measure is weaker.

Figure 11 below show that Uganda’s international trade has been declining during the first three decades, improving in the last decade. The policy measure shows improvement in trade openness. Trade share of GDP plummeted in the first three decades and then rose in the final decade. Also, economic growth declined in the first decade, then improved in the following decades though it shows declining trend in the 1997-2006 decade. Overall, the growth effects of international trade openness can be visualized from the figure. However, trade policy openness measure shows a strong relationship unlike the outcome measure that shows a weaker one.

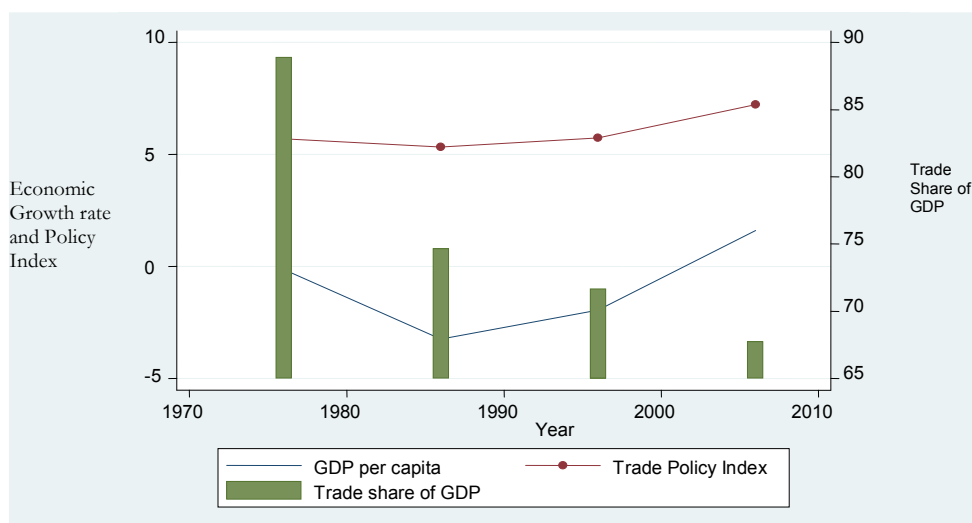
**Figure 11: Uganda**



Source: Authors own construction.

Finally, for Zambia as shown by figure 12 below, economic growth has been improving from low growth rates after experiencing a contraction in the 1970s. Trade share of GDP has been declining over the decades showing no sign of improvement. The policy measure however shows improvement especially in recent decades. The relationship between trade policy openness and economic growth is stronger and that of trade share of GDP is weaker.

**Figure 12: Zambia**



Source: Authors own construction

For all countries, international trade openness exhibits a positive relationship even though in other instances it is either weaker or stronger. International trade openness therefore can stimulate economic growth when adopted comprehensively. The results from the graphical analysis are summarized below;

**Table 3: Summary of the Relationship of between international trade openness and economic growth**

Relationship	Outcome Openness measure	Policy Openness Measure
Weaker	Botswana, Kenya, Malawi, Tanzania, Uganda and Zambia.	Botswana, Kenya and Mauritius
Stronger	Ghana, Mali, Mauritius and Nigeria.	Ghana, Malawi, Mali, Nigeria, Tanzania, Uganda and Zambia.

Table 3 shows that Botswana, Kenya and Mauritius have weaker policy reforms in international trade. Ghana, Malawi, Mali, Nigeria, Tanzania, Uganda and Zambia have undertaken wide policy reforms. The results seem to bear fruit for Ghana, Nigeria and Mali showing increasing trade as a share of GDP. Interesting results are those of Botswana and Mauritius that show a weaker progress on policy reforms, yet they are considered according to Rodrik (1997) as among best

performers in SSA. Mauritius trade has been increasing while Botswana's has been declining. This can be likened with Rodrik's (1997: 5) arguments that Botswana and Mauritius combined both international trade openness and unorthodox policies in other spheres to achieve their economic successes.

From the analysis above, landlockedness seems not to play an enormous role in the economic performance of the sample SSA countries. Overall, the figures are showing similar trends in economic performance for all countries. This effect can be attributed to the countries active participation in COMESA, ECOWAS or SADC that might have improved international trade openness between the countries through reduction of trade barriers. In East Africa, under the EAC common external tariff arrangements, Tanzania and Uganda, for example, trade with Kenya freely, boosting trade in the region.

### **3.3 Methodology and Model Specification**

This section discusses the panel models and shows the selection procedure of the model to be used in this study.

#### **3.3.1 Panel Models**

The panel data models include the random effects (RE) and the fixed effects (FE) models. Using ordinary least squares (OLS) in a panel setting will lead to invalid results (Wooldridge, 2009). Therefore, I will employ either RE or FE model whichever will give consistent estimates in my empirical analysis.

First, I examine the models then explore their strengths and weaknesses before undertaking tests to choose the relevant model for this study. The examination is based on Bollen and Brand (2008), Wooldridge (2009) and Cameron and Trivedi (2009) to illustrate the panel data models.

### (i) Random Effects (RE) Model

The RE model can be specified as follows;

$$Y_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 Z_i + U_i + \epsilon_{it} \quad (1)$$

Where;

$Y_{it}$  is the GDP per capita growth for country  $i$  in time  $t$ .

$\beta_0$  is the intercept that allows assumption that the country specific disturbance term,  $U_i$  has zero mean.

$X_{it}$  is the vector of time-varying regressors (e.g. trade openness, investment, credit, population and industry) for country  $i$  at time  $t$ .

$\beta_1$  is the vector of coefficients that give the impact of regressors on GDP per capita (that is  $X_{it}$  on  $Y_{it}$ ) at time  $t$ .

$Z_i$  is the vector of observed time-invariant regressors for this case the landlocked variable.

$U_i$  is a scalar of all other time-invariant variables that influence GDP per capita.

$\epsilon_{it}$  is the idiosyncratic error term for country  $i$  at time  $t$ .

The three distinct assumptions of the RE model are;

- (a) The RE model assumes that the effects of regressors on the regressand do not change over time.
- (b) The RE model assumes  $U_i$  is a random latent variable that is uncorrelated with idiosyncratic error term and regressors ( $\epsilon_{it}$ ,  $X_{it}$  and  $Z_i$ ) that is  $U_i$  is independent (orthogonal) of all regressors at all time periods.
- (c) The error variance doesn't change over time.

$X_{it}$  for this research are the control variables mentioned earlier while the  $Z_i$  is the time invariant landlockedness variable that is used to proxy for geographical effects on international trade contribution to economic growth of landlocked countries..



## **(ii) Fixed Effects (FE) Model**

The alternative panel model is the FE model where the time invariant country specific error variable is assumed to be correlated with the regressors. The model can be deduced from the RE model and formalized as shown below;

$$Y_{it} = \beta_1 X_{it} + U_i + \epsilon_{it} \quad (ii)$$

The model excludes all time-invariant variables that were captured by the RE model that is  $\beta_2 Z_i$  term. For the FE model, the  $U_i$  is a fixed unknown constant, whereas for the RE model, it is treated as latent variable (Bollen and Brand 2008).

## **(iii) Strengths, Weaknesses and Choice of the Panel Models**

Bollen and Brand (2008: 13, 15), Wooldridge (2009) and Cameron and Trivedi (2009) details the main characteristics of the two panel models. Indeed, Bollen and Brand (2008) show that the most important difference between the two models is that FE model allows  $U_i$  to correlate with the explanatory variables; whereas, REs model do not. The two models assume that the error variance is constant over time. According to them, the importance of RE model is that it can estimate both time variant and time invariant variables unlike the FE model which can only estimate the time-variant regressors. They also argue that the RE model could lead to efficient results than the FE model (*ibid.*)

### **(a) Model choice by Econometric Intuition**

Wooldridge (2009: 493) argues that the FE model produce the best estimates since it allows arbitrary correlation between  $U_i$  and  $X_{it}$  unlike the RE model that do not. But, they observe that if one of the key variables is time-invariant, FE model cannot be used to estimate its effect on the regressand. He further argues that a researcher can use RE estimates unless the Hausman test rejects that the model estimates are consistent (*ibid.*). The FE model otherwise would be a choice to use (Cameron and Trivedi 2009: 260).

Sioum (2002: 22) argue that when the assumption of orthogonality (no correlation) of the individual effect ( $U_i$ ) with the regressors is true, then RE model is preferable to FE model. In addition, he argues that inference in the FE model is country specific to the sample whereas that of RE model inference can be made on countries outside the sample. In this case, the results obtained for the ten SSA countries can be used to infer for the whole region. The use of landlockedness as one of the key variables implies that RE model is the appropriate model for this study. But, formally, the Hausman test is used to test for the most appropriate model. The test is shown below.

### **(b) Hausman Test**

The Hausman test results of which are captured in the appendix C, table C1 show that the overall statistic  $X^2(6)$  is 9.38 and has a p-value of 0.1534 greater than 0.05 accepting the null hypothesis that the RE estimates are consistent, hence appropriate for this study. Heteroscedasticity and Wald tests are shown in tables 4, 5, 6 and 7. The Wald tests have the p-value 0.000 showing that all the variables are jointly significant and heteroscedasticity tests accept that the variables have constant variance or homoscedastic. The RE model is used in the following section in the context of endogenous growth models.

### **(c) Growth Models**

Using the RE model specification, I design Romer-type endogenous growth models as shown below;

$Growth_{it} = f(inv_{it}, pop_{it})$ ; which can be rewritten as;

$$Growth_{it} = B_0 + B_1 inv_{it} + B_2 pop_{it} + V_{it} \quad (iii)$$

The model is extended to include; (a) international trade openness measures; (b) control variables; and (c) interaction terms to capture the effect of contemporaneous policies and/or sectors shown in models (iv) to (vi) below. Similar specifications were implemented by Chang *et al.* (2005) although they used dynamic panel models. Model (vii) represents neoclassical-type model used to examine income convergence in SSA.

$$\text{Growth}_{it} = B_0 + B_1 \text{inv}_{it} + B_2 \text{pop}_{it} + B_3 \text{OPEN}_{it} + V_{it} \quad (\text{iv})$$

$$\text{Growth}_{it} = B_0 + B_1 \text{inv}_{it} + B_2 \text{pop}_{it} + B_3 \text{fin}_{it} + B_4 \text{industry}_{it} + B_5 \text{OPEN}_{it} + B_6 \text{Landlocked}_{it} + V_{it} \quad (\text{v})$$

$$\text{Growth}_{it} = B_0 + B_1 \text{inv}_{it} + B_2 \text{pop}_{it} + B_3 \text{fin}_{it} + B_4 \text{industry}_{it} + B_5 \text{OPEN}_{it} + B_6 \text{Landlocked}_{it} + B_7 \text{OPEN}_{it} * \Phi_{it} + V_{it} \quad (\text{vi})$$

$$\text{Growth}_{it} = B_0 + B_1 \text{inv}_{it} + B_2 \text{pop}_{it} + B_3 \text{fin}_{it} + B_4 \text{industry}_{it} + B_5 \text{OPEN}_{it} + B_6 \text{Landlocked}_{it} + B_7 \text{OPEN}_{it} * \Phi_{it} + \text{gdp}_{\text{cap}67} V_{it} \quad (\text{vii})$$

Where these variables for country  $i$ , in time period  $t$  are;

*Growth* is GDP per capita.

*inv* is the investment.

*pop* is population.

*fin* is domestic credit for country.

*industry* is share of industry to GDP

*OPEN* represents the two measures of openness used in this study that is “openwb” and “policy”.

*Landlocked* is a time invariant variable that compares countries which are landlocked or not.

$\text{OPEN}_{it} * \Phi_{it}$  is the interaction term between the regressors and trade openness.

$\text{gdp}_{\text{cap}67}$  is initial GDP per capita in 1967.

$V_{it} = U_i + \epsilon_{it}$  is the composite error term

Based on the above models, regressions estimation results are discussed in detail in the section below.

### 3.4 Interpretation of the Estimation Results

This research is based on endogenous growth theory. Neoclassical growth theories provide the theoretical base and are used to compare and examine whether the sample of countries can experience income convergence. A critical element of the endogenous growth theory is its prediction of long run growth effects for developing countries of, for example, international trade openness. This is due to its assumption of increasing returns unlike the exogenous growth theories that predicted convergence at steady states by countries due to decreasing returns to scale.

Tables 4 and 5 show the results of the econometric regressions of the effects of both trade policy and outcome measures of international trade openness on economic growth in SSA using RE model. First, table 4 regression show results without lags, and then table 5 presents results with lags which will help mitigate the biases posed by endogeneity problems anticipated in the international trade openness measures and all variables that are shares of GDP such as investment, industry and credit offered by banks in the domestic market.

The FE model results-though not a choice of this study-are shown in tables 6 and 7 in the appendix E with and without lags respectively. Lagging methodology and others suggested such as use of geographical characteristics are good but not sufficient in dealing with endogeneity, but are currently commonly used. Ten year lags have been implemented since the data has been averaged into four decadal periods and led to a loss of a decade of observations. The loss of observations is a weakness with lagging methodology.

The landlocked variable will reflect in part, the geographical features that impacts negatively on trade performance and can inhibit economic growth. The results are in part consistent with those that have been shown in the literature review, for example, that international trade openness promotes economic growth. It is however not in line with the new trade and growth theories' suggestions of some form of trade protection to complement international trade openness. However, contrary to Yanikkaya's (2002) findings, for example, the results do not find any support for trade protection in SSA as a means to enhance economic growth.

The results answer the research questions showing that international trade openness coupled with improvement of contemporaneous policies and/or sectors can accelerate the pace of economic growth in SSA. The results have been presented in both tables in models 1 to 9. On each trade policy and outcome openness measures, the regressions have taken the same format as shown by models in 3.3.1 (c) above. First, a general growth model is regressed, and then international trade openness variables; control variables; interactions; and initial income are included respectively. The FE results do not show results for landlockedness and initial income which are time invariant variables. The results are discussed below first start-

ing with table 4 and table 5 and then briefly FE results in tables 6 and 7 in appendix E.

### 3.4.1 International trade openness

This research as earlier noted use the outcome openness measure and EFW trade policy index that proxy for trade policy openness. A lower policy index according to EFW index, for example, 1 indicates a lower degree of international trade openness or autarky and as the index increases towards 10, it indicates a widening degree of trade openness in a country. The index can be interpreted by assuming 10 percentage points per unit of the index to make up 100% of empirical analysis on the trade policy openness measure.

**Table 4: Random Effects Estimation: Regression without lags**

General Model		Trade Policy openness measure models				Outcome openness measure models			Neoclassical Models	
Models	1	2	3	4	5	6	7	8	9	
VARIABLES	gdpcapita	gdpcapita	gdpcapita	gdpcapita	gdpcapita	gdpcapita	gdpcapita	gdpcapita	gdpcapita	
inv	0.141** (0.0674)	0.114* (0.0637)	0.137* (0.0699)	-0.546 (0.361)	0.0833 (0.0699)	0.0763 (0.0668)	-0.0223 (0.233)	-0.513 (0.35)	-0.0498 (0.243)	
pop	-0.65 (0.73)	-0.0889 (0.714)	-0.486 (0.685)	-0.905 (0.6)	-0.147 (0.735)	-0.138 (0.639)	-0.169 (0.681)	-0.0713 (0.753)	-0.226 (0.819)	
fin			-0.0317 (0.0193)	-0.0274 (0.0186)		-0.0628*** (0.0164)	-0.0566*** (0.0188)	-0.0520** (0.0229)	-0.0587** (0.0245)	
industry			-0.031 (0.0415)	-0.0288 (0.0361)		-0.0803** (0.0402)	-0.0839* (0.0443)	-0.0286 (0.035)	-0.0790* (0.0433)	
landlocked			-0.911 (1.052)	-1.252 (0.82)		-0.425 (0.753)	-0.414 (0.862)	-0.876 (0.824)	-0.493 (0.829)	
policy		0.781*** (0.282)	0.831*** (0.319)	-0.0675 (0.531)				0.0403 (0.518)		
openwb					0.0416** (0.0195)	0.0801*** (0.022)	0.0658* (0.038)		0.0633* 0.037	
policyinv				0.117* (0.0606)				0.105* (0.0591)		
openwbinv							0.00129 (0.0028)		0.00161 (0.00302)	
gdpcap67								0.000976* (0.00056)	0.0000345 (0.000707)	
Constant	1.748 (2.077)	-3.708 (2.753)	-1.034 (2.853)	5.07 (3.416)	-1.697 (2.558)	-0.147 (2.35)	0.816 (3.333)	1.895 (3.78)	1.178 (3.904)	
Observations	40	40	40	40	40	40	40	40	40	
Heteroskedasticity test, iid	0.2329	0.3536	0.4319	0.4701	0.3006	0.4705	0.3244	0.5717	0.4179	
Wald Test (X <sup>2</sup> )	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Overall R <sup>2</sup>	0.2114	0.3045	0.4217	0.4956	0.3115	0.5289	0.5328	0.5406	0.5338	

Source: Authors own construction from RE regressions.

-\*\*\* Significant at 1% level; \*\* Significant at 5% level; \*Significant at 10% level.  
-Standard errors in parentheses.

In Table 4 above, the policy measure significantly shows that international trade openness can stimulate economic growth. The result of models 2 and 3 show

that reduction of trade barriers can significantly contribute to economic growth. A one percentage point increase on the degree of international trade openness can increase the growth of the economy by about 7.81% and 8.31% respectively in a decade. This implies that lowering trade barriers that constitute the index such as taxes to international trade, regulatory barriers and capital market controls in SSA region, like in any developing regions, can be economic growth enhancing. The results show increases in economic growth rates on average every decade to higher rates<sup>4</sup>. The results of models 4 and 8 are insignificant.

This result in part, is contrary to the prediction of the “new” trade and growth theories that some level of trade protection in selected sectors is necessary for developing countries to grow their economies. In table 5, the results show that trade policy openness relates positively with economic growth as expected although insignificantly. The FE results in models 2 and 3 of table 6 in the appendix E show that economic growth can be stimulated by 9.41% and 10.32% due to a one point percentage increase in trade policy openness in a decade respectively. They are both significant at 5% significance level. In table 7, the results are all insignificant.

The use of outcome and policy measures of international trade openness was intended to undertake a comparative study and obtain robust results. Tables 4 and 5 show that using trade share of GDP as international trade openness measure produces statistically significant results. Model 5, 6, 7, and 9 show that a one percentage point increase in the trade share of GDP will respectively lead the growth of the economy every ten years by 0.0416%, 0.0801%, 0.0658% and 0.0633% significant at 5%, 1%, and 10% significance levels respectively.

In table 5, the economic growth will increase in a decade at a rate of 0.0566%, 0.0973%, 0.0917% and 0.0954% with significance levels at 10%, 1%, and 10% respectively. In table 6, FE results show that increase of trade shares of GDP by one percentage point can increase economic growth among the sample countries

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<sup>4</sup> For example, if the SSA growth rate is 2%; 7.81% increase in economic growth means a rise from 2% to 2.16% every decade on average  $\{(2 \times 107.81) / 100\}$  etc.

by 0.0315% and 0.0767% respectively at 10% and 1% significance levels. Although the estimated economic growth effects are lower, trade policy openness measure show a higher contribution to economic growth compared to the outcome openness measure.

**Table 5: Regression with lags to deal with endogeneity problem**

General Model	Trade Policy openness measure models				Outcome openness measure models			Neoclassical Model	
	1	2	3	4	5	6	7	8	9
VARIABLES	gdpcapita	gdpcapita	gdpcapita	gdpcapita	gdpcapita	gdpcapita	gdpcapita	gdpcapita	gdpcapita
inv	0.157** (0.0778)	0.113 (0.0804)	0.155 (0.0957)	-0.837* (0.474)	0.0504 (0.099)	0.0457 (0.0981)	0.0124 (0.279)	-0.755 (0.475)	-0.0102 (0.287)
pop	-0.35 (0.869)	0.0791 (0.889)	-0.802 (0.915)	-1.181 (0.807)	0.662 (1.038)	0.337 (0.929)	0.343 (0.969)	-0.419 (1.136)	0.138 (1.129)
fin			-0.0481* (0.0267)	-0.0204 (0.0288)		-0.0697*** (0.0223)	-0.0658** (0.0263)	-0.0428 (0.0353)	-0.0611* (0.034)
industry			-0.0428 (0.0567)	-0.0627 (0.0502)		-0.0892* (0.0498)	-0.0913* (0.0532)	-0.0443 (0.0518)	-0.1 (0.0619)
landlocked			-0.881 (1.257)	-1.379 (1.081)		-0.537 (0.957)	-0.525 (1.038)	-1.015 (1.103)	-0.701 (1.102)
policy		0.701 (0.444)	0.768 (0.473)	-0.583 (0.759)				-0.369 (0.78)	
openwb					0.0566* (0.0328)	0.0973*** (0.0322)	0.0917* (0.0528)		0.0954* (0.0534)
policyinv				0.179** (0.0835)				0.156* (0.0854)	
openwbinv							0.000456 (0.00348)		0.00081 (0.00366)
gdpcap67								0.000768 (0.00077)	-0.000311 (0.000938)
Constant	0.377 (2.396)	-3.788 (3.502)	0.63 (3.89)	8.469* (4.767)	-4.635 (3.761)	-1.741 (3.485)	-1.474 (4.402)	4.927 (5.969)	-0.646 (5.013)
Observations	30	30	30	30	30	30	30	30	30
Heteroskedasticity test, iid	0.2329	0.3536	0.4319	0.4701	0.3006	0.4705	0.3244	0.5717	0.4179
Wald Test (X <sup>2</sup> )	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Overall R <sup>2</sup>	0.2313	0.2816	0.4435	0.5450	0.3396	0.5597	0.5598	0.5657	0.5623

Source: Authors own construction from RE regressions.

-\*\*\* Significant at 1% level; \*\* Significant at 5% level; \*Significant at 10% level.  
-Standard errors in parentheses.

Trade policy reforms if strengthened in SSA therefore, can accelerate the pace of economic growth to the desired levels. Overall, it is evident from these results that international trade openness can be good for economic growth of SSA countries as it did for the East Asian countries. However, in order to further understand other necessary conditions for economic growth to occur, the study also focuses on the results obtained for the endogenous growth variables; investment and population and control variables industry and credit.

### 3.4.2 Investments

Investments include both local investments and FDI's growth as a share of GDP in SSA. Investments have been identified as “the engine of economic growth” by development economists, policy makers, world leaders and international organizations such as World Bank and United Nations. Both neoclassical and endogenous growth theories have predicted that poor regions of the world such as SSA attract higher profitability to investments, but investment activities are lower than expected. First, in Table 4, models 1, 2, and 3 show investment as a critical channel through which economic growth can be achieved. This is because a one percentage point increase in investments can stimulate economic growth by about 0.141%, 0.114%, and 0.137% respectively, results that are significant at 5%, and 10% significance levels. Models 4 to 9 show statistically insignificant results for investment. The significant results for investment discussed above are related to trade policy openness measures showing that trade policy reforms to reduce trade barriers in SSA can enhance economic growth in the long run.

In Table 5, when variables are lagged, only model 1 and 4 show statistically significant and contradicting results for investment. First, in model 1, a one percentage point increase in investments in SSA will lead to 0.157% increase in economic growth, statistically significant at 5% significance level. Second, model 4 shows a decline of 0.837% in economic growth significant at 10% level. The negative effect of investment on economic growth shown in model 4 can be associated with a weaker investment environment. All the other results are statistically insignificant. The FE results contained in tables 6 and 7 in the appendix E are all insignificant except that of model 1 which shows an economic growth increase of 0.132% for a unit percentage point increase in investments significant at 5% significance level.

Overall, the results are in line with endogenous growth theory which predicts that factors such as investment can contribute to a long run economic growth among developing countries. From the results, this paper can deduce that the effect of investment in SSA on economic growth is lower than expected. This can be attributed to the existing poor and uncertain investment environment in SSA like in many developing countries. In these countries, for example, the poor and uncertain



investment environment can be attributed to factors such as insecurity perception, stringent trade regulatory framework, inadequate modern technology, underdeveloped human capital and physical infrastructure, for example, education and medical services and roads, railways, airports and ship ports respectively. These results may therefore be a reflection of inadequate reforms in SSA to improve the investment environment.

### **3.4.3 Population**

The population growth seems ambiguous in its contribution to increase or decrease in economic growth in SSA. The regression results in both tables 4 and 5 are statistically insignificant and have a negative effect on economic growth. The same applies to FE results in tables 6 and 7.

### **3.4.4 Domestic credit**

The results for domestic credit offered by banks to investors and traders in SSA show a negative effect on economic growth contrary to the expected positive effect. In table 4, models 6, 7, 8 and 9 are the only statistically significant results at 1%, 1% and 5% respectively. This implies that a one percentage point increase in domestic credit can lead to a decline in economic growth by 0.0628%, 0.0566%, 0.0520% and 0.0587% respectively. In table 5, the results show a negatively statistically significant effect of domestic credit on economic growth in models 3, 7, and 9 at 10%, 5%, and 10% respectively. For this case, a percentage point increase in domestic credit can result in an economic growth decline of 0.0481%, 0.0658% and 0.0611% respectively.

The result of model 6 is however positive and statistically significant at 1% significance level. It shows that a one percentage point increase in domestic credit can lead to an economic growth of 0.0697%. The rest of the results are statistically insignificant. Tables 6 of the FE estimation shows in models 6 and 7 that a one percentage point increase in domestic credit can lead to a decline in economic growth by respectively 0.0450% and 0.0349% at 1% and 10% significance levels respectively. The results are insignificant in table 7.

The results show unexpected negative effect on economic growth can be associated in part, with inadequacy and costs of credit and overall inhibitive investment environment. Provision of affordable domestic credit to investors for example can stimulate investments improving the effectiveness of international trade openness in increasing economic growth. Like in many developing countries, the financial sector in SSA is underdeveloped and domestic credit is scarce and expensive. Inadequacy or low access to affordable credit by SSA investors and traders can be attributed to the growth inhibiting effects of the domestic credit. These effects can also be said to constitute the poor investment environment in SSA that has led to the contraction of the investment sector.

### **3.4.5 Industry**

The result for the industry show that in SSA industrial activity slows down the pace of economic growth. In table 4, models 7, 8 and 9 are statistically significant at 5% and 10% significance level respectively. A one percentage point increase in industrial activity can lead to a decline in economic growth by 0.0803%, 0.0839% and 0.0790% respectively. In table 5, it can lead to an economic growth decline of 0.0892% and 0.0913% both significant at 10% respectively. For the FE results in tables 6, a one percentage point increase in industrial activity can lead to economic growth decline of 0.0804% and 0.0833% respectively significant at 10% significance level. The rest of the results are statistically insignificant.

The industry variable has been used in this study to denote the level of industrialization and technological capacity in SSA. The results show a weak industrial sector that cannot adequately support a rapid economic growth in SSA. In addition, the industrial sector production can be argued to be low due to lack of modern technology and cannot contribute adequately to the effectiveness of international trade openness' contribution to economic growth. This can denote low technological and industrial capacity.

The results are particularly significant for the trade share of GDP which can show the nature of trade earnings. Exports trade in SSA might be dominated by exports of primary products that do not attract much earnings compared to manu-

factured products. The results can also be attributed to past and present SSA's industrial experience. SSA Africa subjected its industrial sector to a highly protected regime during the import substitution industrialization (ISI) era such that trade liberalization exposed the infant industry to stiff competition (Dornbusch 1992). In addition, the results could reflect the low levels of investments either local or FDI in the industrial sector in SSA. The effect of technological change suggested in the endogenous growth theory according to these results might not have been achieved in SSA. The technological development can be said to be rudimentary in SSA.

### **3.4.6 Landlockedness**

The results of landlockedness although negative as expected are not statistically significant. The countries geographical characteristics can lead lower economic growth compared to countries with coast lines.

### **3.4.7 International trade openness and Investment Interaction**

The interaction of international trade openness and investment is intended to answer the research sub-question that seeks to examine the necessary conditions for international trade openness to be more beneficial to SSA. The results above show that the underdevelopment of the financial (domestic credit) and industry sectors partly reduce the effectiveness of international trade openness contribution to economic growth. Interactions are intended to show the effect of contemporaneous policy and/or sector reforms on economic growth.

In tables 4, 5 and 6, the results are positive and statistically significant at 10% level for the interaction of trade policy openness measure and investment. The interaction of investment and the outcome openness measure are all insignificant. In table 4 and 5, the result shows that a one percentage point increase in trade policy openness and investments can increase economic growth by 0.0117% and 0.0105% and 0.0179% and 0.0156% respectively in SSA. In table 6, the results show growth of the economy by 0.0989%. In model 8 of both tables 4 and 5, the interaction between the trade policy openness and investment are both positive and significant at 10% significance level. The results respectively show that a one percentage point

increase of the interaction can stimulate economic growth by respectively 0.105% and 0.156%.

Although the results are low, they show that improvement of contemporaneous policies and/ or sectors can improve the effectiveness of international trade openness in accelerating the pace of economic growth in SSA. International trade openness therefore can contribute more to economic growth when reforms are undertaken to improve the investment environment to the desired international standards.

### **3.4.8 Income Convergence**

The neoclassical growth models predicted that countries that have similar characteristics can converge at a steady state GDP per capita. Overall, the results show that SSA has a positive relationship between initial GDP per capita and economic growth. However, all other results are statistically insignificant except model 8 of table 4 that show a very low rate of divergence significant at 10% level. The result disagrees with neoclassical model prediction of income convergence of similar countries such as SSA. Although not used in this study, GMM panel or dynamic models are best placed in examining income convergence or divergence of countries or regions.

The results of this chapter empirically showed that international trade openness can promote economic growth if sufficiently adopted in SSA. In addition, the role of contemporaneous policy and/or sector improvement can enhance economic growth to the desired levels. Chapter 4 below discusses the policy implications of the effects of international trade openness to SSA and conclusions of the study.

## **Chapter 4 Policy Implication of the Study to SSA**

The theoretical, literature and empirical analysis have been able to answer the research questions of this study. First, international trade openness stimulates economic growth in SSA. International trade openness can promote economic growth; but, when contemporaneous policies/and or sector-wide reforms are undertaken to improve investments, access to affordable credit and industrial capacity, international trade openness can rapidly enhance economic growth in SSA. However, due to underdeveloped investment, financial and industrial sectors among other sectors, the contribution of international trade openness in accelerating the pace of economic growth in SSA is below expectation.

The endogenous growth theory identifies that for a country to achieve self generated growth, focus should be placed on improving, for example, human capital, technology, and R&D and international trade openness. Other critical areas of intervention can be physical infrastructure, local and international business regulations, deepening democratic space and observance of the rule of law (see Rodrik 1997). However, the focus of this research is limited to reforms to improve international trade openness, investment environment (finance and policy), Industrial development (industry) and human capital (population). These reforms if well implemented can increase the effectiveness of international trade openness in catalyzing a rapid economic growth in SSA.

### **4.1 International Trade Policy Openness**

Trade policy openness index or measure as noted earlier is constructed from trade barriers such as international trade tax, tariffs and NTBs. Trade openness reforms should be undertaken because it can enhance economic growth to desired levels that propel SSA to a high income region in the next few decades. SSA countries need to undertake reforms aimed at reducing trade barriers to induce more international trade within the region and with other regions, for example, Africa, Asia, Europe, Latin American and North America. Policy reforms that can be undertaken include reduction of international trade tax, tariffs and NTBs.

The empirical analysis shows that greater degree of international trade openness can generate rapid economic growth in SSA. Trade policy reforms can also increase trade within and between countries and regions, therefore, contributing to increase in economic growth. This will enhance exposure to the international experience and can lead to transfer of technology and knowledge to supplement local technological development. The imported technology should be adapted to the local situation of SSA so that supported by the local pool of human capital, more technological innovations and inventions can be achieved. However, absolute exposure to international environment can pose a threat to the nascent economic growth process of SSA and safety nets should be put in place to guard against such impediments. SSA countries should formulate and implement open trade policies coherent with the requirements of the WTO. However, if need be, international trade protection should conform to the requirements of the WTO so as to ensure that free and fair international trade is upheld. A detailed discussion of the implication of contemporaneous policy and/or sector reforms to SSA that can, in part, stimulate rapid economic growth is provided below.

## **4.2 Investment Environment**

A conducive investment environment to international standards can be a prerequisite to economic growth in SSA according to the results of this study. This finding is in line with development economic literature and the theories with regard to the relationship between international trade openness and economic growth. A good investment environment will encourage generation and also expansion of domestic investments and FDI's into the SSA economy. This will enhance economic growth in SSA. These reforms however have not reached the threshold required to sustainably support international trade openness that can stimulate rapid economic growth. Some of the reforms required for a good investment environment are discussed below.

### **(i) Improve investment regulations**

SSA Africa should focus, for example, on review of investment regulations to stimulate investments in the regions and attract more FDI's from the rest of the world. The regulations to be improved should include those that are required to

start and operate investments freely to tap the local potential and allow the transfer and adaptation of, for example, new ideas, skills, and technology in SSA. This will supplement locally generated knowledge and technology. For example, the investment and/or business regulation index of the EFW index indicates that areas to be improved include reducing tax compliance costs, and licensing restrictions. This will reduce the costs associated with operation of investments, therefore, making the countries more open to FDI and modern technology, *inter alia*. The investment regulations instituted should be those that can ensure health and safety of the people and environmental sustainability rather than revenue collection, as it were.

Improvement of investment environment will accelerate the pace of industrialization in SSA. In addition, it will promote creation of new and expansion of existing domestic investments and increase the inflow of FDI into SSA. Improvement of the investment environment therefore, will enhance the effectiveness of international trade openness in SSA's quest to enhance economic growth in a few decades.

**(ii) Improve the financial sector**

A buoyant financial sector can, in part, contribute to a good investment environment. The financial sector which includes insurance and banking services (auxiliary services) are according to literature very important for stimulating economic activities in a country or region like SSA. A strong financial sector is important in enhancing economic growth because it can offer, for example, affordable credit to traders and investors. Empirical results in this study in tables 4, and 5 shows that SSA's financial sector is weak because it shrinks the growth of the economy in the region. The sector therefore needs further reforms to improve to international standards, to be able to sustainably provide affordable credit to traders and investors, among other financial services. Financial sector openness, for example, can enhance international trade openness which is good for economic growth of SSA countries.

### **(iii) Human Capital Development**

Human capital development also constitutes an enabling investment environment for investments to thrive, because it is a source of human resources. Population in this study, in part, has been used to proxy for the growth of the stock of human resources and market for tradable goods. These are essential elements of a good investment environment. Endogenous growth theory underscores human resources development as very important element of endogenous growth in the developing world. In addition, the neoclassical growth theory suggests that the stock of human resources can help in the transmission and adaptation of technology besides being a market for tradables. Endogenous growth theory and economic literature above suggests transfer of skills and knowledge that can improve, for example, the technological capacity of a country or region. The transmission of technology cannot be realized in an investment environment lacking in high quantity and quality human resources.

Both the endogenous and neoclassical theories agree on the effect of human capital in fostering economic growth achieved either endogenously or exogenously respectively. The availability of both skilled and unskilled labour is good for investment and industrial growth in SSA. Therefore, for population to provide an impetus to economic growth through creation of a conducive investment environment in SSA, its quality and quantity should be improved. There is need for SSA countries to expand and build better hospitals, schools, colleges, universities and R&D and technological centres of excellence to improve the education of the people. Training on mathematics, sciences and technology should be given a priority because of their importance, for example, in technology generation, adaptation and upgrading. In addition, the countries should provide more financial support to students pursuing higher education.

### **4.3 Industrial development**

The empirical results of this study in tables 4 and 5 shows that industrial and technological capacity is underdeveloped in SSA and can only contribute to slowing down the process of economic growth in SSA. Industrialization can be achieved



through among other channels, technological and infrastructure improvement and/or overall improvement of the investment environment. SSA relies on exports of primary products indicating her low technological capability. Industrial development can increase trade in manufactured tradables that attracts higher earnings capable of propelling economic growth more than primary products. According to endogenous growth theory, technological innovation and invention can be achieved locally if countries enhance and utilize, for example, their human capital. Enhancement of the human capital is important in technological generation, adaptation and upgrading. Industrial development can also be achieved through transmission of technological knowledge from among other sources, the FDI's.

#### **4.4 Conclusions**

The focus of this study was to investigate the effect of international trade openness on economic growth. In addition, the study examines the necessary conditions for international trade openness to be more beneficial to economic growth in SSA. The theoretical and some economic literature arguments for trade protection to enhance economic growth seems valid but are not supported by the results of this study. This study shows the importance of international trade openness and contemporaneous policies and/or sectors in the SSA's quest to achieve rapid economic growth. The objective of the study has been achieved through the empirical findings that have answered the research questions. The empirical results of this study show that international trade openness if improved with contemporaneous policies and/or sectors, which stimulates a robust economic growth, can transform SSA into a *newly industrializing region* in a few decades to join the league of industrializing Asian economies.

The effect of contemporaneous policies and/or sectors in increasing international trade openness contribution to economic growth has been accentuated by this research. International trade openness and contemporaneous sector-wide policy reforms are suggested as critical policy options for SSA, so that, if comprehensively pursued can turnaround, revamp, and increase economic growth to the desired levels. The study focused on investment, domestic credit by banks (finance), and industry, population and landlockedness as many among critical areas of inter-

vention to foster economic growth in SSA. The reforms can be implemented in the context of the endogenous growth theory which seems to be appropriate for SSA since it predicts long run economic growth that is derived locally, and can be further improved through international trade openness.

The study found out that even though international trade openness contributes to economic growth, its full potential has not been achieved. This can be attributed to underdevelopment of the investments, financial, human resources, and industrial sectors in SSA. The interaction effect of policy measures of openness and investment show, in part, that contemporaneous policies and/or sectors are weak. For example, the investment environment cannot adequately support investments that can spur rapid economic growth in SSA. The financial sector has also been shown to be underdeveloped and cannot be growth enhancing as it should be. In addition, SSA industrial development is rudimentary marked by low levels of technological activity. The research has also found out that contribution of population growth to economic growth in the region is weak, if not ambiguous. The growth inhibitive effects of landlockedness attributed to high transaction costs between the ship ports of the entry countries and the landlocked countries, is also ambiguous in this study.

This research therefore suggests improvement of international trade openness coupled with contemporaneous policy and/or sector-wide reforms to enhance the stock of human resources, investments, credit and industrial capacity in order to accelerate the pace of economic growth in SSA. Further, the results in tables 4 and 5 show that trade barriers such as international trade taxes, tariffs and non-tariff barriers should be removed to improve the degree of international trade openness. However, the rules of the WTO should be adhered to if trade protection of the sectors is needed by SSA. In addition, protection can be acceptable only if they are intended to safeguard health and safety of the people and ensure the conservation of the environment.

The investment environment should be improved to, for example, strengthen the financial sector so that it can be able to provide affordable credit to traders and investors. Traders and investors can therefore easily establish, expand and sus-

tain local investments and FDIs. This can generate new ideas, skills, knowledge and technology, that should be nurtured, adapted and spread among SSA economies. A good investment environment can also increase the inflow of FDIs which will supplement the local skills, knowledge and technical capacity as predicted by both neoclassical and contemporary trade and growth theories.

The study also has identified gaps existing in international trade openness measures used and econometric measures to curb the problem of endogeneity that has been pointed out as a major threat in macro studies, for example, the study of the effect of international trade openness on economic growth. There is therefore need for further research to identify widely accepted international trade openness measure and endogeneity remedy that can lead to more robust results. The study shows, in part, use of numerous measures of international trade openness. The construction of an openness measure that can capture existing ones would further improve empirical results. Further, construction of a single measure to curb endogeneity problems can add to the stock of knowledge in international trade-economic growth nexus literature.

Finally but not least, the studies of international trade openness effects on economic growth can also be examined using micro rather than macro data to in part deal with endogeneity problem and provide empirical results providing undisputed evidence. International trade openness is indeed important to economic growth of SSA countries. The sooner SSA meticulously adopts policies to further open their economies, as well as improve contemporaneous policies and/or sectors, the earlier it can realize the desired economic growth.

## References

- Alam, A. (1994), "The New Trade Theory and Its Relevance for Developing Countries", *World Bank Policy Research Working Paper*, WPS1274, pp. 1-33.
- Barro, R. (1991), "Economic Growth in a Cross Section of Countries", *The Quarterly Journal of Economics*, Vol. 106, No. 2, pp. 407-443.
- Ben-David, B. and M. Loewy (1998), "Free Trade, Growth, and Convergence", *Journal of Economic Growth*, Vol. 3, July, pp. 143-170.
- Billmeier, A. and T. Nannicini (2007), "International trade openness and Growth: Pursuing Empirical Glasnost", *International Monetary Fund (IMF) Working Paper*, No. WP/07/156, PP. 1-52.
- Bollen, K. and J. Brand (2008), "Fixed and Random Effects in Panel Data Using Structural Equations Models", *California Center for Population Research On-Line Working Paper Series*, PWP-CCPR-2008-003, pp.1-70 (Online Paper), Available: [http://cfs.ccpr.ucla.edu/ccprwpseries/ccpr\\_003\\_08.pdf](http://cfs.ccpr.ucla.edu/ccprwpseries/ccpr_003_08.pdf) (Accessed 1<sup>st</sup> September, 2009, 10.00 a.m.).
- Bora, B., P. Lloyd and M. Pangestu (2000), "Industrial Policy and World Trade Organization", *UNCTAD Policy issues in International trade and commodities*, Study Series No. 6, pp. 1-45.
- Cameron, A. and P. Trivedi (2009), *Microeconometrics Using Stata*, Texas: Stata Press Publication.
- Chang, R., L. Kaltani, N. Loayza (2005), "Openness can be good for Growth: The Effect of Policy Complementarities", *World Bank Policy Research Working Paper*, WPS3763, pp. 1-39.
- Chen, P. and R. Gupta (2006), "An Investigation of Openness and Economic Growth Using Panel Estimation", University of Pretoria, Working Paper No. 2006-22 (Online Paper), Available: [http://www.up.ac.za/dspace/bitstream/2263/4528/1/Chen\\_Investigation\(2006\).pdf](http://www.up.ac.za/dspace/bitstream/2263/4528/1/Chen_Investigation(2006).pdf) (Accessed 20<sup>th</sup> April 2009, 900 hours).
- "Common Market for Eastern and Southern Africa" (2009), <http://www.comesa.int/> (Accessed 12<sup>th</sup> October 2009, 0900 hours).
- Cypher, J. and J. Dietz (2008), *The Process of Economic Development, 3<sup>rd</sup> Edition*. New York: Routledge Publishers.
- Deepak L. and H. Myint (1998), *The Political Economy of Poverty, Equity and Growth: A Comparative Study*. New York: Oxford University Press.
- Dollar, D. (1992), "Outward-oriented developing economies really do grow more rapidly: Evidence from 95 LDCs, 1976-1985", *Economic Development and Cultural Change*, No. 072357, Vol. 40(3), pp. 523-44

- Dornbusch, R. (1992), "The Case for Trade Liberalization in Developing Countries", *Journal of Economic Perspectives*, Vol. 6, No. 1, pp. 69-85.
- Easterly, W. and R. Levine (1995), "Africa's Growth Tragedy: A Retrospective, 1960-89", *World Bank Policy Research Paper*, WPS1502, pp. 1-41.
- Edwards, S. (1993), "Openness, Trade Liberalization, and Growth in Developing Countries, Journal of Economic Literature", *Journal of Economic Literature*, Volume 31, Issue 3, pp. 1358-1393.
- Edwards, S. (1998), "Openness, Productivity and Growth: What do we really know?", *The Economic Journal*, Vol. 108(447), pp. 383-398.
- Estevadeordal, A. and A. Taylor (2008), "Is the Washington Consensus Dead? Growth, Openness, and the Great Liberalization, 1970s-2000s", *National Bureau of Economic Research*, August, Working Paper 14264, pp. 1-44.
- Foss, N. (1998), "The New Growth Theory: Some Intellectual Growth Accounting", *Journal of Economic Methodology*, 5: 2, pp. 223-246.
- Frame, I., A. Thomas, A.C. Holman, H. Canton, P. McLntyre, S. Chapman, and J. Maher (eds) (2009) *Africa South of Sahara 2009*, 38<sup>th</sup> Edition, London: Routledge Publishers.
- Frankel, J. and D. Romer (1999), "Does Trade Cause Growth?", *The American Economic Review*, Vol. 89, No. 3, pp. 1-21.
- Greenaway, D., W. Morgan, and P. Wright (1998), "Trade Reform, Adjustment and Growth: What does the Evidence tell us?", *The Economic Journal*, Vol. 108, No. 450, pp. 1547-1561.
- Grossman, G., and E. Helpman (1991), "Trade, Knowledge Spillovers and Growth", *European Economic Review*, Vol. 35, pp. 517-526.
- Grossman, G., and E. Helpman (1990), "Trade, Innovation and Growth", *The American Economic Review*, Vol. 80, No. 2, pp. 86-91.
- Gwartney, J., R. Lawson and S. Norton (2002-2008), "Economic Freedom of the World", *Annual Reports 2002-08*, Chapter 3: The Fraser Institute (Online reports), Available: <http://www.freetheworld.com/reports.html>, (Accessed 21<sup>st</sup> July 2009, 2100 hrs).
- Harrison, A. (1994), "Openness and Growth: A Time Series, Cross Country Analysis for Developing Countries", *Journal of Development Economics*, Vol. 48, 419-447.
- Jones, C. (1995), "Time Series Tests of Endogenous Growth Models", *The Quarterly Journal of Economics*, Vol. 110, No. 2, pp. 495-525.
- Karski, M. (2001), "Does the Degree of Openness of an Economy Affect its Economic Growth?; Openness and Growth: A Panel Data Analysis for Developing Countries", (Online Paper), Available: <https://papyrus.bib.umontreal.ca/jspui/bitstream/1866/952/1/a1.1g862.pdf> (Accessed 20<sup>th</sup> April 2009, 0800 hours).

- Kibritcioglu, A. (2002), "On the Smithian Origins of "New" Trade and Growth Theories", *Economics Volume Bulletin*, No. 2, No. 1, pp. 1-15.
- Krugman, P. (1987), "Is Free Trade Passe?", *Journal of Economic Perspectives*, Vol. 1, No. 2, pp. 131-144.
- Krugman, P. (1994) *Rethinking International Trade*. London: MIT Press Cambridge.
- Lehmann, D. (2000) "Trade Policy and Its Impacts on Economic Growth: Can Openness Speed up Output Growth?" *Ibero-America Institute for Economic Research Discussion Paper*, No. 75, PP. 1-35.
- Levine, R. (1997), "Financial Development and Economic Growth: Views and Agenda", *Journal of Economic Literature*, Vol. XXXV, pp. 688-726.
- Mayer, J. (1996), "Implication of New Trade and Endogenous Growth Theories for Diversification Policies of Commodity-Dependent Countries", *UNCTAD Discussion Papers*, No. 122, UNCTAD/OSG/DP/122, pp. 1-40.
- Milner, H. and D. Yoffie (1989), "Between Free Trade and Protectionism Strategic Trade Policy and a Theory of Corporate Trade Demands", *International Organization Foundation*, Vol. 43, No. 2, pp. 239-272.
- "Pen World Tables 6.3", (2009), [http://pwt.econ.upenn.edu/php\\_site/pwt\\_index.php](http://pwt.econ.upenn.edu/php_site/pwt_index.php) (Accessed 30<sup>th</sup> July, 2009, 1030 hours).
- Ray, D. (1998), *Development Economics*. Princeton, New Jersey: Princeton University Press.
- Renelt, D. (1991) "Economic Growth: A review of the Theoretical and Empirical Literature", *World Bank Working Papers*, WPS678, pp. 1-47.
- Rodrik, D. (1997), "Trade Policy and Economic Performance in Sub-Saharan Africa", *Harvard University Working Papers*, (Online Paper), Available: <http://ksghome.harvard.edu/~drodrik/tp1.PDF>, (Accessed 22<sup>nd</sup> February 2009, 0800 hours).
- Rodrik, D. (2001), "Development Strategies for the Next Century", *Harvard University Working Papers*, (Online Paper), Available: <http://www.eclac.cl/prensa/noticias/comunicados/6/7616/DaniRodrik29-08.pdf> (Accessed 26<sup>th</sup> October 2009, 0900 hours).
- Rodriguez, F. and D. Rodrik (2000) "Trade Policy and Economic Growth: A Skeptic's Guide to the Cross-National Evidence, *NBER Macroeconomics Annual*, Vol. 15, pp. 261-325.
- Rodriguez, F. (2007), "Openness and Growth: What Have we Learned?", *DESA Working paper*, No. 51, ST/ESA/2007/DWP/51, pp. 1-28.
- Romer, P. (1986), "Increasing Returns and Long-Run Growth", *Journal of Political Economy*, Vol. 94, No. 5, pp. 1002-1037.
- Romer, P. (1990), "Endogenous Technological Change", *Journal of Political Economy*, Vol. 98, No.5, pp. S71-S102.

- Romer, P. (1994), "The Origins of Endogenous Growth", *Journal of Economic Perspectives*, Vol. 8, pp. 3-22.
- Rruka, D. (2004), "Decoding the Effect of Trade Volume and Trade Policies on Economic Growth", *EconWPA Series on International Trade*, No. 0405003, pp. 1-85.
- Sachs, J., A. Warner, A. Aslund and S. Fisher (1995), "Economic Reforms and the Process of Global Integration", *Brookings Papers on Economic Activity*, Vol. 1995, No.1, pp. 1-128.
- Same, A. (2007), "Sub-Saharan Africa Strategy for Sustained Growth to Breakthrough in the 21<sup>st</sup> Century", *The World Bank Institute Working Papers*, No. 42992, pp. 1-65.
- Saure, P. (2005), "Revisiting the Infant Industry Argument", *Journal of Development Economics*, Vol. 84, pp. 104-117.
- Sioum, A. (2002), "Private Investment and Public Policy in Sub-Saharan Africa: An empirical Analysis", *Institute of Social Studies Working Papers*, No. 356, January, pp. 1-55.
- Smith, A. (1776), *An inquiry into the Wealth of Nation*. London: The Electric Book Company Ltd. Elecbook Classics (Accessed 27<sup>th</sup> July 2009, 2100 hours).
- Temple, J. (1999), "The New Growth Evidence", *Journal of Economic Literature*, Vol. XXXVII, March, pp. 112-156.
- United Nations (2008), "The Millennium Development Goals Report" pp. 1-60. United Nations downloads (Online paper), Available: <http://www.un.org/millenniumgoals/pdf/The%20Millennium%20Development%20Goals%20Report%202008.pdf> (Accessed 9<sup>th</sup> September 2009, 1537 hours).
- USAID (2004), "Infant-Industry Protection and Trade Liberalization in Developing Countries", No. PCE-I-00-98-00016-00, pp. 1-39. USAID downloads (Online Paper), Available: <http://www.nathaninc.com/nathan2/files/ccLibraryFiles/FILENAME/000000000003/Infant%20Industries%20Paper%20%28Final%29.pdf> (Accessed 22<sup>nd</sup> September 2009, 0755 hours).
- Vamvakidis, A. (2002), "How Robust is the Growth Openness Connection? Historical Evidence", *Journal of Economic Growth*, Vol. 7, pp. 57-80.
- Wacziarg, R. (1998), "Measuring Dynamic Gains from Trade", *The World Bank Economic Review*, Vol. 15, No. 3, pp. 393-429.
- Wacziarg, R. and K. Welch (2003), "Trade Liberalization and Growth: New Evidence", *National Bureau of Economic Research Working Paper*, No. 10152, pp. 1-90.
- Wooldridge, J. (2009), *Introductory Econometrics: A modern Approach, 4<sup>th</sup> Edition*. Michigan State University: South-Western Cengage Learning.

- World Bank (2009), “Doing Business 2009: Comparing Regulation in 181 Countries”, *A Publication of World Bank and International Monetary Fund*, No. 123408070605, pp. 1-211. The World Bank downloads (Online Report), Available: [http://www.doingbusiness.org/Documents/FullReport/2009/DB\\_2009\\_English.pdf](http://www.doingbusiness.org/Documents/FullReport/2009/DB_2009_English.pdf) (Accessed 23<sup>rd</sup> July 2009, 2000 hours).
- World Bank (2008), *World Development Indicators 2008*. The Hague: *Institute of Social Studies Statistical Database*.
- World Trade Organization, (2008), “The World Trade Report 2008: Trade in Globalizing World”, pp. 1-204. WTO downloads (Online Paper), Available: [http://www.wto.org/english/res\\_e/booksp\\_e/anrep\\_e/world\\_trade\\_report08\\_e.pdf](http://www.wto.org/english/res_e/booksp_e/anrep_e/world_trade_report08_e.pdf) (Accessed 23<sup>rd</sup> July 2009, 1700 hours).
- World Trade Organization, (2009), “The General Agreement on Tariffs and Trade 1947”, pp. 1-145. WTO downloads (Online paper), Available: [http://www.wto.org/english/docs\\_e/legal\\_e/gatt47\\_e.pdf](http://www.wto.org/english/docs_e/legal_e/gatt47_e.pdf) (Accessed 21<sup>st</sup> September 2009, 0832 hours).
- Yanikkaya, H. (2002), “International trade openness and Economic Growth: A Cross-Country Empirical Investigation”, *Journal of Development Economics*, Vol. 72, pp. 57-89.



# Appendices

## Appendix A: Selection Criteria

**Table A1: Selection Criteria for the Countries**

No.	Country	GDP Growth rate 2006	GDP Per Capita 2006	WDI data	EFW data	Penn World Tables	Landlocked
1.	Angola	19	1069	n	n	y	0
2.	Benin	4	324	y	n	y	0
3.	Botswana	2	4423	y	y	y	1
4.	Burkina Faso	6	262	y	n	y	1
5.	Burundi	5	102	y	y	n	1
6.	Cameroon	4	688	y	n	y	0
7.	Cape Verde	6	1393	n	n	y	0
8.	Central African Republic	4	223	y	n	y	1
9.	Chad	0	266	y	n	y	1
10.	Comoros	1	379	n	n	y	0
11.	Congo, Dem. Rep	5	91	y	n	y	0
12.	Congo, Rep	6	1147	y	n	y	0
13.	Côte d'Ivoire	1	555	y	n	y	0
14.	Equatorial Guinea	-6	7470	n	n	y	
15.	Eritrea	-1	160	n	n	y	0
16.	Ethiopia	9	146	n	n	y	1
17.	Gabon	1	4263	y	n	y	0
18.	Gambia	5	320	y	n	y	0
19.	Ghana	6	294	y	y	y	0
20.	Guinea	3	406	n	n	y	0
21.	Guinea-Bissau	4	135	n	n	y	0
22.	Kenya	6	440	y	y	y	0
23.	Lesotho	7	528	y	n	y	1
24.	Liberia	8	134	n	n	n	0
25.	Madagascar	5	238	y	n	y	0
26.	Malawi	7	145	y	y	y	1
27.	Mali	5	290	y	y	y	1
28.	Mauritania	12	483	y	n	y	0
29.	Mauritius	4	4522	y	y	y	0
30.	Mozambique	8	330	n	n	y	0
31.	Namibia	3	2166	n	n	y	0
32.	Niger	5	168	y	n	y	1
33.	Nigeria	5	440	y	y	y	0
34.	Rwanda	5	262	n	n	y	1
35.	Sao Tome and Principe	7	4389	n	n	y	0
36.	Senegal	2	499	y	n	y	0
37.	Seychelles	5	7005	y	n	y	0
38.	Sierra Leone	7	225	y	n	y	0
39.	Somalia	-	463	n	n	n	0
40.	South Africa	5	3562	y	y	y	0
41.	Sudan	12	502	y	n	y	0
42.	Swaziland	2	1401	y	n	y	1
43.	Togo	6	335	n	y	y	0
44.	Uganda	4	240	y	y	y	1
45.	Tanzania	5	275	y	y	y	0
46.	Zambia	6	371	y	y	y	1
47.	Zimbabwe	-	2015	n	n	y	1

Source: Authors construction based WDI, EFW and Penn World Tables data.

\*WDI-World Development Indicators

\*EFW-Economic Freedom of the World

\*y means majority of data available.

\*n means majority of the data absent.

Table A1 above is used to select the countries from SSA to be investigated in this study. Key indicators are economic growth performance and availability of data

from the sources used. In 2006, the economic growth rates are quite high for all the countries except Botswana with 2% economic growth. However Botswana has a higher GDP per capita compared to the other sample countries. The country has been maintained in the sample unlike South Africa due to its exemplary example of a country that grew in a few decades, even though it is landlocked. Mauritius on the other hand is included in the sample because it is an example of free trade zone (or special economic zone). The country has a higher GDP per capita like Botswana. Both the countries were used by Rodrik (1997) as good examples of prosperous countries in SSA and this also informs my selection of the two countries. The rest of the countries have similar per capita GDP.

Data is adequately available for countries whose data is available from all the three sources, the WDI, EFW and PWT respectively. The data for this study has been constructed from all interactively from these sources. For the WDI, the data is readily available for 31 countries; while for EFW data is available for 12 countries and PWT data is available for 45 countries. The countries that meticulously have data from all the sources captioned above are 11 including Botswana, Ghana, Kenya, Malawi, Mali, Mauritius, Nigeria, South Africa, Uganda, Tanzania, and Zambia. South Africa has been left out in order to construct a geographically balanced sample with five landlocked countries and five with coastlines. In addition, South Africa was left out on the basis her unique economic characteristics can pose outlier effects since; overall, the country is at a uniquely higher level of economic prosperity compared to the rest of the countries. Therefore, the rest of the countries were selected as a sample of this study. Table A2 below show the SSA countries classified by Rodrik (1997) as worst and best performers respectively. The table has also provided invaluable information in the selection process of the sample countries.

**Table A2: Worst and Best Performers in Sub-Saharan Africa**

	<i>per-capita income in 1985 dollars</i>							
	1960	1964	1970	1975	1980	1985	1992	1994
<i>Part A: 1994 level of per-capita income lower than in 1960</i>								
ANGOLA	930	1038	1237	800	732	767	699	532
BENIN	1102	1127	1118	1053	1114	1108	956	973
BURUNDI	636	446	324	446	479	526	568	467
CENTRAL AFR.R.	737	711	757	705	709	640	530	529
CHAD	757	748	660	593	527	409	408	391
COTE D'IVOIRE	1130	1449	1615	1821	1794	1520	1102	1004
MADAGASCAR	1197	1118	1148	996	983	769	607	585
MALI	513	413	420	461	533	532	520	489
MOZAMBIQUE	1167	1277	1501	1191	926	761	798	944
NIGER	532	591	806	595	716	559	463	457
RWANDA	540	369	641	641	757	763	757	275
SENEGAL	1148	1232	1147	1124	1134	1162	1120	1061
SOMALIA	857	854	768	797	745	654		
UGANDA	597	610	647	618	534	540	547	586
ZAIRE	510	540	671	637	478	442	308	
ZAMBIA	965	911	1110	1252	955	796	671	638
<i>Part B: 1994 per-capita income greater than 20 percent above the 1960 level</i>								
BOTSWANA	534	609	824	1338	1940	2335	2432	2384
CAMEROON	641	658	804	859	1195	1484	1029	916
CAPE VERDE IS.	471	437	633	482	934	1100	1185	1231
CONGO	1083	1024	1599	1645	1887	2699	2244	1971
ETHIOPIA	257	277	296	306	321	300	279	319
GABON	1693	2335	3710	5683	4739	4122	3517	2905
GUINEA-BISS	502	603	701	770	471	650	647	678
KENYA	636	611	586	837	918	805	952	930
LESOTHO	314	408	419	762	993	977	954	1112
MALAWI	380	369	440	509	554	518	496	473
MAURITIUS	2855	3243	2400	3635	3986	4225	6289	6637
NAMIBIA	2196	2807	3384	3711	3010	2733	2966	2924
NIGERIA	718	764	955	1244	1434	1063	980	954
SEYCHELLES	1257	1402	1664	1847	2905	3185	4229	4347
SOUTH AFRICA	2271	2592	3255	3592	3531	3390	3147	3108
SWAZILAND	1172	1679	2530	2573	3062	2200	2406	2373
TANZANIA	314	366	418	492	468	459	522	521
TOGO	367	443	619	617	730	641	551	497
ZIMBABWE	990	918	1082	1349	1206	1226	1167	1215

Source: Rodrik 1997

## Appendix B: Information on International trade openness and Growth

**Table B1: Description of Variables and Data Sources**

Table BI explains the variables used in this study with their sources.

Variable	Description
GDP per Capita	<i>Annual GDP per capita percentage growth rate at constant prices:</i> this is constructed by dividing the GDP growth and population of the country (World Bank Development Indicators 2008 and Penn World Tables 6.3 2009)
Investment (Inv)	<i>Investment share (% GDP):</i> this includes local investments and FDI establishments in the economy. It is the addition to the fixed assets in the economy which include “land improvements plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings”, (World Bank Development Indicators 2008 and Penn World Tables 6.3 2009)
Domestic credit (fin)	<i>Domestic credit provided by the banking sector (% GDP):</i> This is the credit offered to the all sectors of the economy including trade and investment and not to the government (World Bank Development Indicators 2008).
Industry	<i>Share of Industry (% GDP):</i> Industry includes manufacturing, mining, construction, electricity, water and gas (World Bank Development Indicators 2008).
EFW Trade Policy Index (Policy)	<i>Freedom to trade internationally:</i> This implies the extend countries trade in goods and services. Trade protection through tariffs and non-tariff barriers reduce countries’ freedom to trade. This index measures the degree of openness from lower at 0 to higher at 10 (Fraser Institute EFW reports 2002-08).
Openwb	<i>International Trade Openness</i> is the ratio of exports and imports to GDP, calculated as exports plus imports then divided by GDP (World Bank Development Indicators 2008).
Population	<i>Population growth:</i> This is a country’s growth rate of the population (World Bank Development Indicators 2008).

**Table B2: Business Environment Indicators**

Country	Global aggregate rankings	Procedure to start a Business	Days to start a business	Cost of starting a business (% of GDP per capita)	Minimum capital to start a business (% of GDP per capita)	Documents to export	Days to Export	Cost of Export (US\$ per container)	Documents to import	Days to import	Cost of import (US\$ per container)	Strengths of legal rights (0-10)	Strengths of investor protection index (0-10)	EFW Business regulation index (0-10)
Botswana	38	10	78	2.30	0.00	6	1	2508	9	2	3054	7	6.00	6.17
Ghana	87	9	34	32.70	16.60	6	9	1003	7	9	1130	7	6.00	6.34
Kenya	82	12	30	39.70	0.00	9	9	2055	8	6	2190	10	5.00	5.80
Malawi	134	10	39	125.90	0.00	12	5	1671	10	4	2550	8	5.30	5.19
Mali	166	11	26	121.50	390.40	9	8	2012	11	2	2902	3	3.30	5.21
Mauritius	24	5	6	5.00	0.00	5	7	725	6	6	677	5	7.70	6.60
Nigeria	118	8	31	90.10	0.00	10	5	1179	9	2	1306	8	5.70	4.29
Tanzania	127	12	29	41.50	0.00	5	4	1262	7	1	1475	8	5.00	5.34
Uganda	111	18	25	100.70	0.00	6	9	3090	7	7	3290	7	4.00	5.76
Zambia	100	6	18	28.60	1.50	6	3	2678	9	4	3335	9	5.30	5.30

Source: Doing Business 2009

**Table B3: Economic Freedom Ranking 2006**

Country	Economic Freedom	Global Ranking	Trade Policy Index	Global Rankings
Botswana	6.96	60	6.91	64
Ghana	6.84	66	7.29	41
Kenya	6.96	60	6.61	77
Malawi	5.42	126	4.96	122
Mali	6.13	100	6.25	92
Mauritius	7.26	41	7.38	37
Nigeria	5.88	111	7.22	47
Tanzania	6.47	79	5.93	104
Uganda	6.78	69	6.33	89
Zambia	7.09	51	7.11	57

Source: EFW Report 2008

**Table B4: Landlocked countries and entry Points**

No.	Country	Entry Country
1	Botswana	South Africa, Namibia
2	Malawi	South Africa, Mozambique
3	Mali	Cote d'Ivoire, Togo, Ghana, Senegal
4	Uganda	Kenya
5	Zambia	South Africa, Mozambique, Tanzania

Source: Africa South of the Sahara 2009

## Appendix C: Correlations, Descriptive and Summary Statistics, Tables and Figures

**Table C1: Econometric Tests**

No.	Test		P-Value	What it means
1	Hausman test	X <sup>2</sup> (6): 9.38	0.1534	Random effects model have consistent estimates
2	Wald test	F(10,29)=3.91	0.0019	Variables jointly significant
3	Ramsey RESET test	F(3,25)=1.0	0.4106	Model good; accepted
4	Cameron & Trivedi's IM-Test	X <sup>2</sup> (51.50): 51	0.4539	Accepts Model Assumptions

**Table C2: Data Description**

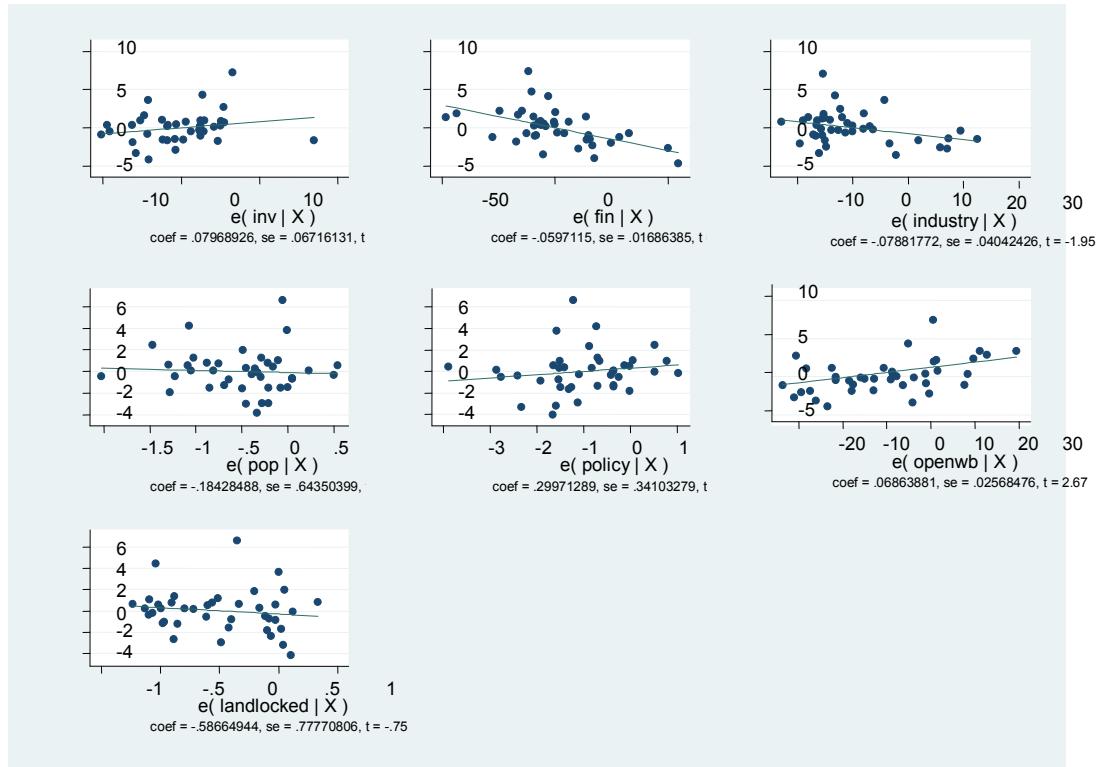
variable name	storage display	type	value format	label	variable label
gdpcapita	float	%9.0g		GDP per capita growth (annual %)	
inv	float	%9.0g		Investment share (% GDP)	
fin	float	%9.0g		Domestic credit provided by banking sector (% of GDP)	
industry	float	%9.0g		Share of industry (% GDP)	
pop	float	%9.0g		Population annual growth (%)	
policy	float	%9.0g		Trade policy measure Index	
openwb	float	%9.0g		World Bank openness index	
landlocked	byte	%8.0g		Landlocked=1, otherwise=0	
gdpcapita	float	%9.0g		GDP per capita growth (annual %)	

**Table C3: Data Summary**

Variable	Obs	Mean	Std. Dev.	Min	Max
gdpcapita	40	1.464617	2.925583	-4.41825	11.36607
inv	40	10.42827	7.061382	2.012	37.053
fin	40	26.56883	24.53397	-40.6339	89.36042
industry	40	26.29461	13.91904	7.944312	57.74829
pop	40	2.696369	.6775365	1.001395	3.752697
policy	40	5.407325	1.425969	1.96	7.479
openwb	40	64.61408	27.94535	18.782	126.7933
landlocked	40	.5	.5063697	0	1

## Appendix D: Relationship between Regressand and Regressors and Kernel Density Curves

Figure D1: Relationships between the Regressand and the Regressors

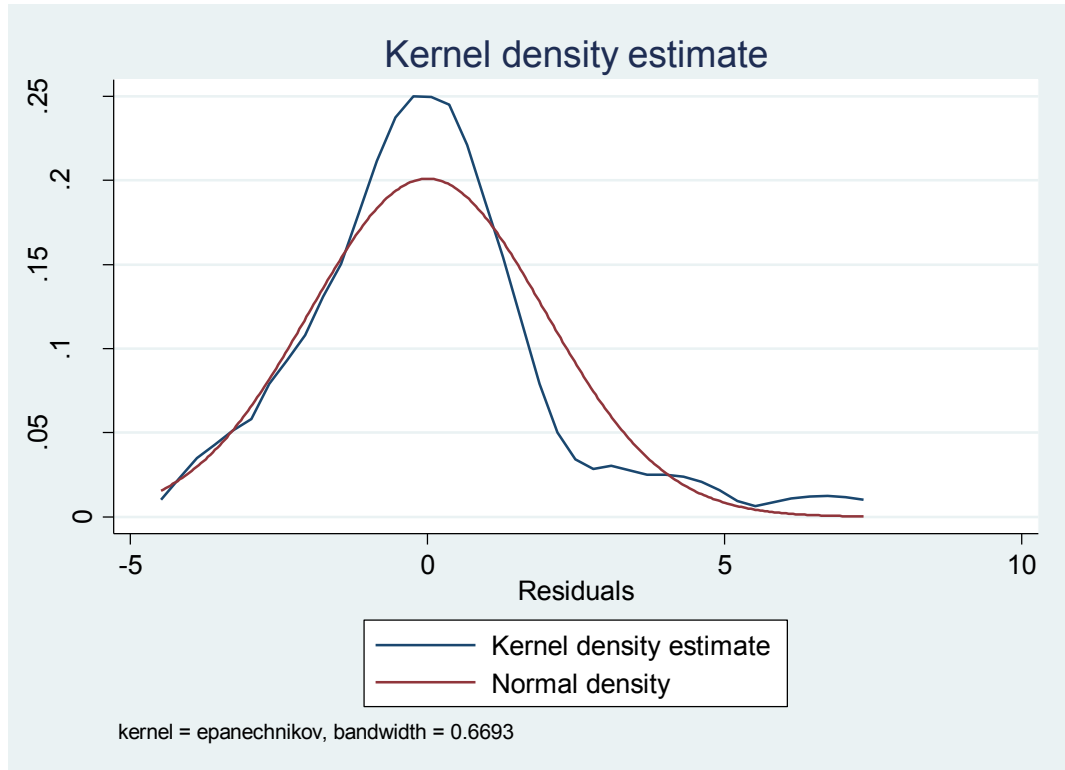


Source: Own construction through econometric regression

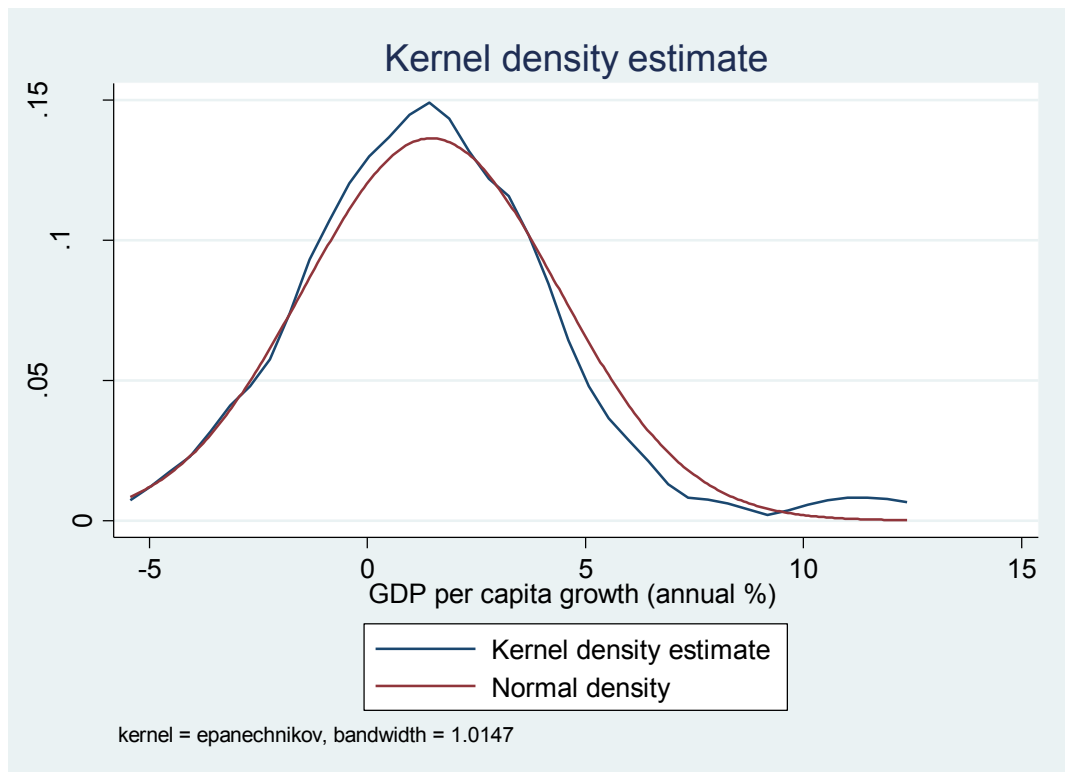
Note: The Y-Axis represents the independent variable (GDP per capita) and X-axis the regressors used in this study.

Figure D2: Kernel Density Estimate

(i) Residuals

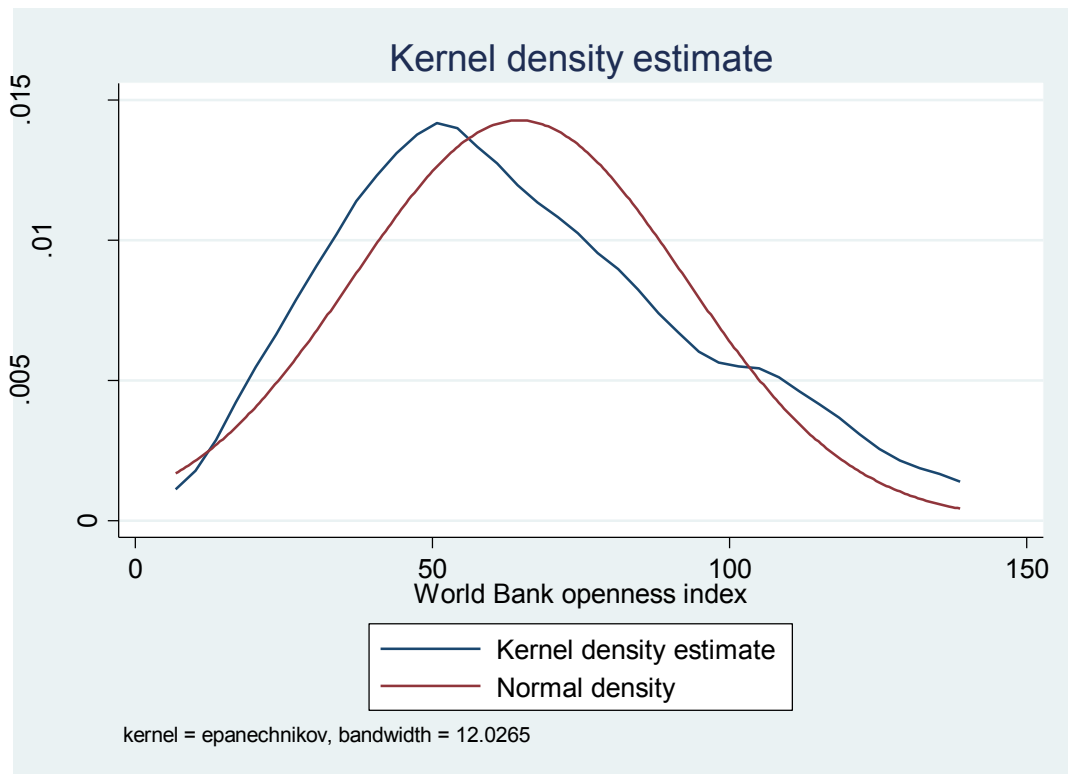


(ii) Growth

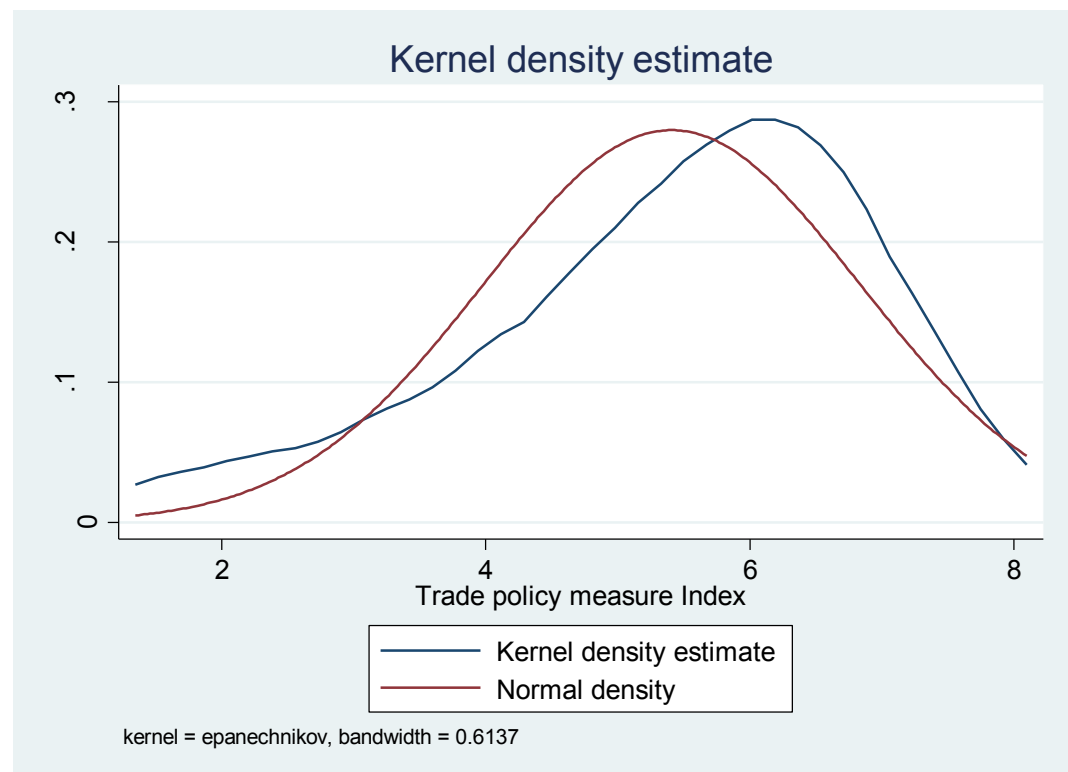




(iii) Trade share of GDP



(iv) Trade Policy Index



## Appendix E: Fixed Effects Regression Estimations

**Table 6: Fixed Effects Estimation: Regressions without lags**

Models	General Model	Trade Policy openness Measure models			Outcome openness Measure models		
	1	2	3	4	5	6	7
VARIABLES	gdpcapita	gdpcapita	gdpcapita	gdpcapita	gdpcapita	gdpcapita	gdpcapita
inv	0.132** (0.0652)	0.0433 (0.0699)	0.066 (0.0845)	-0.518 (0.333)	0.0813 (0.0718)	0.0677 (0.0761)	-0.0692 (0.23)
pop	0.706 (0.734)	0.679 (0.696)	0.237 (0.693)	-0.149 (0.652)	0.683 (0.712)	0.252 (0.636)	0.264 (0.666)
fin			-0.00978 (0.0188)	-0.00645 (0.0189)		-0.0450*** (0.0174)	-0.0349* (0.0197)
industry			-0.0288 (0.0413)	-0.0182 (0.0389)		-0.0804* (0.0427)	-0.0833* (0.0455)
policy		0.941** (0.386)	1.032** (0.42)	0.325 (0.603)			
openwb					0.0315* (0.0191)	0.0767*** (0.0222)	0.0523 (0.0389)
policyinv				0.0989* (0.056)			
openwbinv							0.0019 (0.00279)
Constant	-1.17 (2.281)	-4.151* (2.418)	-2.718 (2.612)	2.058 (3.232)	-2.268 (2.348)	-0.501 (2.323)	0.688 (3.18)
Observations	40	40	40	40	40	40	40
Country dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Heteroskedasticity test, iid	0.2329	0.3536	0.4319	0.4701	0.3006	0.4705	0.3244
Wald Test (X <sup>2</sup> )	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Overall R <sup>2</sup>	0.1731	0.2463	0.0496	0.0905	0.3101	0.2132	0.1521

-\*\*\* Significant at 1% level; \*\* Significant at 5% level; \*Significant at 10% level.

-Standard errors in parentheses.

**Table 7: Fixed Effects Estimation: Regressions with lags**

Models	General Model	Trade Policy openness measure models			Outcome openness measure models		
	1	2	3	4	5	6	7
VARIABLES	gdpcapita	gdpcapita	gdpcapita	gdpcapita	gdpcapita	gdpcapita	gdpcapita
inv	0.00934 (0.0849)	-0.00678 (0.0874)	0.0851 (0.107)	-0.379 (0.539)	0.0212 (0.0933)	0.099 (0.105)	0.0691 (0.107)
pop	1.93 (1.163)	1.588 (1.232)	1.176 (1.254)	0.908 (1.301)	2.021 (1.223)	0.989 (1.331)	0.431 (1.424)
fin			0.0146 (0.0322)	0.0193 (0.033)		0.00429 (0.0336)	-0.00088 (0.0338)
industry			-0.122 (0.0919)	-0.142 (0.0952)		-0.201 (0.126)	-0.163 (0.13)
policy		0.544 (0.61)	0.455 (0.613)	-0.215 (0.981)			
openwb					-0.0152 (0.0421)	0.0447 (0.0571)	0.0456 (0.0568)
policyinv				0.0866 (0.0985)			
openwbinv							0.00194 (0.00182)
Constant	-3.142 (3.212)	-4.399 (3.528)	-1.433 (5.032)	2.743 (6.653)	-2.676 (3.548)	0.482 (4.215)	0.0591 (4.213)
Observations	30	30	30	30	30	30	30
Country dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Heteroskedasticity test, iid	0.2329	0.3536	0.4319	0.4701	0.3006	0.4705	0.3244
Wald Test (X <sup>2</sup> )	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Overall R <sup>2</sup>	0.000	0.0912	0.0366	0.4177	0.1010	0.1414	0.1358

-\*\*\* Significant at 1% level; \*\* Significant at 5% level; \*Significant at 10% level.

-Standard errors in parentheses.